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LABRADOR IRON MINES HOLDINGS LIMITED

TECHNICAL REPORT ON THE PRELIMINARY ECONOMIC ASSESSMENT OF THE HOUSTON PROJECT, PROVINCES OF NEWFOUNDLAND AND LABRADOR AND QUÉBEC, CANADA

NI 43-101 Technical Report

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1 SUMMARY

EXECUTIVE SUMMARY

Roscoe Postle Associates Inc. (RPA), now part of SLR Consulting Ltd (SLR), was retained by Labrador Iron Mines Holdings Limited (LIMH) to prepare a Preliminary Economic Assessment (PEA) and a supporting independent Technical Report on the Houston Direct Shipping Iron Ore Project (the Houston Project), located near Schefferville, Québec, Canada. The purpose of this report is to support the disclosure of PEA results based on an updated Mineral Resource estimate for the Houston Project's Houston and Malcolm properties. This Technical Report conforms to National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101). The effective date of the Mineral Resource estimates in this report is December 31, 2020, and information is current as of that date unless otherwise specified. The Qualified Person (QP) visited the Property on October 28, 2020.

Parent company LIMH is headquartered in Toronto, Ontario, Canada. Labrador Iron Mines Limited (LIM) is majority owned (approximately 52%) by LIMH and Schefferville Mines Inc. (SMI) is a wholly owned subsidiary of LIM. LIM directly holds the group's iron properties located in the province of Newfoundland and Labrador and SMI directly holds the group's iron properties located in the province of Québec. Houston Iron Royalties Limited (HIRL) holds the right to a 2% royalty on sales of iron ore from the Houston and Malcolm properties. Unless otherwise stated, the data in this report reflects 100% of the Houston Project.

The Houston Project is proposed as a series of open pits located in Labrador and Québec, near the town of Schefferville, Québec. Table 1-1 presents a summary of the Mineral Resource estimates for the Houston Project, with an effective date of December 31, 2020. Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves (CIM (2014) definitions) were used for Mineral Resource classification.

TABLE 1-1 SUMMARY OF HOUSTON PROJECT MINERAL RESOURCES - DECEMBER 31, 2020

Labrador Iron Mines Holdings Limited – Houston Project

Category	Tonnes (Mdmt)	Fe %	SiO_2 %	Mn %	P %	Al_2O_3 %
Measured	11.4	62.7	6.8	0.52	0.07	0.68
Indicated	9.1	62.7	7.3	0.41	0.06	0.54
M + I	**20.5**	**62.7**	**7.0**	**0.47**	**0.06**	**0.62**
Inferred	14.3	59.4	13.7	1.02	0.07	0.83

Notes:
1. CIM (2014) definitions are followed for Mineral Resources.
2. Mineral Resources are estimated based on an open pit mining scenario.
3. Mineral Resources are estimated based on a cut-off of 50% Fe.
4. Mineral Resources are estimated using a long-term benchmark iron price of US$100/dry metric tonne (dmt) for 62% Fe fines Cost and Freight (CFR) China and a metallurgical recovery of 50% to 100% dependent on mineralization domain.
5. Bulk density is based on a formula relating bulk density to iron content.
6. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
7. Numbers may not add due to rounding.

The QP is not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other relevant factors that could materially affect the Mineral Resource estimates.

The PEA is based on conventional truck and shovel open pit operations. Proposed mining operations target high-grade iron mineralization domains for processing in a dry sizing plant, which consists of crushing and screening only to produce lump and sinter fines products. The products are hauled to a proposed rail siding located adjacent to an existing mainline rail and loaded into rail car gondolas for sale to a potential offtake buyer. The proposed PEA Run-of-Mine (RoM) production schedule is summarized in Table 1-2.

TABLE 1-2 SUMMARY OF THE ROM PRODUCTION SCHEDULE

Labrador Iron Mines Holdings Limited – Houston Project

	High-grade Iron Domain (Mdmt)	Fe (%)	SiO_2 (%)	Total Waste (Mdmt)	Strip Ratio	Total Mined (Mdmt)
Year 1	0.8	63.1	7.1	0.1	0.1:1	0.9
Year 2	2.1	63.3	6.1	2.6	1.2:1	4.7
Year 3	2.1	62.2	7.1	4.9	2.3:1	7.0
Year 4	2.1	62.2	7.2	4.9	2.3:1	7.0
Year 5	2.1	62.1	7.9	4.8	2.3:1	6.9
Year 6	2.0	62.5	7.1	2.3	1.1:1	4.3
Year 7	2.1	62.3	6.4	4.9	2.3:1	7.0

	High-grade Iron Domain (Mdmt)	Fe (%)	SiO_2 (%)	Total Waste (Mdmt)	Strip Ratio	Total Mined (Mdmt)
Year 8	2.1	61.9	6.2	6.4	3.1:1	8.5
Year 9	2.0	61.6	8.4	7.0	3.5:1	9.0
Year 10	2.1	61.4	9.4	6.9	3.3:1	9.0
Year 11	2.1	62.2	8.2	6.4	3.1:1	8.5
Year 12	1.9	62.1	8.1	1.4	0.7:1	3.3
Total	**23.4**	**62.2**	**7.4**	**52.5**	**2.2:1**	**76.0**

Note: values may not sum due to rounding.

Production is projected to be approximately 2.0 million dry metric tonnes per annum (2.0 Mdmtpa) over approximately 12 years. Year 1 through Year 5 RoM production is from the Houston 1 and Houston 2 pits exclusively with almost all of the production classified as Measured or Indicated Mineral Resources. During Year 6, production moves to the north to the Malcolm Mineral Resources, followed by relocating south to the Houston 3 Mineral Resources during Year 8 through to the end of the mine life. Approximately 80% of the proposed Life-of-Mine (LoM) production is classified as Measured or Indicated Mineral Resources, with the remainder as Inferred Mineral Resources.

The construction period is estimated at approximately one year with the majority of earthworks construction being performed during the second half of the construction period. The Houston 1 and 2 phases of the Houston Project were previously permitted and the permits remain in good standing or are available for renewal. The permits cover the first approximately five years of proposed operations, which include mining and processing operations in Labrador and construction of the access and product haul road and rail siding.

This report is considered by the QP to meet the requirements of a PEA as defined in Canadian NI 43-101 regulations.

ECONOMIC ANALYSIS

The economic analysis contained in this report is based, in part, on Inferred Resources, and is preliminary in nature. Inferred Resources are considered too geologically speculative to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves. There is no certainty that economic forecasts on which this PEA is based will be realized.

The Houston Project economic analysis was performed by RPA using a discounted cash flow model on a pre-tax and after-tax net present value (NPV) basis. Annual cash flow projections were estimated over the LoM based on sales revenue, capital and sustaining costs, and production costs. The estimates of capital, sustaining, and site production costs have been developed specifically for the Houston Project and are presented in Section 21 of this report. The economic analysis confirms a positive economic result for the Houston Project PEA at the base case benchmark iron ore price of US$90/dmt.

All currency is in Canadian dollars unless noted otherwise.

ECONOMIC CRITERIA

After-tax cash flow projections were generated from the LoM production schedule and capital and operating cost estimates and is summarized in Table 1-3. A summary of the key criteria is provided below.

PRODUCTION

- Total mine life: 12 years:
- Mining rate: up to 9.0 Mdmtpa.
- LoM plant feed average: 2.0 Mdmtpa.
- Fe head grade average: 62.2%.
- Product moisture: 5%.
- Total LoM production: 23.4 Mdmt.
    - Lump production (30%): 7.0 Mdmt.
    - Sinter fines production (70%): 16.4 Mdmt.
- Production losses: 1.5% for dry sizing, product truck haul, and loading trains.

REVENUE

- Exchange rate US$1.00 = $1.33.
- Benchmark iron ore price 62% Fe fines CFR China: US$90/dmt.
    - Lump premium: US$10/dmt.
    - Fe grade differential premium of US$1.61/dmt for the incremental portion of the grade above and below 62% Fe.
    - Penalty for silica at US$1.50/dmt/% over 4%.
- Pay factor: 98.5% (to account for losses during railing and port handling).

- Revenue is recognized at selling point: Freight-on-Board (FOB) train Houston Project rail siding; offtake buyer pays for rail, port, and ocean freight charges.
- Net revenue FOB Houston Project rail siding (after royalties): $50.58/dmt sold (US$37.94/dmt sold).
- Revenue timing: products are only railed to port from May through November (revenue from December production is received in the following calendar year).
- Price participation: for the purpose of the PEA, price participation between LIM and the potential offtake buyer is assumed at 50:50 for benchmark iron ore prices greater than US$90/dmt.

COSTS

- Pre-production period: one year (six months in Year -1 and six months in Year 1).
- Initial capital costs: $86.8 million (major mobile equipment is purchased under capital lease).
- Sustaining capital: $67.7 million (includes payments and financing costs for major mobile equipment capital lease after Year 1).
- Reclamation and closure costs: $8.4 million.
- LoM unit operating cost average of:
    - Mining: $3.82/dmt mined.
    - Processing and Power: $3.14/dmt processed.
    - Product Haulage: $4.64/dmt hauled.
    - Train Loading: $1.25/dmt loaded.
    - Site G&A: $10.47/dmt processed.
- Total unit operating costs of $31.87/dmt processed or $32.84//dmt sold.
- LoM operating costs of $747 million.

