ISLE OF MAN GOVERNMENT
ANNUAL MINERALS MONITORING REPORT
YEAR 2022

(Draft Version 0.9 dated 19th August 2022)

Isle of Man Government
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EXECUTIVE SUMMARY

This is the 11th Annual Mineral Monitoring Report (AMMR 2022) since the original was published in September 2012. It is prepared by Wardell Armstrong published as the official Government statement on minerals, including mineral reserves and need. It is intended to advise the interpretation of need within the Isle of Man Strategic Plan 2016 policies: Minerals Policy 1 and Waste Policy 1.

The data used in this Report is provided from information on primary aggregate sales submitted to Government by the mineral operators and is compiled from half yearly mining lease returns. It covers the period from 1st December 2020 to 30th November 2021.

The AMMR is supported by baseline geological data and historical information contained within the former Department of Economic Development's Minerals Resources Plan 2010.

Primary Aggregate Sales

- The total primary aggregate sales for 2021 (sand & gravel and hard rock) were c. 290,000 tonnes compared to c. 309,500 tonnes in 2020, an overall decrease of 19,500 tonnes from 2020.
- Sand and gravel sales decreased by c. 9,500 tonnes relative to 2020.
- Hard rock aggregate sales decreased by c. 9,950 tonnes compared to 2020.
- During 2021, the Island's hard rock primary aggregate supply was split 52% : 48% between the commercial and government operated quarries.
- Of the c. 91,000 tonnes total sales from government run quarries, c. 70,000 tonnes (77%) were used for Government sources with 20,000 tonnes (23%) sold to the Private sector, of which c, 3,100 tonnes comprised PSV chippings supplied to Colas for use in their own coating plant.
- Sales of Agricultural Lime increased slightly compared to 2020. The Department of Environment, Food and Agriculture (DEFA) have recently announced the introduction of a 'Soil Improvement Scheme' which will make available a 30% subsidy to farmers. Colas anticipate that this could see agricultural lime sales increase to c. 4,000 – 5,000 tonnes per annum.
- Building stone sales continued the downward trend experienced since 2017, with just over 500 tonnes collectively sold from Cringle, Earystane and Pooil Vaaish quarries.

Reserves

- The total planned reserves of sand and gravel as of 30th November 2020 were **c. 1,096,000** tonnes. This represents a significant decrease of 488,250 tonnes due to a re-evaluation of remaining reserves at Ballaharra Quarry by Wardell Armstrong.

- The hard rock planned reserves (all quarries) are c. **4,017,000 tonnes** having been bolstered by the 600,000 tonnes of limestone as a result of the commencement of quarrying in the extension at Billown Quarry.

Landbanks

- As of 30th November 2021, the landbank for Sand & Gravel (based on a 10-year average) stands at **11 years**.

- The equivalent Hard Rock landbank including Government reserves (based on a 10-year average) is **22.5 years**. When Government reserves are excluded, the landbank reduces to **17.5 years**.

- Having given due consideration to the short-term demand of aggregates based on the annual aggregates demand over the past three years, the landbank for Sand & Gravel is also **11 years**.

- The Hard Rock landbank including Government reserves (based on a 3-year average) is **22 years** and **15.5 years** when Government reserves are excluded.

Key conclusions

- A reappraisal of the sand deposits at Ballaharra Quarry (as a consequence of observations at the quarry) has resulted in a significant reduction in the planned sand reserves. It is anticipated that a planning application for an extension to the quarry will need to be submitted within the next 12 – 18 months to ensure continuity of supply.

- At the Point of Ayre Quarry the proportion of gravel within the remaining mineral reserves is decreasing. The operator, Island Aggregates, has to increase production in order to maintain an adequate supply of gravel to meet customer demand. This means the reserves are being depleted at a faster rate and so it is anticipated that a planning application to extend the operation will be required in the next 5 years.

- Since AMMR 2021, Colas have commenced quarrying in the extension area which ensures the continuity of the supply of graded and bitumen affinity aggregates from the private sector for approximately 10 years.

- A updated reserve/resource assessment for Poortown Quarry is nearing completion which will give clarity as to the current landbank of PSV aggregates.

1 PRIMARY MINERAL SALES

1.1 All mineral operators provide information on the actual tonnage of primary mineral sold (in the form of sand and gravel, crushed rock and building stone between 1ST December 2020 and 30TH November 2021). This information is provided on official royalty statements to the Department of Environment, Food and Agriculture (DEFA) .

1.2 Data on quarry and ancillary mineral extraction is available dating back to 1993 which has been used to calculate the rolling 10-year averages of sand and gravel (S&G) and hard rock (HR) (see Section 5 - Forecast Need for Minerals).

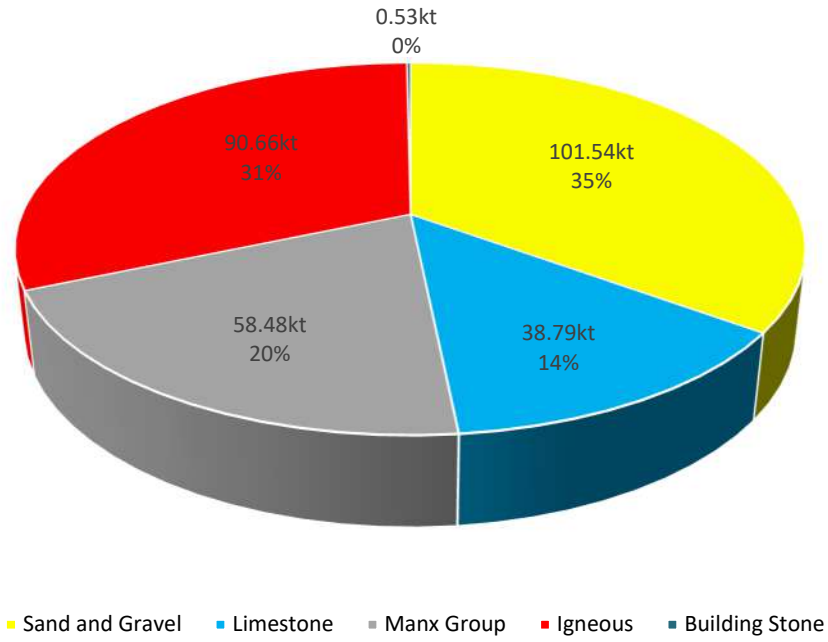
Table 1: Summary of Primary Aggregate & Building Stone Sales 2019 – 2021