TAXATION AND ROYALTIES

- Federal Income Tax rate: 15%.
- Provincial Income Tax:
    - Newfoundland and Labrador: 15%.
    - Québec: 11.6%.
- Mining Tax:
    - Newfoundland and Labrador: 15%.
    - Québec (based on profit margin):
        - 0%-35% profit margin: 16%.
        - 35%-50% profit margin: 22%.
        - 50%-100% profit margin: 28%.
- Tax Pools:
    - Corporate Income Tax pool balances: $300 million.
    - Newfoundland and Labrador Mining Tax pools:
        - Undepreciated capital cost general asset base: $83 million.

- Processing plant specific asset base: $80 million.
- Accumulated exploration expenditures: $31 million.

- Royalties
  - Fonteneau royalty: 3.0% of the selling price FOB port per tonne of iron ore produced and shipped from the Houston property payable to Fonteneau, capped at US$1.50 per tonne.
  - HIRL royalty equal to 2.0% of the sales proceeds (FOB Port of Sept-Îles) received by LIM from sales of iron ore from LIM's Houston and Malcolm properties.
  - Hollinger royalty on Malcolm property at $2.00 per tonne.
  - Four royalties negotiated in the First Nations IBAs, equivalent to an overall NSR royalty (FOB Port of Sept-Îles) of approximately 1.1%.

TABLE 1-3 AFTER-TAX CASH FLOW SUMMARY
Labrador Iron Mines Holdings Limited – Houston Project

Parameter	Units	Value
LoM	years	12
Net Revenue, after Charges	**$ million**	**1,253**
Royalties	$ million	(104)
Operating Costs		
Mining	$ million	(290)
Processing & Power	$ million	(74)
Product Haulage	$ million	(109)
Train Loading	$ million	(29)
Site G&A	$ million	(245)
Total Operating Cost	$ million	(747)
Operating Margin (EBITDA)	**$ million**	**403**
Initial Capital		
Direct Cost	$ million	(51)
Indirect Cost	$ million	(11)
Owner's Cost	$ million	(11)
Contingency	$ million	(13)
Subtotal Initial Capital	$ million	(87)
Sustaining Capital	$ million	(68)
Total Capital	**$ million**	**(155)**
Reclamation and Closure	$ million	(8)
Project Net Cash Flow, pre-tax	**$ million**	**240**
Project Net Cash Flow, after-tax	**$ million**	**234**

Note: values may not sum due to rounding.

CASH FLOW ANALYSIS

The Houston Project economics have been evaluated using the discounted cash flow method, taking into account annual processed tonnages, iron grades, benchmark iron ore price, operating costs, selling charges, royalties, capital and sustaining capital costs, and reclamation and closure costs.

The economic analysis confirms a positive economic result for the Houston Project PEA at the base case benchmark iron ore price of US$90/dmt. The summary of the results of the cash flow analysis is presented in Table 1-4.

TABLE 1-4 CASH FLOW ANALYSIS
Labrador Iron Mines Holdings Limited – Houston Project

Item	Units	Value
Pre-tax NPV at 7% discount	$ million	123
Pre-tax NPV at 8% discount	**$ million**	**113**
Pre-tax NPV at 10% discount	$ million	93
IRR	%	39%
After-Tax NPV at 7% discount	$ million	120
After-Tax NPV at 8% discount	**$ million**	**109**
After-tax NPV at 10% discount	$ million	91
IRR	%	39
Payback	years	2.6

Note: the cash flow analysis is at the base case benchmark iron ore price of US$90/dmt.

The undiscounted pre-tax cash flow is $240 million, and the undiscounted after-tax cash flow is $234 million. The pre-tax NPV at an 8% discount rate is $113 million and the after-tax NPV at an 8% discount is $109 million. The pre-tax Internal Rate of Return (IRR) is 39% and the after-tax IRR is 39%. The after-tax payback period is 2.6 years from the start of operations in July of Year 1.

At recent benchmark iron ore prices of US$160/dmt, adjusted for assumed 50:50 price participation above the base case benchmark iron ore price of US$90/dmt, the pre-tax NPV at an 8% discount rate is $696 million and the after-tax NPV at an 8% discount rate is $459 million. The pre-tax IRR is 233% and the after-tax IRR is 209%. The after-tax payback period is 0.9 years.

SENSITIVITY ANALYSIS

Project risks can be identified in both economic and non-economic terms. Key economic risks were examined by running cash flow sensitivities for:

- Fe grade
- Benchmark iron ore price
- Exchange rate
- Operating costs
- Capital costs

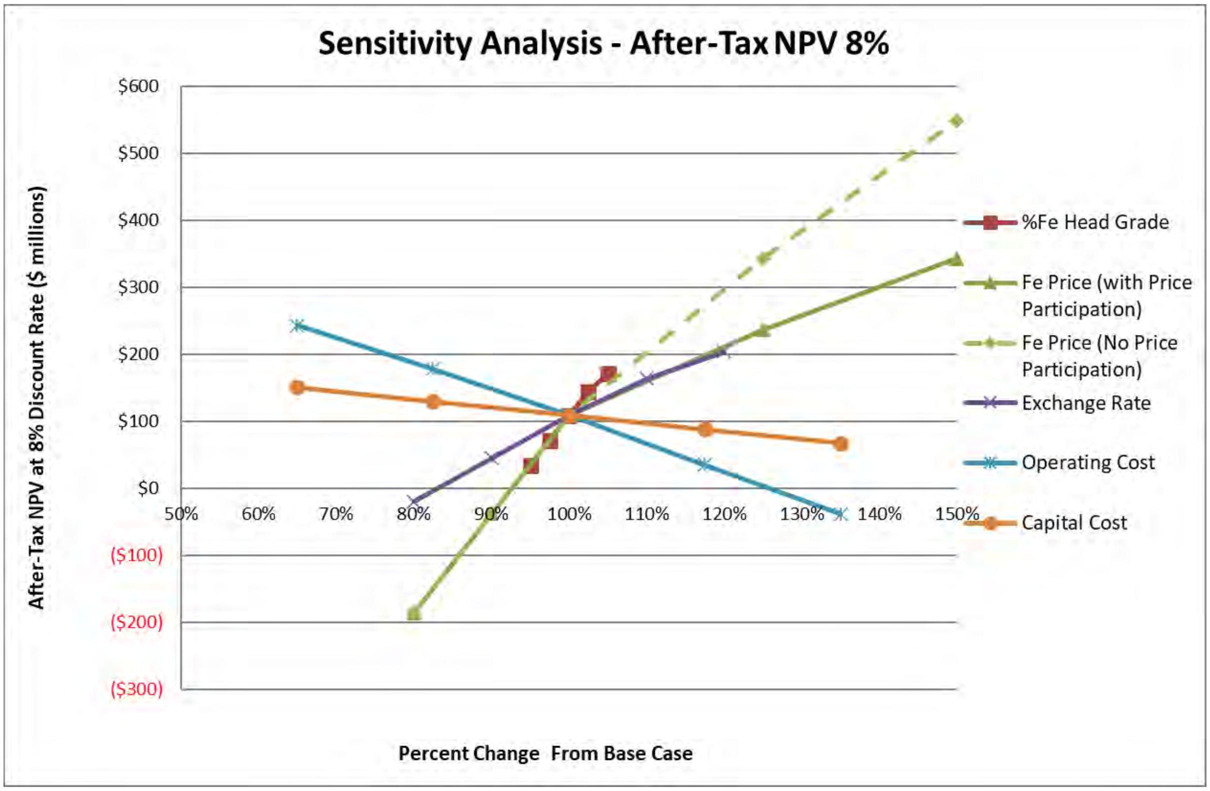
NPV sensitivity over the base case has been calculated for -5% to +5% for Fe head grade, -20% to +50% for benchmark iron ore prices, -20% to +20% for exchange rate, and -35% to +35% for operating costs and capital costs variations. The sensitivities are shown in Table 1-5 and Figure 1-1.

TABLE 1-5 AFTER-TAX SENSITIVITY ANALYSIS
Labrador Iron Mines Holdings Limited – Houston Project

	Head Grade %Fe	**NPV at 8% ($ million)**
95%	0.59	34
97.5%	0.61	72
100%	0.62	109
102.5%	0.64	145
105%	0.65	171
	Fe Price US$/dmt	**NPV at 8% ($ million)**
80%	72	-185
90%	81	-38
100%	90	109
125%	113	237
150%	135	343
	Exchange Rate US$1.00 = $	**NPV at 8% ($ million)**
80%	1.07	-20
90%	1.20	45
100%	1.33	109
110%	1.47	164
120%	1.60	204
	Operating Costs ($ million)	**NPV at 8% ($ million)**
65.0%	485	243
82.5%	616	179
100.0%	747	109
117.5%	878	36
135.0%	1,008	-38

	LoM Capital Costs ($ million)	NPV at 8% ($ million)
65.0%	109	151
82.5%	138	130
100.0%	167	109
117.5%	197	88
135.0%	226	67

FIGURE 1-1 AFTER-TAX NPV SENSITIVITY GRAPH



In addition to the benchmark iron ore price sensitivity with assumed 50:50 price participation over US$90/dmt, a sensitivity excluding any price participation is presented in Figure 1-1 (SLR notes that the after-tax NPV of the no price participation sensitivity is calculated under the assumption that all taxes are paid by LIM on all incremental income per the listed economic criteria and that there are no additional capital or operating cost requirements). At the recent benchmark iron ore price of US$160/dmt, the after-tax NPV at an 8% discount rate is $778 million without price participation.

The Houston Project's after-tax NPV is most sensitive to head grade and benchmark iron ore prices, followed by capital costs and operating costs.

CONCLUSIONS

The QP concludes that the Houston Project is a project of merit, with a relatively low capital intensity and positive economics at long term benchmark iron ore prices. In the QP's opinion, LIM should continue to advance the Houston Project. The QP's offer the following conclusions by area.

GEOLOGY AND MINERAL RESOURCES

- The sample preparation, analysis, quality assurance and quality control (QA/QC) program, and security procedures for the Houston Project are adequate for use in the estimation of Mineral Resources.
- The database is adequate for the purpose of Mineral Resource estimation.
- Both Houston and Malcolm deposits were constrained by wireframe domains based on a 58% Fe cut-off grade, focussing on differentiating the mineralization potentially suitable for crushing and screening in a dry sizing plant and requiring no upgrading to produce a potentially saleable product.
- A block model for Mineral Resource estimation was constructed to include all three of the Houston deposits. A second block model was constructed to cover the entire area of the Malcolm deposit.
- In order to fulfill the CIM (2014) requirement that Mineral Resources have reasonable prospects for eventual economic extraction, RPA developed a conceptual open pit shell to constrain the Houston and Malcolm deposits using all categories of Mineral Resources in the block models.
- Resource classification is based on the confidence in the estimation for iron only. Assaying for iron is more complete whereas assay data is lacking to a varying degree for the other elements.

MINING

- The PEA mine plan has been developed based on Mineral Resources from the Houston and Malcolm properties considering all resource categories. Overall, Measured and Indicated Mineral Resources represent approximately 80% of the production total.
- Four mining areas are developed and mined in order starting at Houston 1 and 2, in Labrador, followed by Malcolm in Québec, and finishing at Houston 3 in Labrador. Houston 1 and 2 were previously permitted and the permits remain in good standing or are available for renewal. The permits cover the first approximately five years of proposed operations.
- The mining schedule targets high-grade iron mineralization domains, which are suitable for the dry sizing process. The pit mining quantities are estimated to total 23.4 Mdmt of high-grade iron mineralization at a diluted grade of 62.2% Fe over the LoM, along with 52.5 Mdmt of waste material.
- The proposed mining production schedule is relatively low risk in that all of the volume within the large and continuous high-grade iron mineralization domains is considered as production, with the exception of a few relatively minor and discrete

lower grade pods of mineralization. The selectivity at the hanging wall and footwall contacts is defined by a gradational decrease in iron grades along with an increase in deleterious grades.

- Mining pre-production development is limited to access road development and overburden removal for initial open pit and waste storage areas as the iron mineralization outcrops with sufficient high-grade mineralization accessible for Year 1 operations with negligible waste stripping required.
- Owner-operated mining will be carried out using conventional open pit methods, consisting of the following activities:
  - Production blasthole drilling.
  - Blasting services provided by an explosives' contractor.
  - Loading and hauling operations performed with backhoe excavators and rigid frame haulage trucks.
- The mining fleet major mobile equipment is specified with multiple common units across the Houston Project's unit operations, resulting in a relatively simple fleet to operate and maintain.
- Geotechnical and pit design parameters were based on data, information, and results from previous geotechnical study at Houston 1 and 2.

MINERAL PROCESSING

- The majority of test work was completed on three trench samples obtained in 2011 classified as Hanging Wall (HU1), Footwall (HU2), and DRO.
- Mineralogical studies indicated that iron in the samples was mainly present as hematite and goethite. Minor magnetite content was noted in the DRO sample. A significant amount of the iron in the DRO sample was present in a manganese oxide mineral (FeMnO(OH)). Quartz was the main gangue mineral present.
- Assays of different size fractions of each of the samples showed that iron content decreased with decreasing size, particularly below approximately one millimetre in size, and silica content increased with decreasing size. This implies that removal of finer material and processing it separately could be employed to improve the grade of the sinter fines (and potentially that of future concentrate produced through an upgrading process).
- The DRO and hanging wall samples were of acceptable quality for sale without upgrading iron content (>60% Fe) and require only crushing and screening. Potential for penalty charges exist, in particular for silica and manganese content, however, based on historic LIM sales agreements from the James Mine, these are not expected to be significant.
- The footwall sample was lower in iron content and higher in silica content and lump and sinter fines sourced from footwall material may require upgrading to produce saleable products or may be saleable as low-grade products (<58% Fe) with potential for penalty charges due to elevated silica levels.
- Splits to lump product for the DRO sample ranged from approximately 29% to 33%, and for the hanging wall sample ranged from approximately 42% to 44%. For the footwall sample the split was approximately 49% to 53% to lump product. The PEA

has used a 30% split to lump product and 70% to sinter fines product as the operating assumption.

- Various gravity upgrading techniques were tested with limited success.
- The samples were shown to be amenable to upgrading by WHIMS and in the QP's opinion this technique has the potential to form part of a future wet upgrading circuit, particularly for the fines (-1 mm), which are high in silica.

INFRASTRUCTURE

- Other than the existing gravel public access road and a dry materials landfill site owned by LIM, there is no existing infrastructure at the Houston Project site.
- Right-of-way clearing of trees was previously completed for the access and product haul road and rail siding.
- All proposed site buildings and equipment for the dry sizing plant are considered mobile and will only require an engineered fill for foundation (i.e., no concrete foundations).
- Collection and treatment of surface contact water will be managed locally at the various open pits, waste dumps, and dry sizing plant (collectively the mine site), along the product haul road, and at the rail siding.

ENVIRONMENTAL, SOCIAL AND PERMITTING CONSIDERATIONS

- LIM has developed a staged approach to permitting whereby proposed mining will begin in Houston 1 and Houston 2 (the Houston 1 and 2 Project) while regulatory approvals are obtained for Malcolm and Houston 3.
- The Houston 1 and 2 Project has been released from the Newfoundland and Labrador Environmental Assessment Act and the Canadian Environmental Assessment Act. The provincial Environmental Release included conditions which LIM has met. The Houston 1 and 2 Project Registration document does include an assessment of effects on selected Valued Environmental Components (VEC).
- Houston 1 and 2 have an approved Environmental Protection Plan (EPP) that provides management measures to address potential environmental effects. The EPP will be regularly revised.
- Houston 1 and 2 have an approved waste management plan, an approved Newfoundland and Labrador Benefits Plan, and a Woman's Employment Plan.
- Houston 1 and 2 have received all required approvals for the construction and operation and the company maintains a list of these permits and approvals. LIM expects reactivation of expired permits to be an administrative process.
- Vegetation clearing activities of the product haul road right-of-way and the rail siding have been completed for the Houston Project.
- A rehabilitation and closure plan has been developed for Houston 1 and 2 and approved by the Department of Natural Resources (DNR), which will be regularly updated during operations. A similar rehabilitation and closure plan is proposed for Malcolm and Houston 3 for the PEA.

- Malcolm and Houston 3 are at an earlier stage of planning and additional studies will need to be conducted, with particular consideration of Houston Creek, which traverses the proposed Houston 3 pit footprint.
- LIM has conducted stakeholder engagement and specifically engaged First Nations communities in the area. LIM has signed agreements with several First Nation communities aimed at establishing a positive ongoing relationship for the development and operation of the Houston Project with economic benefits directed at these communities. These agreements were suspended in 2015 until mining operations resume, however, LIM plans to re-establish stakeholder consultation and engagement and reactivate the Impact Benefit Agreements (IBA) prior to commencement of development of the Houston Project.

RECOMMENDATIONS

The QP offers the following recommendations to advance the Houston Project and evaluate potential opportunities for development.

GEOLOGY AND MINERAL RESOURCES

1. Complete sampling and assaying, where possible, of the 2013 diamond drill holes, which were left incomplete as a result of a halt in company spending in 2014 due to financial circumstances and are excluded from the current Mineral Resource estimate.
2. Complete additional infill exploration drilling to upgrade Inferred Mineral Resources to Measured or Indicated, as well as step out drilling on high priority targets within immediate vicinity of existing defined pits.
3. Incorporate commercially supplied blank samples with zero iron content in future assaying programs.
4. Investigate additional wireframe domaining of lithology units and/or mineralization domains, to further control estimation of not just the iron grades, but also the deleterious elements.
5. A minimum three-metre composite length should be used in future Mineral Resource updates as the majority of sampling was carried out at three-metre intervals.
6. Complete additional density measurement samples in both mineralization and waste in order to interpolate the density values and adjust them for the iron content as appropriate.

MINING

1. Complete geotechnical investigations for Malcolm and Houston 3 pit slope recommendations and for all waste dump facilities.
2. Infill exploration drilling targeting the lower grade mineralization pods excluded from within the high-grade iron mineralization domains to further increase the confidence in grades in the local area.
3. Complete drilling and surface sampling to better define the contact of the Menihek shale within the vicinity of the proposed open pits.

4. Maintain the flexibility to mine Houston 3 prior to Malcolm during permitting, as this will reduce the number of times the operation will need to be relocated.
5. Review potential for construction of a portion of the Houston Project product haul road by LIM, as the mine equipment fleet utilizes similar equipment to that proposed for the construction.

MINERAL PROCESSING

1. Complete additional test work, including variability test work, to confirm results supporting dry processing of high-grade iron ore mineralization to produce lump and sinter fines without upgrading, and to confirm and optimize the process steps required and provide the necessary engineering data for the design of the processing plant.
2. Conduct additional testing on gravity separation and flotation techniques to confirm whether or not gravity separation and flotation could form part of a future concentrator process.