		2019	2020	2021
Mineral Type	Mineral Operation	Tonnes ('000)	Tonnes ('000)	Tonnes ('000)
Sand & Gravel	Ballaharra Sand Pit	7.41	8.55	9.26
	Point of Ayre	83.38	102.52	92.28
Limestone	Billown Quarry	51.81	48.60	38.79
	Pooil Vaaish Quarry (CR)	0.00	0.00	0.00
	Pooil Vaaish Quarry (BS)	0.06	0.10	0.19
Manx Formation	Cringle Quarry (CR)	31.60	51.71	53.98
	Cringle Quarry (BS)	0.51	0.57	0.05
	Earystane Quarry (CR)	2.39	11.51	4.50
	Earystane Quarry (BS	0.20	0.30	0.29
Igneous	Poortown Quarry (CR-G)	20.92	42.33	49.44
	Poortown Quarry (CR-P)	40.71	16.77	17.13
	Stoney Mountain Quarry (CR-G)	12.80	23.94	20.84
	Stoney Mountain Quarry (CR-P)	9.57	2.58	3.25
	TOTAL	**261.36**	**309.48**	**290.00**

Key:

CR: Crushed Rock
BS: Building Stone
CR-G: Crushed Rock – Sales to Government
CR-P: Crushed Rock – Sales to Private Sector

Figure 1: Sales of Primary Aggregate in 2021



Primary Mineral Extraction by Mineral Type: Sand and Gravel; Limestone; Manx Group; Igneous

Table 2: Total Sales as Primary Aggregate 2012 – 2021 *('000 tonnes)*

Mineral Type	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	10 Year Ave.
Sand & Gravel	101.8	94.66	98.80	101.01	116.99	108.13	92.41	90.79	111.07	101.54	101.72
Limestone	72.74	57.86	51.84	57.87	50.06	48.87	40.25	51.81	48.60	38.79	51.87
Manx Group	22.91	15.35	24.29	34.24	26.95	37.28	34.62	34.00	63.22	58.49	35.14
Igneous	89.17	110.26	100.45	93.23	91.67	85.69	84.43	84.04	85.62	90.65	91.52
TOTAL	**286.62**	**278.13**	**275.38**	**286.35**	**285.67**	**279.97**	**251.71**	**260.64**	**308.51**	**289.47**	**280.25**

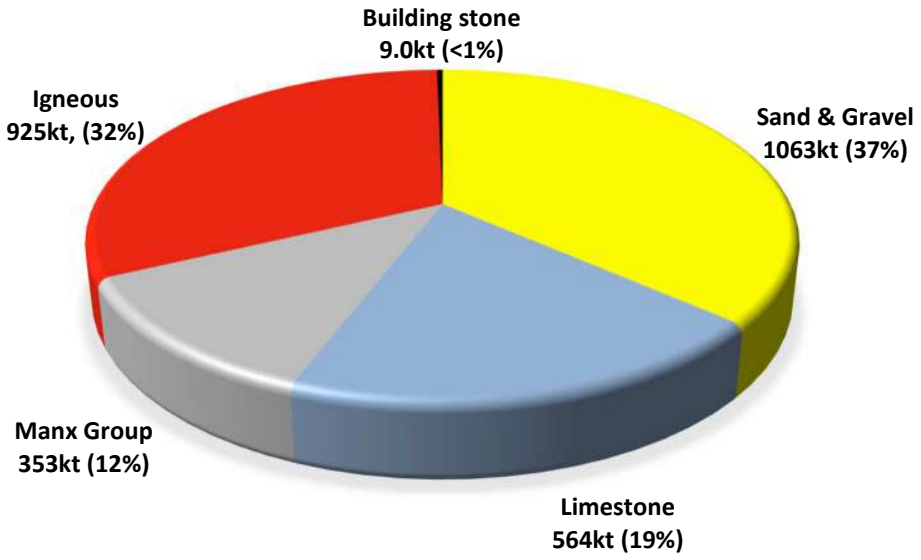
Table 3: Total Sales as Building Stone 2012 – 2021 *('000 tonnes)*

Mineral Type	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	10 Year Ave.
Limestone	0.12	0.06	0.00	0.00	0.00	0.04	0.06	0.06	0.10	0.19	0.06
Manx Group	0.66	0.65	0.40	0.72	0.99	1.53	1.23	0.71	0.87	0.34	0.81
TOTAL	**0.78**	**0.71**	**0.40**	**0.72**	**0.99**	**1.57**	**1.28**	**0.77**	**0.97**	**0.53**	**0.87**

Table 4: Total Sales Primary Agg & Building Stone 2012 – 2021 *('000 tonnes)*

Mineral Type	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	10 Year Ave.
Primary Agg	286.62	278.13	275.38	286.35	285.67	279.97	251.71	260.64	308.51	289.47	280.25
Building St.	0.78	0.71	0.4	0.72	0.99	1.57	1.28	0.77	0.97	0.53	0.87
TOTAL	**287.4**	**278.84**	**275.78**	**287.07**	**286.66**	**281.54**	**252.99**	**261.41**	**309.48**	**290.00**	**281.12**

Figure 2: Total 10 Year Sales of Primary Aggregate and Building Stone (tonnes) 2012-2021



2 END USE OF EXTRACTED MINERALS

2.1 Extracted minerals can be processed into aggregate products which are suitable for a variety of end uses. The range of potential aggregate end uses is, in general, determined by the mineralogy of the S&G and HR.

2.2 Data on mineral end-use over time can, where available, provide a useful indication of the demand for specific mineral products on Island. While at the strategic level forecasting the need for S&G and HR is based on a ten-year average annual sales, a more detailed interpretation of product end-use can advise the assessment of individual mineral planning applications.