INFRASTRUCTURE

1. Update the surface water management plan for the mine site based on the proposed localized handling and treatment of surface contact water.
2. Review trade-off study for use of a battery electric version of the recommended haul truck.
3. Review the potential to establish grid power from the Menihek hydro-electric facility operated by Nalcor and Québec Hydro, to include relocation of the electrical substation owned by LIM to the project site and a new powerline connect to the grid system. Grid power can be available seasonally, in the warmer months, when the electrical heating demand in Schefferville is lower.
4. Review trade-off study for use of an aerial tramway for transporting product from the dry sizing plant in Labrador to the rail siding. RPA notes this would eliminate the need for a full-size product haul road, while tramways are proven to operate in winter climatic conditions.
5. Complete trade-off study on use of the Redmond property rail right-of-way for the Houston Project's rail loading operations. Although a longer truck haul is required (approximately 1.5 km greater), the Redmond property rail right-of-way was formerly used for loading iron ore trains and includes a rail loop at the end to turnaround, versus the current proposed operation, which requires the train to be split multiple times.

ENVIRONMENTAL, SOCIAL AND PERMITTING CONSIDERATIONS

1. Review all permitting requirements for Houston 1 and 2 permits and update/revise permits as needed.
2. Reactivate the IBAs and ensure all Houston Project areas and activities are addressed as the Houston Project moves forward.
3. Conduct additional acid rock drainage (ARD) testing of the Menihek shale lithology as required by the Houston 1 and 2 Project approvals in the first year of operation and adjust the material management plan if needed.

4. Ensure that the closure financial costing is calculated based on execution by a third party and that a closure bond or suitable mechanism be established prior to any construction activities as per applicable regulatory requirements.
5. Undertake environmental assessment, stakeholder engagement, and permitting of the Malcolm and Houston 3 components of the Houston Project as soon as possible.
6. During the permitting of Malcolm and Houston 3, assess potential impacts on fish habitat and implement appropriate management measures.
7. The following best practice actions are recommended as the Houston Project progresses:
    a) Develop a comprehensive Environmental and Social Management System (ESMS) to assess and manage potential environmental and social risks and effects.
    b) Re-establish stakeholder engagement by developing and implementing a stakeholder engagement plan prior to commencement of development activities and update this plan regularly. Stakeholder engagement must be inclusive and should consider the current COVID-19 pandemic in terms of how interaction with stakeholders and communities can be achieved both effectively and safely, until the pandemic is no longer a significant factor.

The QP recommends the following work programs and proposed budget to advance the Houston Project, as presented in Table 1-6.

TABLE 1-6 RECOMMENDED WORK PROGRAM
Labrador Iron Mines Holdings Limited – Houston Project

Area	Proposed Budget ($000): Pre-construction	Ongoing Malcolm and Houston 3
Trenching and Drilling	250	1,700
Metallurgical Investigation	100	200
Geotechnical and Hydrology	100	300
Environment, Permits, EIS	200	500
Planning and Engineering	200	300
Subtotal	**850**	**3,000**
Contingency	128	450
Total Cost	**978**	**3,450**

TECHNICAL SUMMARY

The Houston Project consists of the Houston property, which includes the Houston 1, Houston 2, and Houston 3 Mineral Resources, located in Labrador, and the Malcolm property, which includes the Malcolm Mineral Resources and is contiguous to the northwest and located in Québec. The Houston Project is a part of LIM's Schefferville Projects.

PROPERTY DESCRIPTION AND LOCATION

The Houston Project is located in the west central part of the Labrador Trough iron range, approximately 1,140 km northeast of Montreal and adjacent to, or within, 15 km of the town of Schefferville, Québec. The Houston Project is located approximately 200 km northeast of Labrador City and approximately 200 km northwest of Goose Bay in Newfoundland and Labrador.

LAND TENURE

With respect to the Houston property, LIM holds the title to one mineral rights licence issued by the Department of Natural Resources, Province of Newfoundland and Labrador, representing 112 mineral claims located in northwest Labrador covering approximately 2,800 ha. In addition, LIM holds the title to Mining Lease 216 (20433M) covering approximately 352 ha over the Houston 1 and 2 deposits, Surface Lease 135 (Houston 1 and 2 Project) covering approximately 1,062 ha, Surface Lease 139 (Houston Discharge) covering approximately 83 ha, and Surface Lease 140 (Houston Pipeline) covering approximately 22 ha, each issued by the Department of Natural Resources, Province of Newfoundland and Labrador.

The Malcolm property includes 41 claims issued by the Québec government, covering approximately 1,842 ha in Québec. LIM, through its subsidiary SMI, holds the title to the Malcolm claims in Québec.

EXISTING INFRASTRUCTURE

While both the Houston and Malcolm properties can be reached by all-weather exploration gravel roads from the town of Schefferville, there are no roads connecting this area to western Labrador or elsewhere in Québec. Access from the southern areas of the provinces of Québec and Newfoundland and Labrador to the Houston Project area is either by rail from Sept-Îles to Schefferville or by air from Montreal, Québec City, Sept-Îles, Wabush, Goose Bay, or St. John’s.

The town of Schefferville has a fire station and fire-fighting equipment. The Sûreté du Québec Police Force is present in the town of Schefferville and the Matimekush-Lac John reserve. There is a clinic in Schefferville with limited medical facilities. Schefferville also has a municipal garage, a small motor repair shop, a local hardware store, a mechanical shop, a local convenience store, two hotels, numerous outfitters accommodations, a community radio station, recreation centre, parish hall, gymnasium, playground, childcare centre, and drop-in centre.

Schefferville has a modern airport, which includes a 2,000 m paved runway and navigational aids for passenger jet aircraft. Regular air service is provided to and from St. John's and Goose Bay, via Wabush, Labrador, and to Montreal and Québec City, via Sept-Îles.

Schefferville is accessible by train via the approximately 560 km main rail line between Schefferville and Sept-Îles. The rail line was originally constructed for the shipment of iron ore from the Schefferville area and has been in continuous operation for over sixty-five years. The railway station in Schefferville provides services for both passenger and freight trains. There is a bulk fuel storage facility at the station and yard space for limited off-loading of freight. TSH Railway maintains a maintenance shop at the rail station yard (Garage Bleu).

It is assumed that approximately 20% of the workforce will come from the local area including Schefferville, Québec, as has been the case for previous LIM mining operations (James Mine). The remaining 80% will likely be sourced from further afield in the Labrador City / Wabush / Goose Bay areas, other parts of Newfoundland and Labrador and parts of Québec (Sept-Îles, Québec City, or Montreal) and will fly in and fly out of the operations. The fly in and fly out personnel will be accommodated in a mine camp (the Bean Lake camp) previously owned by LIM, but sold to a local group who now operates it. The Bean Lake camp is located south of Schefferville along the Menihek power plant road, and just north of the proposed Houston Project rail siding. Additional trailer camp style accommodations and two commercial hotels exist in Schefferville.

The Menihek power plant is located 35 km southeast of Schefferville. LIM owns an electrical substation/transformer station that was previously used to operate a wet iron ore processing plant at Silver Yards (2010-2013), which is located near the Bean Lake camp. This system is currently not energized, however, a power purchasing agreement is in place with Nalcor, the provincial power authority.

HISTORY

The Labrador Trough, which forms the central part of the Québec-Labrador Peninsula in eastern Canada, is the largest iron ore producing region in Canada and one of the largest iron ore producing regions in the world, and has a tradition of iron ore mining since the early 1950s.

The region remained largely unexplored until the late 1930s and early 1940s when the first serious mineral exploration was initiated by Labrador Mining and Exploration Company Limited (LM&E), which acquired large mineral concessions in northwestern Labrador. Hollinger was then established in 1941 to acquire concessions across the border in Québec.

After World War II, Hollinger attracted the interest of MA Hanna, a large U.S. mining company, and the Iron Ore Company of Canada (IOC) was formed in 1949 by a consortium of U.S. steel companies to explore and develop the iron deposits.

To support its operations, IOC established the town of Schefferville in Québec, and built extensive supporting infrastructure in the area, including an airport and a railway that provided a direct transportation link from Schefferville to Sept-Iles. IOC also built extensive infrastructure in Sept-Iles, including a deep seaport with shipping access to both the Great Lakes and the Atlantic Ocean.

In 1954, IOC started to operate open pit mines in the Schefferville region and exported a DSO product to steel companies in the U.S. and Western Europe. Starting in 1963, IOC also developed the larger but lower grade Carol Lake deposit in the Labrador City-Wabush region, approximately 200 km south of Schefferville, and started to produce concentrates and pellets.

As the technology of the steel industry changed over the ensuing years, more emphasis was placed on the concentrating ores of the Labrador City region. Subsequently, interest in and markets for the Schefferville region DSO declined. In addition, high growth in the demand for steel, which began after the end of World War II, came to an abrupt end in the early 1980s due to the impact of increasing oil prices. In 1982, IOC closed its DSO operations in the Schefferville region, focusing thereafter on iron ore concentrate and pellet production in the Labrador City region.

From 1954 to 1982, IOC's DSO operations in the Schefferville region produced approximately 150 million tons of lump and sinter fines from approximately 400 million tons of reserves and resources identified by IOC in the region, leaving approximately 250 million tons identified but undeveloped. The historical reserve and resource estimates identified by IOC were based on work completed prior to 1983 and were not prepared in accordance with NI 43-101 standards. The historical IOC estimates are not considered current mineral resources or reserves and should not be relied upon, however, they do provide an indication of the potential of the region and are considered relevant to ongoing exploration.

Following the closure of the IOC mining operations in 1982, the mining rights in Labrador reverted to LM&E, and ownership of the leases in Québec reverted back to Hollinger. Over the following years, most of the underlying mineral claims were allowed to lapse and reverted to the Crown.

In the early 1990s, Hollinger was acquired by La Fosse Platinum Group Inc. (La Fosse). La Fosse sought and was granted a project release under the Environmental Assessment Act for the James deposit in June 1990, but did not proceed with project development and the claims subsequently were permitted to lapse.

Between 2003 and 2006, Fenton and Graeme Scott (the principals of La Fosse and Fonteneau Resources Limited (Fonteneau)), Energold Minerals Inc. (Energold) (controlled by John Kearney, later Chairman of LIM), and New Millennium Iron Corp. (NML) began staking open claims over the former IOC iron ore deposits in the Schefferville region, in both Labrador and Québec.

Recognizing a need to consolidate the mineral ownership, Energold entered into agreements with Fonteneau and formed a joint venture with Anglesey Mining plc, a UK public company listed on the London Stock Exchange, through its then subsidiary LIM. In 2007, all the properties were consolidated into LIM and the project was taken public by the flotation of LIMH on the Toronto Stock Exchange. LIM subsequently acquired additional properties in Labrador by staking.

In October 2009, LIM entered into an agreement with NML to exchange certain of their respective mineral licences in Labrador. The exchange eliminated the fragmentation of the ownership of certain mining rights in the Schefferville region enabling both parties to separately study and potentially develop their respective mineral licences in as efficient a manner as possible. As part of the agreement, NML transferred to LIM 125 ha in five mineral licences in Labrador that adjoin or form part of the Houston property.

In December 2009, LIM, through its subsidiary SMI, acquired control over a large package of mineral claims in the Schefferville region in Québec from Hollinger/La Fosse.

During the period from 2007 to 2012, LIM carried out extensive exploration of its various deposits in the Schefferville region and upgraded some of the historical resources to current Mineral Resources. LIM also completed development and other work, including metallurgical test work, marketing studies, environmental studies, rail transport and port handling agreements, and negotiated IBAs with local indigenous groups.

LIM commenced construction of its James Mine in 2010, constructed a processing plant at Silver Yards near Menihek in Labrador, and built other infrastructure in support of the mine. Mining of the James deposit commenced in 2011, and in the three-year period of 2011, 2012, and 2013, LIM mined approximately 4.6 Mt of iron ore from the James Mine, producing a total of 3.6 million dry metric tonnes (dmt) of DSO product, all of which was railed to Sept-Îles and sold into the China spot market.

LIM has not undertaken mining operations since 2013, primarily due to volatile iron ore market conditions, but has maintained its properties on a stand-by care and maintenance basis. The former James Mine and the Silver Yards processing facility have been in progressive reclamation since 2014, following termination of mining at the James Mine, and LIM has now substantially completed its environmental regulatory requirements relating to rehabilitation of the former James Mine, the Silver Yards processing site, and related infrastructure.

There has been no past production from the Houston or Malcolm properties of the Houston Project.

GEOLOGY AND MINERALIZATION

The Labrador Trough, also known as the Labrador-Québec Fold Belt, extends for more than 1,000 km along the eastern margin of the Superior craton from Ungava Bay to Lake Pletipi, Québec. The belt is approximately 100 km wide in its central part and narrows considerably to the north and south. The Houston Project is located within the Knob Lake Iron Range, which is located on the western margin of the Labrador Trough adjacent to Archean basement gneisses.

The Knob Lake Iron Range consists of tightly folded and faulted iron formation exposed along the height of land that forms the boundary between Québec and Labrador. At least 45 hematite-goethite iron deposits have been discovered within the Knob Lake Iron Range in an area 20 km wide that extends 100 km northwest of Astray Lake. The iron deposits occur in deformed segments of the iron formation, and iron mineralization of interest in individual deposits varies from one million to more than 50 Mt.

The general stratigraphy of the Knob Lake area is representative of most of the Knob Lake Iron Range, except that the Denault dolomite and Fleming Formation are not uniformly distributed. The sedimentary rocks, including the cherty iron formation, are weakly metamorphosed to greenschist facies. In the structurally complex areas, leaching and secondary enrichment have produced earthy textured iron deposits. Unaltered, banded, magnetite iron formation, often referred to as taconite, occurs as gently dipping beds west of Schefferville, in the Howells River area.

The earthy bedded iron deposits are a residually enriched type within the Sokoman iron formation that formed after two periods of intense folding and faulting, followed by the circulation of meteoric waters in the fractured rocks. The enrichment process was caused largely by leaching and the loss of silica, resulting in a strong increase in porosity. This produced a friable, granular, and earthy textured iron mineralization. The siderite and silica minerals were altered to hydrated oxides of goethite and limonite. The second stage of enrichment included the addition of secondary iron and manganese, which appear to have moved in solution and filled pore spaces with limonite-goethite. The types of iron mineralization developed in the deposits are directly related to the original mineral facies. The predominant blue granular iron mineralization was formed from the oxide facies of the middle iron formation. The yellowish-brown iron mineralization, composed of limonite-goethite, formed from the carbonate-silicate facies, and the red painty hematite iron mineralization originated from mixed facies in the argillaceous slaty members. The overall ratio of blue to yellow to red iron mineralization in the Schefferville area deposits is approximately 70%:15%:15% but can vary widely within and between the deposits.

The Houston Project focusses on iron mineralization that is amenable to potential production of lump and sinter products by dry sizing only. Historically, this mineralization was categorized by IOC based on chemical, mineralogical, and textural compositions summarized as follows:

- The blue ores, which are composed mainly of the hematite and martite minerals, are generally coarse grained and friable. They are usually found in the middle section of the iron formation.
- The yellow ores, which are made up of the limonite and goethite minerals, are located in the lower section of the iron formation in a unit referred to as the silicate carbonate iron formation (SCIF).
- The red ore is predominantly a red earthy hematite. It forms the basal layer that underlies the lower section of the iron formation. Red ore is characterized by its clay and slate-like texture.

EXPLORATION STATUS

Exploration work has been performed by LIM between 2005 and 2013. Initial exploration was conducted by and over LIM's Labrador properties during the summer of 2005, including the Houston property. The work consisted of surveying old workings (trenches, pits, and drill holes), prospecting, mapping, and collecting samples. Between 2006 and 2013 inclusively, LIM completed 87 diamond drillholes, 184 RC drillholes, and 13 trenches on the Houston and Malcolm properties. Drilling completed by LIM included holes for geotechnical and hydrogeological investigation and sampling for metallurgical test work. Prior to LIM's work, IOC completed 87 RC drillholes and 236 trenches, primarily on the Houston property.

MINERAL RESOURCES

RPA audited the internal Mineral Resource estimates prepared by George H. Wahl, P.Geo., in March 2014, for the Houston 1, 2, and 3 and Malcolm deposits based on data available to March 3, 2013. RPA reviewed the data validation, resource estimation parameters and assumptions, methodology, and classification. RPA accepted most attributes of the Wahl block models, including the grade estimates, but made modifications to the Mineral Resource classification and developed a new conceptual open pit shell to constrain Mineral Resources to meet a CIM (2014) requirement of "reasonable prospects for eventual economic extraction". CIM (2014) definitions were used for Mineral Resource classification.

Tables 1-7 and 1-8 present a summary of the Mineral Resource estimates for the Houston and Malcolm deposits respectively, with an effective date of December 31, 2020. The data cut-off date for the current Mineral Resource estimate is March 3, 2013, for Houston and February 14, 2013, for Malcolm.

TABLE 1-7 SUMMARY OF MINERAL RESOURCES HOUSTON DEPOSITS - DECEMBER 31, 2020

Labrador Iron Mines Holdings Limited – Houston Project

Category	Tonnes (Mdmt)	Fe %	SiO_2 %	Mn %	P %	Al_2O_3 %
Measured	11.4	62.7	6.8	0.52	0.07	0.68
Indicated	6.5	62.7	7.5	0.42	0.06	0.60
M + I	**17.9**	**62.7**	**7.1**	**0.48**	**0.07**	**0.65**
Inferred	9.7	60.1	16.0	1.02	0.06	0.86

Notes:
1. CIM (2014) definitions are followed for Mineral Resources.
2. Mineral Resources are estimated based on an open pit mining scenario.
3. Mineral Resources are estimated based on a cut-off of 50% Fe.
4. Mineral Resources are estimated using a long-term benchmark iron price of US$100/dmt for 62% Fe fines CFR China and a metallurgical recovery of 50% to 100% dependent on mineralization domain.
5. Bulk density is based on a formula relating bulk density to iron content.
6. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
7. Numbers may not add due to rounding.

TABLE 1-8 SUMMARY OF MINERAL RESOURCES MALCOLM DEPOSIT - DECEMBER 31, 2020

Labrador Iron Mines Holdings Limited – Houston Project

Category	Tonnes (Mdmt)	Fe %	SiO_2 %	Mn %	P %	Al_2O_3 %
Indicated	2.6	62.6	6.9	0.38	0.05	0.39
Inferred	4.6	57.9	9.0	1.01	0.08	0.77

Notes:
1. CIM (2014) definitions are followed for Mineral Resources.
2. Mineral Resources are estimated based on an open pit mining scenario.
3. Mineral Resources are estimated based on a cut-off of 50% Fe.
4. Mineral Resources are estimated using a long-term benchmark iron price of US$100/dmt for 62% Fe fines CFR China and a metallurgical recovery of 50% to 100% dependent on mineralization domain.
5. Bulk density is based on a formula relating bulk density to iron content.
6. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
7. Numbers may not add due to rounding.

The QP is not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other relevant factors that could materially affect the Mineral Resource estimates.

RPA conducted several checks on the resource database, including a search for unique, missing, and overlapping intervals, a total depth comparison, and a visual search for extreme or deviant survey values. As a result of the checks, one duplicate assay value was removed from the data. As part of the data review, RPA compared the MS Excel files against the scan copy of the original paper log. No errors were observed.