2.3 For analysis purposes, the demand for minerals has been subdivided into the following categories:

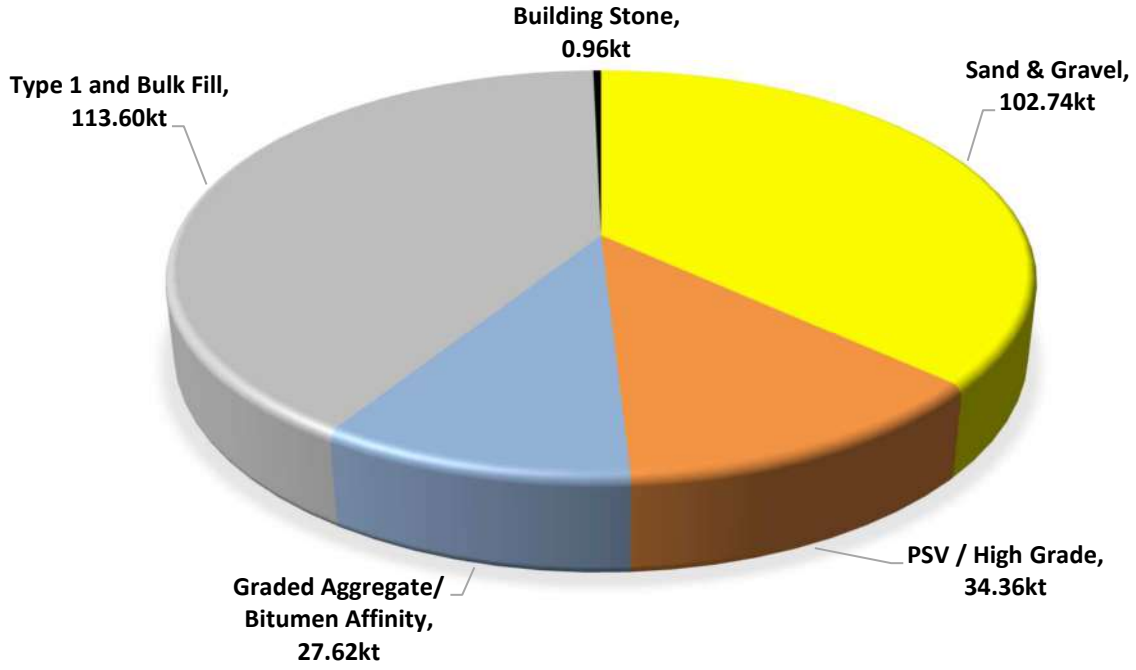
- Sand and Gravel
- Polished Stone Value (PSV) / High grade aggregates
- Graded aggregates / bitumen affinity
- Type 1 and Bulk Fill
- Building and Dimension stone

2.4 Table 5 below illustrates the variations in product categories over the past 7 years.

Table 5: Aggregate Sales by Subcategories 2015 – 2021 *('000 tonnes)*

Product Category	2015	2016	2017	2018	2019	2020	2021	Total	7yr Ave.
Sand & Gravel	101.01	116.99	108.12	92.41	90.79	111.07	101.54	**719.19**	102.74
PSV / High Grade	25.11	32.06	28.76	32.21	40.58	44.68	45.00*	**240.51**	34.36
Graded Aggregate/ Bitumen Affinity	34.53	27.59	20.94	19.42	31.68	28.95	19.40*	**193.33**	27.62
Type 1 and Bulk Fill	125.70	109.03	122.15	107.66	97.59	123.81	123.53*	**795.19**	113.60
Building Stone	0.72	0.99	1.57	1.28	0.77	0.97	0.53	**6.70**	0.96
TOTAL	**287.07**	**286.66**	**281.54**	**252.98**	**261.41**	**309.48**	**290.00**	**1955.00**	279.27
* Estimated figures									

Figure 3: Percentile Summary of Aggregate Sales by Sub Categories (7-year average 2015 - 2021)



2.5 AGRICULTURAL LIME

2.5.1 All agricultural land used for crop production requires the soil to have a pH in the region of 5.8 to 6.2 to maintain good levels of production and ensure that any fertilisers applied are utilised efficiently. The majority of the Island's soils are acidic and therefore require the periodic application of lime to increase and/or maintain pH.

2.5.2 Sources of lime used on the Island commonly includes crushed limestone and imported pelletised lime. Historically, crushed limestone has also been imported. The sole source of indigenous agricultural lime is Billown Quarry, operated by Colas.