Samples were composited to 2.5 m lengths for statistics and grade interpolation. Composites were manually flagged to the database and selected on a section-by-section basis to reflect intercepts that fell within mineralization domains. Where holes were twinned by old IOC holes, the historic holes were excluded from the composite dataset.

All mineralization domain boundaries were treated as hard during the interpolation. Interpolations within mineralization domains were carried out in a single pass using inverse distance squared (ID^2) methodology with a 75 m isotropic search ellipse. The grades of Fe, Al_2O_3, Mn, P, and Si_2O were estimated using a minimum of four and maximum of 24 composites, with a maximum of four composites per hole.

Density testing was carried out on core using the conventional water immersion method. A regression curve was developed to estimate density in model blocks based on the Fe grade, along with a 10% factor to account for porosity. A value of 2.63 g/cc was assigned to all blocks with a grade less than 23% Fe.

A block model was constructed to include all three of the Houston deposits. A second block model was constructed to cover the entire area of the Malcolm deposit. Block size in both models is 5 m by 5 m by 5m.

Definitions for resource categories used in this report are consistent with those defined by CIM (2014) and adopted by NI 43-101. In the CIM classification, a Mineral Resource is defined as “a concentration or occurrence of solid material of economic interest in or on the Earth’s crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction”. Mineral Resources are classified into Measured, Indicated, and Inferred categories. A Mineral Reserve is defined as the “economically mineable part of a Measured and/or Indicated Mineral Resource” demonstrated by studies at Pre-Feasibility or Feasibility level as appropriate. Mineral Reserves are classified into Proven and Probable categories.
Mineral Resources were classified using the following criteria:

- Measured Mineral Resources: within an interpreted mineralized domain and within 50 m of the nearest informing sample.

- Indicated Mineral Resources: within an interpreted mineralized domain and greater than 50 m and less than 100 m of the nearest informing sample.
- Inferred Mineral Resources: within an interpreted mineralized domain and greater than 100 m of the nearest informing sample.

RPA modified the resource classification by smoothing the outlines of the Measured and Indicated blocks into more continuous and coherent shapes and reclassifying isolated blocks within areas dominated by other resource categories.

MINING METHOD

Conventional open pit mining methods are proposed for the Houston Project. Proposed RoM operations would begin in the Houston 1 pit in July of Year 1, followed by the addition of the Houston 2 pit in Year 2. Both Houston 1 and 2 were previously permitted, as described in Section 20. In Year 6, RoM operations move north to the Malcolm pits in Québec, and in Year 8, RoM operations return to Labrador for mining of Houston 3.

Mining operations will be performed by LIM year-round using its own equipment and workforce, with the exception of blasting services, which will be provided by an explosives contractor. The specified fleet sizing significantly reduces dependence on an individual unit and allows for a high level of operational flexibility in deployment. In addition, many of the production units are common with the product truck haul and rail siding operations.

RoM operations target production of approximately 2.0 Mdmtpa of high-grade iron mineralization for product sales over a 12-year period. Approximately 23.4 Mdmt of high-grade iron mineralization is mined at a diluted grade of 62.2% Fe over the LoM, along with 52.5 Mdmt of waste material. The LoM stripping ratio is approximately 2.2 units of waste to each unit of high-grade iron mineralization (2.2:1). Of specific note are the very low stripping ratios in Years 1 and 2, at 0.1:1 and 1.2:1 respectively.

MINERAL PROCESSING

Processing at the Houston Project will comprise dry processing targeting >58% Fe iron mineralization, to produce two products, lump (-31.5 mm to +6.3 mm), and sinter fines (-6.3 mm). Processing will consist of crushing and screening, resulting in two stockpiles, one for each product, which will be recovered by front end loader and loaded into trucks for hauling to the rail siding where they will be loaded into rail cars. Processing is scheduled to take place year-round with an allowance included for weather-related interruptions.

Process facilities at the Houston Project will consist of a mobile crushing and screening plant sized to process a nominal 2.0 Mdmtpa of high-grade iron mineralization (the dry sizing plant). The dry sizing plant will produce approximately 150 tph of lump product and 350 tph of sinter fines. Each section of the plant will be on a trailer and will not require any civil work or concrete foundations for the plant floor, which will allow the plant to be moved to Québec for processing of Malcolm high-grade iron mineralization, and moved back to Labrador for processing Houston 3 high-grade iron mineralization.

PROJECT INFRASTRUCTURE

LIM's Schefferville Projects benefit from established and extensive infrastructure including railway service, roads, airstrip, hydro power, multiple work camp facilities, laboratory facilities, and the nearby town of Schefferville.

There is currently no existing infrastructure at the Houston Project site. Right-of-way clearing of trees was previously completed for the permitted product haul road and rail siding.

The following is a summary list of the proposed infrastructure for the Houston Project:

- Houston and Malcolm pits and associated access roads.
- Explosives and magazine facilities (provided by explosives contractor).
- Waste, overburden, and low-grade stockpile material storage areas and associated access roads.
- Dry sizing plant facilities (mobile / modular facility to be located in Labrador for sizing of Houston property iron mineralization and located in Québec for sizing of Malcolm property iron mineralization).
- Sample preparation trailer (prepared samples will be shipped offsite for contract assaying).
- Site power primary diesel generator, backup generator, and site distribution facilities.
- Site haul roads.
- Rail siding.
- Water management infrastructure including dewatering wells, as required, for open pit water management, in-pit sumps, surface water collection and diversion ditches, and sedimentation ponds.

- Fuel storage (day tanks only – fuel will be despatched by a contracted truck service from Schefferville) and distribution facilities.
- Maintenance shop (portable soft-sided building) including warehouse facilities.
- Hazardous waste storage area (for waste oil, filters, batteries, etc.).
- Mobile trailer type offices and lunchroom, including mine rescue and first-aid station.
- Mobile trailer type mine dry facility.
- Wastewater leach field for sewage management.
- Parking areas.
- Security signage and gates.
- Storage and laydown areas.
- Communications system including internet and radio system.
- Existing dry materials landfill site.
- Proposed use of the existing camp facility at Bean Lake at 144-person capacity (contracted service).

MARKET STUDIES

For the past two years the benchmark iron ore price (62% Fe fines CFR China, dry metric tonne basis) has often exceeded US$100/dmt. This has been a function of both supply disruptions and steady and increasing demand from China.

The cumulative impact of robust demand in China and tight supply has led to a significant increase in the benchmark price of iron ore over the past year. In February 2021, the price reached over US$170/dmt, representing the highest price in more than six years, while the three year trailing average is at US$90/dmt.

Market commentators are generally confident that continuing strong demand from China will support a robust iron ore market. Going forward, a significant global economic recovery driven by COVID-19 recovery stimulus programs expected worldwide in 2021 should create strong demand for steel production and a supportive price floor for benchmark iron ore at approximately US$100/dmt.

The Houston Project is proposed to produce direct shipping iron ore mineralization for both lump and sinter fines products, which can be marketed globally.

The Houston Project Mineral Resources have been estimated using a benchmark iron ore price of US$100/dmt, based on long-term independent forecasts from banks and financial institutions.

The Houston Project PEA cash flow uses a benchmark iron ore price of US$90/dmt. The benchmark price was adjusted to account for the following:

- Lump premium: US$10/dmt.
- Penalties for deleterious elements: US$1.50 per 1.0% silica above grade threshold of 4.0%.

The Houston Project assumes the sale of its products at the proposed rail siding south of Schefferville on a FOB basis. The offtake buyer would assume title to the products at this point and be responsible for transporting the products by rail to the port of Sept-Îles, with all port charges, and ocean freight charges to the offtake buyer. The offtake buyer would assume all risk associated with changes in commercial terms related to transporting the products to a final customer. A fixed price including consideration for potential premiums and penalties would be paid to LIM at the rail siding to ensure a minimum return to LIM on its invested capital. For the purpose of the PEA, price participation between LIM and the potential offtake buyer is assumed at 50:50 for the incremental portion of the benchmark iron ore price greater than US$90/dmt.

ENVIRONMENTAL, PERMITTING AND SOCIAL CONSIDERATIONS

The Houston Project is a part of LIM's Schefferville Projects and as such is a continuation of LIM's previous operations and ongoing activity in the Schefferville area. LIM has indicated that the company will build on the studies, knowledge, and experiences gained in the Schefferville Projects and will develop the Houston Project in accordance with LIM's environmental and corporate policies and procedures.

The Houston Project consists of the Houston property, which includes the Houston 1, Houston 2, and Houston 3 Mineral Resources, located in Labrador, and the Malcolm property, which includes the Malcolm Mineral Resources and is contiguous to the northwest and located in Québec. The PEA proposes development of the Houston Project in phases, with operations starting with Houston 1 and Houston 2, followed by the development of Malcolm and Houston 3. The Houston Project site is currently undeveloped, with activity currently limited to vegetation clearing of the product haul road right-of-way and the rail siding and train loading area.

LIM has established policies, practices, and procedures addressing environmental, social, health, and safety aspects.

LIM initiated environmental baseline data collection programs in 2005 in the Schefferville Projects area, including the Houston Project area, and the programs are ongoing. The programs include: traditional environmental knowledge; land use studies; heritage and archaeological resources; wildlife (including Caribou); natural history; avifauna; terrestrial and aquatic habitat and vegetation; fish and fish habitat; air quality; species at risk; noise and vibration; ARD potential; surface and groundwater quality; and geochemistry.