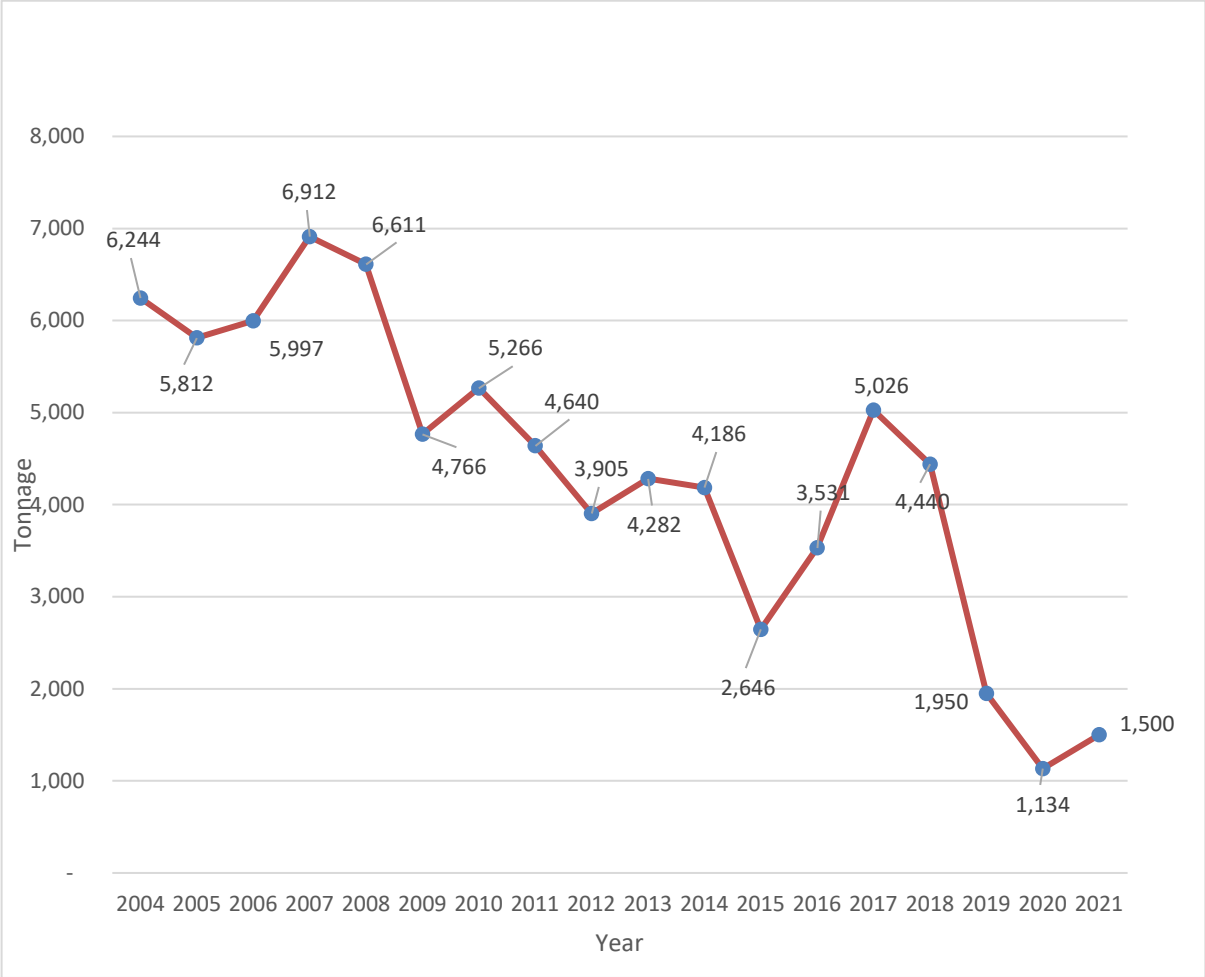
2.5.3 Limestone that is used for agricultural purposes is not classified as an 'aggregate' for the purposes of forecasting need for Hard Rock. Furthermore, as the agricultural lime tonnage is minimal in comparison with total aggregate sales it has not been allocated a product category in Table 5 and Figure 3 above but is included in the limestone sales.

2.5.4 The Department has not received factual written data from Colas concerning the level of agricultural lime sales in 2021 but Colas have verbally indicated sales were c. 1,500 tonnes.

2.5.5 DEFA have recently announced the introduction of the 'Agri-Environmental Initiatives Scheme' which was approved in May 2022 and will make available a 50% subsidy to farmers. Colas

anticipate that this could see agricultural lime sales increase to c. 4,000 – 5,000 tonnes per annum.

Figure 4: Agricultural Lime Production 2004 – 2021 (Billown Quarry)



3 MINERAL RESERVES

3.1 Introduction

3.1.1 A mineral reserve is the tonnage of mineral that is permitted to be extracted from a mineral operation which has a valid planning permission. The respective mineral reserves have been calculated for each existing mineral operation. The mechanism for determining mineral reserves is based on two options:

a) any re-assessment of reserves carried out by the mineral operator; or
b) assessment of reserves based on the total tonnage of minerals permitted to be extracted by an approved planning permission and adjusted by deducting the total tonnage of sales between the date of activation of the planning permission and 30 November 2021.

3.1.2 The reserve calculations have been undertaken by DEFA which collates information on annual mineral sales as part of the licencing of mineral extraction and collection of mineral royalties. The following mineral reserves reflect the situation at each mineral operation as at 30 November 2021.

3.2 Sand and Gravel Reserves

TABLE 6: Sand and Gravel Reserves on 30th November 2021

Operation	2018 Tonnes	2019 Tonnes	2020 Tonnes	2021 Tonnes
Point of Ayre	1,314,500	1,231,000	1,128,500[1]	1,036,000[1]
Ballaharra Sand Pit	494,200	486,800	478,250	80,000[2]
TOTAL	**1,808,700**	**1,717,800**	**1,606,750[1]**	**1,116,000[2]**

Notes:
1 Includes the silt content in the reserve
2 Re-evaluation of Sand Reserves by Wardell Armstrong/Corletts (August 2021)

3.2.1 This latest edition of the AMMR estimates the proportion of sand and gravel making up the Island's permitted reserves at each operation.

Ballaharra Sand Pit

3.2.2 The proportion of gravel contained within the deposits has historically been very low and inconsistent. For the purpose of this estimate, the reserve is assumed to comprise 100% sand, i.e. 80,000 tonnes. Ballaharra sand has the properties to produce a building sand, concreting sand, equestrian sand, pavior bedding sand and kiln dried pavior jointing sand. Any gravel is processed to produce 6mm and 14mm aggregate.

3.2.3 In the past 12 months, sand extraction has exposed underlying glacial boulder clay which indicates that the remaining sand reserves become thinner as the excavations progress to the north. A reappraisal of the sand reserves based upon observations within the workings and

historical boreholes has resulted in a significant reduction of the remaining reserves from 478,250 tonnes to 80,000 tonnes. It is anticipated that a planning application for an extension to the quarry will need to be submitted within the next 12 – 18 months to ensure continuity of supply.

Point of Ayre

3.2.4 Evidence from previous site exploration indicates that the reserves comprise 46% gravel, 52% sand and 2% silt[1]. Therefore, of the remaining reserve, the quantities comprises approximately 476,600 tonnes of gravel, 538,700 tonnes of sand and 20,700 tonnes of silt.

3.2.5 Once the clay and silt has been removed, the sand at Point of Ayre can be processed to produce a 0/2mm Building Sand, 0/4mm concrete sand, 0/6mm grit sand, sport turf sand and top dressing sand. The gravel content is crushed and screened to produce 4/10mm chippings, 10/20mm chippings as well as a 20mm sand and gravel mix and a 4/20mm gravel mix.

3.3 Sand & Gravel Reserve Summary

Operation	Sand	Gravel	Total
Ballaharra Remaining reserves Annual Sales (10 year average) Remaining life of reserve	 80,000 10,600 c. 7.5 years	 0	 80,000
Point of Ayre Remaining reserves Annual Sales (10 year average) Remaining life of reserve	 538,700 41,200 c. 13.1 years	 476,600 48,500 c. 9.8 years	 1,015,300
TOTAL			**1,095,300[1]**
Notes: 1. Excluding silt/clay content in Point of Ayre reserves			

[1] Mineral Resources Plan 2010

3.4 HARD ROCK Reserves

TABLE 7: Hard Rock Reserves on 30th November 2021

		2018	2019	2020	2021
Mineral	**Operation**	**Tonnes**	**Tonnes**	**Tonnes**	**Tonnes**
Limestone	Billown Quarry	39,000	50,000	55,000	616,000[1]
	Pooil Vaaish Quarry	99,584	99,500	99,400	99,000
Manx Group	Cringle Quarry	1,050,781	820,000	767,700	714,000
	Earystane Quarry	129,444	127,000	115,200	110,000
Igneous	Poortown Quarry	562,881	501,000	441,800	375,000[2]
	Stoney Mountain Quarry	2,175,982	2,154,000	2,127,500	2,103,000
TOTAL		**4,057,672**	**3,751,500**	**3,606,600**	**4,017,000**

Notes.

1. Reserve increased by 600,000 tonnes due to the quarry extension approved under planning permission ref. 18/0161/B dated 9th August 2018.

2. Provisional figure, remaining reserves currently being assessed.

4 FORECAST NEED FOR MINERALS, AND REVIEW OF MINERAL PRODUCTION

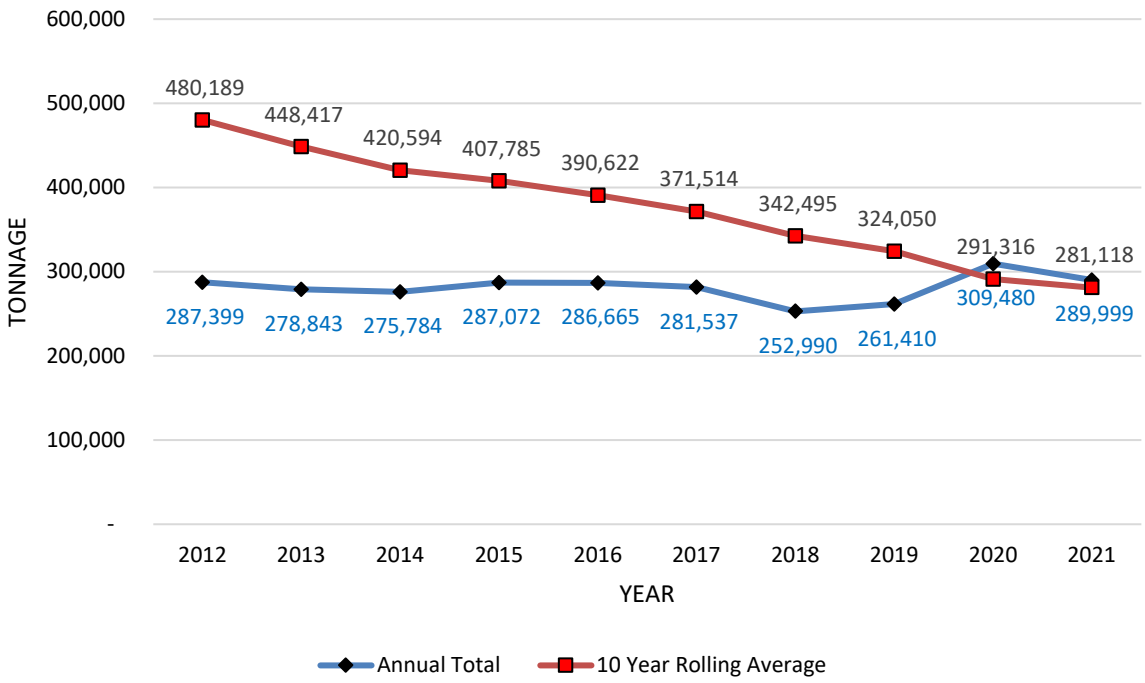
4.1 Introduction

4.1.1 Key for business planning in the minerals industry is certainty about the availability of reserves. Forecasting need for minerals based on changes in measures of economic activity (e.g. GDP) has historically proven to be unreliable. Using a 10-year rolling average of annual aggregate sales from all quarries to forecast the future 12 months' minerals need is considered the most accurate method. This mitigates the potential of a one-off major infrastructure construction project to skew average aggregate demand.

4.1.2 Figure 5 below compares the actual annual primary aggregate sales of sand & gravel and hard rock (blue line) against the rolling 10-year annual aggregates demand (red line) since 2012.

4.1.3 The gap between forecast (10 yr. rolling average) and actual tonnage sales has continually narrowed over the past 10 years. In 2020, the annual sales and rolling 10 year average have crossed over and there is now correlation between these two data sets.

Figure 5: Comparison of Actual Aggregate Sales with Forecast Aggregate Sales Based on a 10-year rolling average



4.2 Forecast of Aggregate Need in 2022

4.2.1 The AMMR reports on mineral sales and reserves for all quarries on the Island. On the Isle of Man, the Government owns and operates two hard rock quarries, namely Poortown Quarry and Stoney Mountain Quarry. This is to ensure that the Island can meet its national need for highest grade aggregate and rock for Government infrastructure works.

4.2.2 The majority of the high-quality aggregate produced from Poortown and the granite from Stoney Mountain is utilised by Government. However lower quality mineral from both Poortown and Stoney Mountain is supplied to the commercial sector which includes certain mineral operators. In seeking to reflect the situation the AMMR currently reports the aggregate data including and excluding Government sales and reserves. It is acknowledged however that removing Government reserves entirely from the calculation of the Hard Rock landbank does not accurately represent the availability of aggregate to the commercial market.