LIM has adopted a staged approach to regulatory permitting for the proposed Houston Project, whereby mining and processing will begin on the Houston 1 and 2 deposits, which was released under the Newfoundland and Labrador Environmental Protection Act and the Canadian Environmental Assessment Act. Houston 1 and 2 received regulatory approval for operations in 2014, along with various other permits required to begin construction. In general, the permits and approvals are still in good standing and only require administrative activation to reactivate. Malcolm and Houston 3 are at an earlier stage in planning.

The proposed Houston Project plans to mine Houston 1 and 2 deposits in the first half of the LoM, allowing adequate time for regulatory approval of the Malcolm and Houston 3 deposits prior to their proposed start of production in Year 6 and Year 8 of the production schedule respectively. Additional environmental assessment and permitting will be required for the development of Malcolm and Houston 3.

LIM believes that Houston 3 will likely be released under both the federal and provincial environmental assessment processes with the submission of a Project Registration document, as was the Houston 1 and 2 Project, and that approval could be obtained within a period of 12 to 18 months. It is anticipated that the environmental assessment of Malcolm will take longer, however, the timeframe will be reasonable in relation to the proposed production schedule.

The Houston 1 and 2 Project Registration document provides information on Houston 1 and 2, including available baseline information, addresses some of the potential future effects of Houston 1 and 2, and discusses environmental and social management measures. The Houston 1 and 2 Project Registration document concludes that overall construction, operation, and decommissioning are not likely to result in significant adverse environmental effects on the VEC identified. In addition, no significant adverse cumulative effects were identified for Houston 1 and 2, while it was noted that Houston 1 and 2 will result in socio-economic benefits.

An EPP was compiled for Houston 1 and 2 and approved by the regulator, Newfoundland and Labrador Department of Environment and Conservation (DOEC) and describes the management measures to be instituted for the Houston 1 and 2 Project. A Waste Management Plan has also been developed. A Newfoundland and Labrador Benefits Plan, including a Women's Employment Plan, has also been approved by the provincial government and is formally in place.

LIM has engaged in community and public consultation activities including consultation with Indigenous communities in both Labrador and Québec, in the Schefferville and surrounding areas since 2008 and has committed to continue to do so. The communities most directly affected by the Houston Project include the Innu Nation of Labrador, the Naskapi Nation of Kawawachikamach, the Innu Nation of Matimekush-Lac John, the Innu Nation of Takuaikan Uashat Mak Mani-Utenam (ITUM), and NunatuKavut Community Council (formerly the Labrador Métis Nation).

LIM entered into Impact Benefit Agreements or Economic Development Agreements (collectively, IBAs) with the four First Nation peoples asserting traditional and native rights to all or part of the area of the Schefferville Projects. LIM also entered into an Economic Partnership Agreement with the NunatuKavut Community Council, representing the Southern Inuit of Labrador.

The primary mine waste produced will be waste rock and collected surface contact water. It is currently proposed that waste rock will be stored on the surface for the Houston Project, however, opportunities may exist to backfill exhausted pits in the future once the full extent and development of the resources are known. One waste rock lithology, namely the Menihek shale, has the potential to generate acid and poor-quality leachate. A materials handling plan has therefore been developed to manage the Menihek shale appropriately. Surface contact water will be collected during the proposed operations and treated locally in sedimentation ponds prior to authorized discharge to the environment.

A rehabilitation and closure plan has been developed for the Houston 1 and 2 Project and approved by the provincial regulator (DNR). This plan includes closure and rehabilitation costing for which LIM must provide financial assurance prior to the commencement of construction. For the PEA, similar rehabilitation and closure methods are proposed for Malcolm and Houston 3.

LIM has a proven track record for planning, developing, operating, and closing an iron ore mine in the Schefferville region of Labrador, namely the James Mine and its Silver Yards processing facilities (dry and wet processes). LIM is in the final stage of completing the rehabilitation and closure requirements for the James Mine and Silver Yards.

CAPITAL AND OPERATING COST ESTIMATES

All costs are expressed in fourth quarter 2020 or first quarter 2021 Canadian dollars ($) unless otherwise noted.

The estimated cost to construct the Houston Project as described in this PEA is approximately $86.8 million, which includes $13.3 million in contingency (approximately 18% contingency). This amount includes the direct field costs for execution and equipment acquisition through Year 1, plus indirect and owner's costs associated with construction. Cost estimates are based on the PEA design and are considered to have an accuracy of +/- 35%.

Construction capital spending begins in the second half of Year -1 and consists primarily of owner's costs and indirects related to the mobilization of contractors. The majority of construction earthworks and equipment and facilities purchasing and installation is completed in the first half of Year 1. Remaining first purchase of equipment in the second half of Year 1 are also included in the construction capital. Costs associated with processing high-grade iron ore mineralization starting in the second half of Year 1 are captured as operating costs.

The estimated cost of sustaining capital over the LoM is $67.7 million. Sustaining capital primarily includes equipment first purchases and replacements incurred starting in Year 2 through the end of the mine life and the cost of relocating the dry sizing plant in Years 6 and 8. The major mobile equipment fleet (i.e., drills, excavators, loaders, trucks, dozers, and graders) are purchased under a capital lease arrangement over a period of three to five years and the payments and associated financing costs are included in the sustaining capital.

The cost of reclamation and closure is captured prior to the start of activity in an area. Total reclamation and closure cost is estimated at $8.4 million, which includes ongoing monitoring costs for three years post mining operations.

Operating costs are estimated for a steady state of approximately 2.0 Mdmtpa dry production on a year-round operating basis, except for train loading, which is performed seasonally at approximately 200 days per year in the warmer months. Full year operating costs range between $52 million and $75 million per year. LoM operating costs total approximately $747 million ($32.84/dmt sold).

2 INTRODUCTION

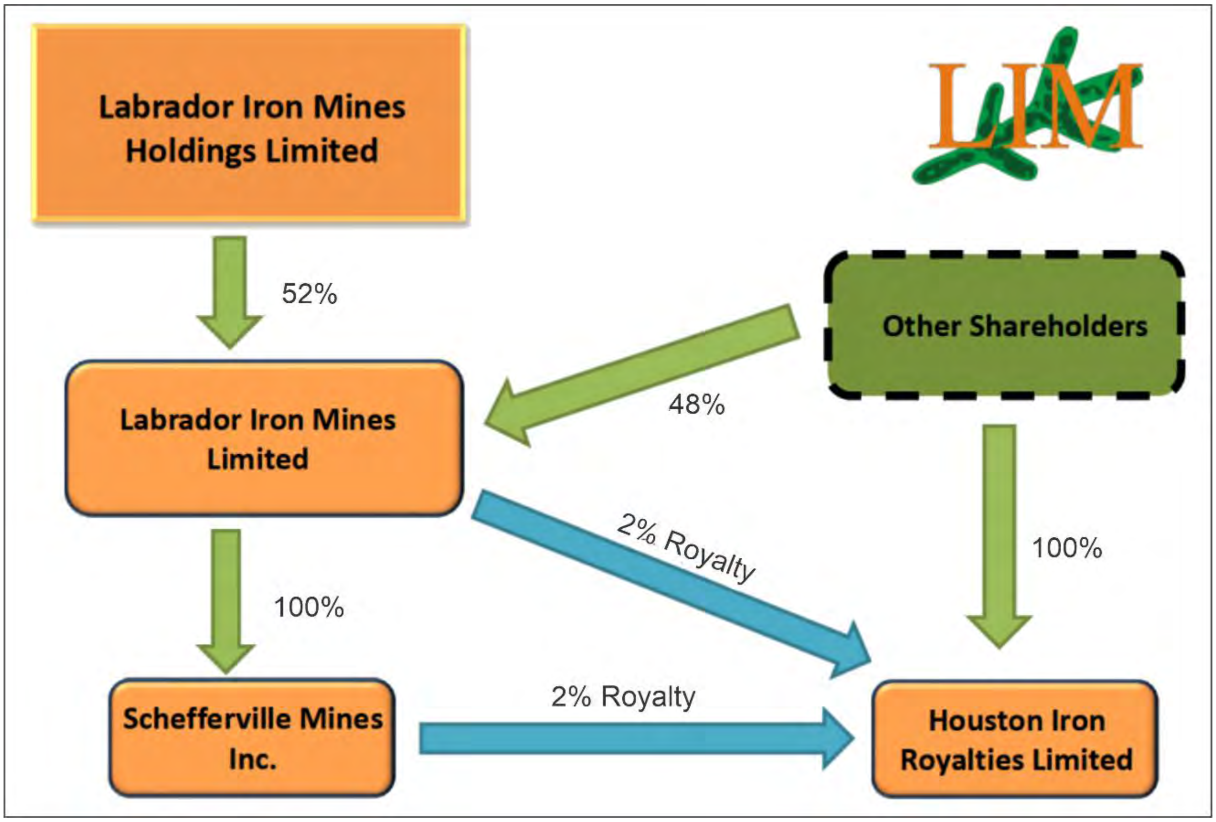
Roscoe Postle Associates Inc. (RPA), now part of SLR Consulting Ltd (SLR), was retained by Labrador Iron Mines Holdings Limited (LIMH) to prepare a Preliminary Economic Assessment (PEA) and a supporting independent Technical Report on the Houston Direct Shipping Iron Ore Project (the Houston Project), located near Schefferville, Québec, Canada. The purpose of this report is to support the disclosure of PEA results based on an updated Mineral Resource estimate for the Houston Project's Houston and Malcolm properties. This Technical Report conforms to National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101).

Parent company LIMH is headquartered in Toronto, Ontario, Canada. Labrador Iron Mines Limited (LIM) is majority owned (approximately 52%) by LIMH and Schefferville Mines Inc. (SMI) is a wholly owned subsidiary of LIM. LIM directly holds the group's iron properties located in the province of Newfoundland and Labrador and SMI directly holds the group's iron properties located in the province of Québec. Houston Iron Royalties Limited (HIRL) holds the right to a 2% royalty on sales of iron ore from the Houston and Malcolm properties.