4.3 Sand and Gravel

4.3.1 The forecast of the requirement for sand and gravel is based upon the average tonnage over the previous 10 years.

Table 8: Forecast of Need for Sand and Gravel in 2022 (10 years)

2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	10 Year Total Tonnes ('000)	10 Year Ave. Tonnes ('000)
101.8	94.7	98.8	101.0	117.0	108.1	92.4	90.8	111.1	101.5	**1017.2**	**101.7**

4.3.2 The annual sand and gravel requirement for 2022 using the 10-year aggregate forecast is c.**102,000 tonnes**. This represents a decrease of 4,600 tonnes compared to the c. 106,000 tonnes forecast for 2020.

Table 9: Forecast of Need for Sand and Gravel in 2022 (3 years)

2019	2020	2021	3 Year Total Tonnes ('000)	3 Year Ave. Tonnes ('000)
90.8	111.1	101.5	**303.4**	**101.1**

4.3.3 The annual sand and gravel requirement for 2022 using the 3-year aggregate forecast is c.**101,000 tonnes**. This represents an increase of 3,000 tonnes compared to the 98,000 tonnes forecast for 2021.

4.4 Hard Rock (aggregate/building stone)

4.4.1 Hard Rock (HR) quarries are operated on Island by both the commercial sector and by Government. To reflect how this impacts on commercial need for, and availability of, aggregate, the AMMR reports the aggregate data in a number of formats, including and excluding Government sales and reserves.

4.4.2 The forecast of the requirement for hard rock is also based upon the average tonnage over the previous 10 years.

Option A All Sales from all Hard Rock quarries

4.4.3 Based on a 10-year rolling average of annual aggregate/building stone sales from **all HR quarries,** including all sales (to private and commercial sectors) from Poortown (PT) and Stoney Mountain (SM) quarries.

Table 10: Forecast of Need – HR 2022 - All HR Quarries (10 years)

Mineral Type	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	10 Year Total Tonnes ('000)	10 Year Ave. Tonnes ('000)
Limestone	72.8	57.9	51.8	57.9	50.1	48.9	40.3	51.9	48.7	39.0	519.3	51.9
Manx Group	23.6	16.0	24.7	35.0	27.9	38.8	35.9	34.8	64.1	58.8	359.6	36.0
Igneous	89.2	110.3	100.4	93.2	91.7	85.7	84.4	84.0	85.7	90.7	915.3	91.5
TOTAL	**185.6**	**184.2**	**176.9**	**186.1**	**169.7**	**173.4**	**160.6**	**170.7**	**198.5**	**188.5**	**1794.2**	**179.40**

4.4.4 The total HR requirement for 2022 (based on all HR sales) using the 10-year aggregate forecast is **c.179,000 tonnes**. This represents a decrease of c. 6,000 tonnes compared to the 185,000 tonnes forecast for 2021.

Table 11: Forecast of Need – HR 2022 - All HR Quarries (3 years)

Mineral Type	2019	2020	2021	3 Year Total Tonnes ('000)	3 Year Ave. Tonnes ('000)
Limestone	51.9	48.7	39.0	139.4	46.5
Manx Group	34.8	64.1	58.8	157.7	52.6
Igneous	84.0	85.7	90.7	260.4	86.8
TOTAL	**170.7**	**198.5**	**188.5**	**557.5**	**185.9**

4.4.5 The total HR requirement for 2022 (based on all HR sales) using the 3-year aggregate forecast is **c.186,000 tonnes**. This represents an increase of 9,000 tonnes compared to the 177,000 tonnes forecast for 2021.

Option B Excluding All Sales from Poortown and Stoney Mountain Quarries

4.4.6 Based on a 10-year rolling average of annual aggregate/building stone sales from all HR quarries but excluding **all** sales from Poortown and Stoney Mountain quarries.

Table 12: Forecast of Need – HR in 2022 Excluding all sales from PT and SM (10 years)

Mineral Type	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	10 Year Total Tonnes ('000)	10 Year Ave. Tonnes ('000)
Limestone	72.8	57.9	51.8	57.9	50.1	48.9	40.3	51.9	48.7	39.0	519.3	51.9
Manx	23.6	16.0	24.7	35.0	27.9	38.8	35.9	34.8	64.1	58.8	359.6	36.0
TOTAL	**96.4**	**73.9**	**76.5**	**92.9**	**78.0**	**87.7**	**76.2**	**86.7**	**112.8**	**97.8**	**878.9**	**87.9**

4.4.7 The total HR requirement for 2022 (excluding sales from Poortown and Stoney Mountain) using the 10-year aggregate forecast is **c.88,000 tonnes**. This represents an decrease of 4,000 tonnes compared to the c. 92,000 tonnes forecast for 2020.

Table 13: Forecast of Need - HR in 2022 Excluding all sales from PT and SM (3 years)

Mineral Type	2019	2020	2021	3 Year Total Tonnes ('000)	3 Year Ave. Tonnes ('000)
Limestone	51.9	48.7	39.0	139.6	46.5
Manx Group	34.8	64.1	58.8	157.7	52.6
TOTAL	**86.7**	**112.8**	**97.8**	**297.3**	**99.1**

4.4.8 The total HR requirement for 2022 (excluding sales from Poortown and Stoney Mountain) using the 3-year aggregate forecast is **c. 99,000 tonnes**. This represents an increase of 7,000 tonnes compared to the 92,000 tonnes forecast for 2020.

Option C All Sales from All HR quarries excluding Poortown Quarry

4.4.9 Based on a 10-year rolling average of annual aggregate/building stone sales from **all HR quarries** including Stoney Mountain Quarry but excluding all sales (to private and commercial sectors) from Poortown (PT).

Table 14: Forecast of Need – HR 2022 - All HR Quarries excluding Poortown (10 years)

Mineral Type	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	10 Year Total Tonnes ('000)	10 Year Ave. Tonnes ('000)
Limestone	72.8	57.9	51.8	57.9	50.1	48.9	40.3	51.9	48.7	39.0	519.3	51.9
Manx Group	23.6	16.0	24.7	35.0	27.9	38.8	35.9	34.8	64.1	58.8	359.6	36.0
Igneous - SM	28.4	33.7	22.4	16.4	17.1	18.1	23.0	22.4	26.5	24.1	232.1	23.2
TOTAL	**124.8**	**107.6**	**98.9**	**109.3**	**95.1**	**105.8**	**99.2**	**109.1**	**139.3**	**121.9**	**1,111.0**	**111.1**

4.4.10 The total HR requirement for 2022 (based on all HR sales excluding Poortown Quarry) using the 10-year aggregate forecast is **c.111,000 tonnes**. This represents a decrease of 5,000 tonnes compared to the 116,000 tonnes forecast for 2021.

Table 15: Forecast of Need – HR 2022 - All HR Quarries excluding Poortown (3 years)

Mineral Type	2019	2020	2021	3 Year Total Tonnes ('000)	3 Year Ave. Tonnes ('000)
Limestone	51.9	48.7	38.8	139.4	46.5
Manx Group	34.8	64.1	58.8	157.7	52.6
Igneous - SM	22.4	26.5	24.1	73.0	24.3
TOTAL	**109.1**	**139.3**	**121.9**	**370.3**	**123.4**

4.4.11 The total HR requirement for 2022 (based on all HR sales excluding Poortown Quarry) using the 3-year aggregate forecast is **c.123,000 tonnes**. This represents an increase of c.6,000 tonnes compared to the 116,000 tonnes forecast for 2021.

Table 16 Summary of Aggregate Need in 2022

4.4.12 The annual forecasts in the table below have been rounded to the nearest thousand tonne.

Forecast annual need from:	Annual tonnage based on 10 years average sales	Annual Tonnage based on 3 years average sales
Sand & Gravel quarries	**102,000**	**101,000**
Hard Rock quarries – all	**179,000**	**186,000**
Hard Rock quarries – excluding Government Quarries	**88,000**	**99,000**
Hard Rock quarries – excluding Poortown Quarry	**111,000**	**123,000**

5 LANDBANKS

5.1 Introduction

5.1.1 A mineral landbank is defined as the stock of permitted reserves that have a valid planning permission. Landbanks are needed to ensure a continuous supply of minerals. Conventional advice is that minimum length of the landbank should reflect the time needed to obtain planning permission and bring the operations into full production. The landbank required for both HR and S&G is set at 10 years as agreed by the MSATPG.

5.1.2 It is acknowledged that landbanks are only an indication of the availability of minerals. The interpretation and management of landbanks should be based on considerations of real need and real supply taking into account factors such as:

- the nature and quality of the aggregate which may change within a quarry and over time;
- known constraints on the availability of consented reserves that might limit output over the landbank period;
- significant future increases in demand that can be forecast with reasonable certainty.

5.1.3 Whilst the hard rock landbank may indicate a sufficient amount of reserves remaining without the need for new planning applications to replenish depleted reserves, **this may mask a situation where a shortfall in the availability of certain minerals**, e.g. graded aggregates/bitumen affinity products.

5.2 Classification

5.2.1 The standard protocol adopted by Aggregate Working Parties across the UK for classifying landbanks is by the two main mineral types HR and S&G. There is some sub-classification but this is for minerals with a specialised end use e.g. silica sand.

5.2.2 The option of sub-dividing the reserves of these two main mineral types was considered. For example, HR reserves could be sub-divided into high grade aggregate (PSV/ bitumen affinity), Type 1/graded aggregate, and building stone. However, the option was discounted as being both impracticable and imprecise. A HR reserve may produce a range of aggregate types due to local variations in mineralogy, weathering along faults lines, intrusions or bedding planes. Reserves can also be processed into a range of products according to demand. The landbanks for both sand and gravel and hard rock on the Island are calculated as follows:

$$\text{Landbank} = \frac{\text{Total Mineral reserves remaining}}{\text{Average 10 year (or 3 year) annual mineral production}}$$

5.3 2022 Landbank Assessments (as at 30th November 2021)

Sand and Gravel Landbank – 10 Year

Sand and Gravel Landbank of permitted reserves	=	1,095,000 tonnes[1]	
10-year forecast of annual production	=	102,000 tonnes	
Landbank Requirement (10 years)	=	1,020,000 tonnes	(i.e. 102,000 tonnes x 10 years)
Status of Landbank	=	75,000 tonnes	(SURPLUS)
S&G Landbank	=	**10.7 Years**	(i.e. 1,095,000 ÷ 102,000)

Notes
1. Excludes the silt content contained in the Point of Ayre reserve

Sand and Gravel Landbank – 3 years

Sand and Gravel Landbank of permitted reserves	=	1,095,000 tonnes[1]	
3-year forecast of annual production	=	101,000 tonnes	
Landbank Requirement (3 years)	=	1,010,000 tonnes	(i.e. 101,000 tonnes x 10 years)
Status of Landbank	=	85,000 tonnes	(SURPLUS)
S&G Landbank	=	**c.10.8 Years**	(i.e. 1,095,000 ÷ 101,000)

Notes
1. Excludes the silt content contained in the Point of Ayre reserve

5.4 Observations

5.4.1 The sand and gravel landbank figure of 1,095,000 tonnes assumes the sand and gravel to be of equal proportion. However, this is not the situation in reality. On the basis that the mineral reserves at Ballaharra are effectively 100% sand, this means the Island's permitted gravel reserves are located entirely at the Point of Ayre. This latest version of the AMMR estimates there to be approximately 477,000 tonnes is gravel at Point of Ayre, effectively 44% of the total sand and gravel landbank.

5.4.2 Because the proportion of sand and gravel can vary significantly throughout the Point of Ayre deposit, it is necessary for the operator to extract a higher tonnage of mineral per annum in order to generate sufficient quantity of gravel aggregate to meet the annual demand of say 50,000 tonnes. Consequently, at this rate, the Island's permitted gravel reserves could be depleted in around 9.5 years.

5.4.3 To ensure continuity of aggregate supply, a lead in time of say 5 years to secure a new planning permission for an extension to the Point of Ayre Quarry would not be considered unreasonable.

This allows sufficient time to complete the various environmental surveys, prepare a planning application and Environmental Statement, determination and possible public inquiry.

5.4.4 **Hence, a planning application at Point of Ayre may be necessary within the next 4 – 5 years, if not sooner, in order to secure continuity of gravel supply.**

5.5 Hard Rock

5.5.1 Hard rock quarries are operated on Island by both the commercial sector, i.e. Billown, Cringle, Earystane, Pooil Vaaish, and by Government, i.e. Poortown and Stoney Mountain.

5.5.2 To reflect how this impacts on commercial need for, and availability of, aggregate, the AMMR reports aggregate data including and excluding Government sales and reserves subdivided into Options A, B and C, where:

- Option A: Island Hard Rock Landbank (including all hard rock reserves);
- Option B: Hard Rock Landbank excluding Government reserves; and
- Option C: Hard Rock Landbank excluding Poortown reserves.

5.5.3 Each of the above options are assessed based on the average 10 year demand and 3 year demand.

Option A1: Island hard rock Landbank (10 year average sales)

Hard Rock Landbank of permitted reserves	=	4,017,000 tonnes	
10-year forecast of annual production	=	179,000 tonnes	
Landbank Requirement	=	1,790,000 tonnes	(i.e. 179,000 tonnes x 10 years)
Status of Landbank	=	2,227,000 tonnes	**(SURPLUS)**
Hard Rock Landbank – all quarries	=	**22.5 Years**	(i.e. 4,017,000t ÷ 179,000t)

Option A2: Island hard rock Landbank (3 year average sales)

Hard Rock Landbank of permitted reserves	=	4,017,000 tonnes	
3-year forecast of annual production	=	186,000 tonnes	
Landbank Requirement	=	1,860,000 tonnes	(i.e. 186,000 tonnes x 10 years)
Status of Landbank	=	2,157,000 tonnes	**(SURPLUS)**
Hard Rock Landbank – all quarries	=	**21.6 Years**	(i.e. 4,017,000 ÷ 186,000t)

Option B: Hard Rock Landbank excluding reserves and sales for Poortown & Stoney Mountain -10 Year

Hard Rock Landbank of permitted reserves	=	1,539,000 tonnes	
10-year forecast of annual production	=	88,000 tonnes	
Landbank Requirement	=	880,000 tonnes	(i.e. 88,000 tonnes x 10 years)
Status of Landbank	=	659,000 tonnes	**(SURPLUS)**
Hard Rock Landbank excl PT & SM	=	**17.5 Years**	(i.e. 1,539,000t ÷ 88,000t)

Option B: Hard Rock Landbank excluding reserves and sales for Poortown & Stoney Mountain – 3 year

Hard Rock Landbank of permitted reserves	=	1,539,000 tonnes	
3-year forecast of annual production	=	99,000 tonnes	
Landbank Requirement	=	990,000 tonnes	(i.e. 99,000 tonnes x 10 years)
Status of Landbank	=	549,000 tonnes	**(SURPLUS)**
Hard Rock Landbank excl PT & SM	=	**15.6 Years**	(i.e. 1,539,000t ÷ 99,000t)

Option C: Hard rock Landbank excluding Poortown reserves & sales (10 Year)

Hard Rock Landbank of permitted reserves	=	3,642,000 tonnes	
10-year forecast of annual production	=	111,000 tonnes	
Landbank Requirement	=	1,110,000 tonnes	(i.e. 111,000t x 10 years)
Status of Landbank	=	2,532,000 tonnes	**(SURPLUS)**
HR Landbank – all HR Excl. Poortown	=	**32.8 Years**	(i.e. 3,642,000t ÷ 111,000t)

Option C: Hard rock Landbank excluding Poortown reserves & sales (3 Year)

Hard Rock Landbank of permitted reserves	=	3,642,000 tonnes	
3-year forecast of annual production	=	123,000 tonnes	
Landbank Requirement	=	1,230,000 tonnes	(i.e. 123,000 tonnes x 10 years)
Status of Landbank	=	2,412,000 tonnes	**(SURPLUS)**
HR Landbank – all HR Excl. Poortown	=	**29.6 Years**	(i.e. 3,642,000t ÷ 123,000t)

6 SUMMARY OF NEED FOR AGGREGATE RESERVES DURING 2022

6.1 A review of the sand and gravel and hard rock landbanks indicates that as at 30th November 2021:

Sand and Gravel

- The landbank of sand and gravel reserves provides a further **10.7 years** of supply using the 10 year average sales analysis or **10.8 years** supply based on the 3 year average.

- On this basis there would appear to be no requirement to seek to identify further reserves of sand and gravel. However, a more detailed examination of the respective reserves at Point of Ayre suggest that the gravel element of the reserve could be exhausted in less than 10 years. Therefore, to ensure continuity of supply of gravel aggregate, a planning application for an extension to the operation at the Point of Ayre may need to be made within the next 5 years.

- Also, with the reduction in the sand reserves at Ballaharra there is likely to be a requirement for a planning application for an extension to the site to be submitted within the next 12 – 18 months.

Hard Rock

- With the commencement of quarrying at the Billown extension, the 600,000 tonnes of additional limestone means that there is **no requirement** to seek to identify further reserves of hard rock for aggregate purposes if the reserves of the Government operated quarries are included. The landbank is c. **22.5 years** using the 10-year average sales analysis and **21.6 years** based on 3-year average sales.

- With the reserves of the Government quarries excluded, the 10 year and 3 year average landbank forecast for Hard Rock are **17.5** and **15.6 years** respectively.

- The Hard Rock landbank with Poortown Quarry reserves excluded is c. **33 years** for based on 10 year average sales and c. **30 years** for 3 year average.

- This assessment of need for aggregate does not take account of the need for agricultural lime which is a non-aggregate product (see Section 2.5).

DRAWINGS