RPA is independent of LIMH, LIM, SMI, and HIRL.

Figure 2-1 presents the LIMH group's ownership structure.

FIGURE 2-1 LIMH GROUP OWNERSHIP STRUCTURE



Source: LIMH

LIM holds the mineral claims for the Houston property, which hosts the Houston iron ore Mineral Resources located in Labrador, while SMI holds the claims for the Malcolm 1 (Malcolm) property, which hosts the Malcolm iron ore Mineral Resources located in Québec. In addition to the Houston and Malcolm properties, LIM and SMI hold numerous other properties in the area, which as a whole are referred to as the Schefferville Projects.

The Houston property Mineral Resources are split into three areas; Houston 1, Houston 2, and Houston 3, all located in Labrador. Houston 2 is the northernmost area, starting at the Québec-Labrador border. Immediately to the south is Houston 1, followed by Houston 3. Houston 1 and Houston 2 were previously permitted for construction, with significant permits still valid, as described in further detail in Section 20. To the northwest and along strike of the Houston property is the Malcolm property in Québec.

The Houston Project proposes to mine and direct ship approximately two million dry metric tonnes per annum (Mdmtpa) of iron ore mineralization lump and sinter fines products over an approximate 12-year mine life. Conventional open pit mining operations are proposed, with Run-of-Mine (RoM) iron ore mineralization dispatched to a dry sizing plant for processing. The dry sizing plant will be mobile or modular to facilitate relocation, so that mineralization mined in Labrador is processed in Labrador, and mineralization mined in Québec is processed in Québec. The dry sizing plant will consist of crushing and screening equipment, to size the iron ore mineralization into lump and sinter fines products. Lump product is typically defined with a +6.3 mm to -31.5 mm size distribution and sinter fines are typically +150 micron to -6.3 mm in size distribution. Lump product traditionally commands a premium price compared to sinter fines.

The lump and sinter fines products will be transported along a haul road to a rail siding, which is located adjacent to an existing operational mainline rail. The haul road and rail siding are to be constructed for the Houston Project, with tree clearing of the rights-of-way previously completed. The lump and sinter fines will be stockpiled at the rail siding for loading onto trains, which is planned as the Houston Project's selling point (i.e. Freight-on-Board (FOB) rail).

Various aspects of the Houston Project were previously permitted for operations, with significant permits still valid. These include the mining of Houston 1 and 2 and construction and operation of the proposed haul road and rail siding. The PEA proposes construction and operations of the Houston Project to begin with Houston 1 and 2, the already permitted areas, while advancing permitting at Malcolm and Houston 3 for proposed continued operations extending the mine life.

This report is considered by the Qualified Person (QP) to meet the requirements of a PEA as defined in Canadian NI 43-101 regulations. The cost estimation accuracy is +/-35% consistent with a Class 4 estimate defined under AACE International's cost estimate classification system. The economic analysis contained in this report is based, in part, on Inferred Mineral Resources, and is preliminary in nature. Inferred Mineral Resources are considered too geologically speculative to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves. There is no certainty that economic forecasts on which this PEA is based will be realized.

SOURCES OF INFORMATION

A site visit was carried out by Glen Ehasoo, P.Eng., RPA Principal Mining Engineer, on October 28, 2020. All critical components of the proposed Houston Project were traversed or observed, including:

- The Houston property, including observation of drill collars, trenches, and test pits.
- The Malcolm property.
- Exploration drilling storage facilities, including observation of drill core samples and rejects from LIM's Schefferville Projects, including the Houston Project.
- Existing access roads and permitted haul road right-of-way intersections.
- Existing rail main line.
- Permitted water storage facility.
- Existing proposed camp facility.

Discussions were held with personnel and representatives of LIMH:

- Mr. Rodney Cooper, M.B.A., P. Eng., Acc. Dir., Chief Operating Officer, LIM.
- Mr. Richard Pinkerton, CPA, CFA, Chief Financial Officer, LIM.
- Mr. Aiden Carey, Senior Vice President Operations, LIM.
- Mr. Larry LeDrew, M.Sc., Vice President Sustainable Development, LIM.
- Mr. Wayne Walsh, Operations Manager, LIM.
- Mr. George Wahl, P.Geo., Geological Consultant, GH Wahl and Associates Consulting.
- Mr. Maxime Dupere, P.Geo., Geologist, SGS Geological Services.

Table 2-1 summarizes the QPs that contributed to the various sections of the Technical Report.

TABLE 2-1 RPA QUALIFIED PERSONS AND THEIR RESPONSIBILITIES FOR TECHNICAL REPORT
Labrador Iron Mines Holdings Limited – Houston Project

Qualified Person	Title	Responsibilities
Glen Ehasoo, P.Eng.	Principal Mining Engineer	Section 13, portions of Sections 1 to 6, 15 to 19, and 21 to 27.
Dorota El Rassi, P.Eng.	Senior Geological Engineer	Portions of Sections 1, 7 to 12, 14, and 25 to 27.
Marc Lavigne, M.Sc., ing.	Principal Mining Engineer	Portions of Sections 1, 15 to 19, and 21 to 27.
Luke Evans, M.Sc., ing.	Technical Director, Geology Group Leader	Portions of Sections 1 to 12, 14, and 25 to 27.
Stephan Theben, SME R.M.	Mining Sector Lead, Managing Principal,	Section 20; portions of Sections 1, and 25 to 27

The documentation reviewed, and other sources of information, are listed at the end of this report in Section 27 References.

LIST OF ABBREVIATIONS

Units of measurement used in this report conform to the metric system. All currency in this report is Canadian dollars ($) unless otherwise noted.

μ	micron
μg	microgram
a	annum
A	ampere
bbl	barrels
Btu	British thermal units
°C	degree Celsius
C$	Canadian dollars
cal	calorie
cfm	cubic feet per minute
cm	centimetre
cm^2	square centimetre
d	day
dia	diameter
dmt	dry metric tonne
dwt	dead-weight ton
°F	degree Fahrenheit
ft	foot
ft^2	square foot
ft^3	cubic foot
ft/s	foot per second
g	gram
G	giga (billion)
Gal	Imperial gallon
g/L	gram per litre
Gpm	Imperial gallons per minute
g/t	gram per tonne
gr/ft^3	grain per cubic foot
gr/m^3	grain per cubic metre
ha	hectare
hp	horsepower
hr	hour
Hz	hertz
in.	inch
in^2	square inch
J	joule
k	kilo (thousand)
kcal	kilocalorie
kg	kilogram
km	kilometre
km^2	square kilometre
km/h	kilometre per hour
kPa	kilopascal
kVA	kilovolt-amperes
kW	kilowatt
kWh	kilowatt-hour
L	litre
lb	pound
L/s	litres per second
m	metre
M	mega (million); molar
m^2	square metre
m^3	cubic metre
MASL	metres above sea level
m^3/h	cubic metres per hour
mi	mile
min	minute
μm	micrometre
mm	millimetre
mph	miles per hour
MVA	megavolt-amperes
MW	megawatt
MWh	megawatt-hour
oz	Troy ounce (31.1035g)
oz/st, opt	ounce per short ton
ppb	part per billion
ppm	part per million
psia	pound per square inch absolute
psig	pound per square inch gauge
RL	relative elevation
s	second
st	short ton
stpa	short ton per year
stpd	short ton per day
t	metric tonne
tpa	metric tonne per year
tpd	metric tonne per day
US$	United States dollar
USg	United States gallon
USgpm	US gallon per minute
V	volt
W	watt
wmt	wet metric tonne
wt%	weight percent
yd^3	cubic yard
yr	year

3 RELIANCE ON OTHER EXPERTS

This report has been prepared by RPA for LIMH. The information, conclusions, opinions, and estimates contained herein are based on:

- Information available to RPA at the time of preparation of this report.
- Assumptions, conditions, and qualifications as set forth in this report.

For the purpose of this report, the QP's have relied on ownership and permitting information provided by LIMH (LIMH 2021a, LIMH 2021b). The QP's have not researched property title or mineral rights for the Houston Project and express no opinion as to the ownership status of the property.

The QP's have relied on LIMH for guidance on applicable taxes, royalties, and other government levies or interests, applicable to revenue or income from the Houston Project.

Except for the purposes legislated under provincial securities laws, any use of this report by any third party is at that party's sole risk.

4 PROPERTY DESCRIPTION AND LOCATION

The Houston Project includes the Houston property in the province of Newfoundland and Labrador, and the Malcolm property in the province of Québec. The Houston Project is part of LIM's Schefferville Projects, which in addition to the Houston and Malcolm properties include numerous other properties in the Schefferville region. The approximate location of the Houston Project is shown in Figure 4-1.

HOUSTON PROPERTY

LOCATION

The Houston property is located in Labrador, in the western central part of the Labrador Trough iron range, approximately 1,140 km northeast of Montreal and 15 km southeast of the town of Schefferville, Québec. The northern limit of the Houston property abuts the Labrador Québec border. The Houston property covers a number of separate deposits along strike historically identified from the northwest to the southeast as Houston 2, Houston 1, and Houston 3.

LAND TENURE

With respect to the Houston property, LIM holds the title to one mineral rights licence issued by the Department of Natural Resources, Province of Newfoundland and Labrador, representing 112 mineral claims located in northwest Labrador covering approximately 2,800 ha (Table 4-1 and Figures 4-2 and 4-3).

TABLE 4-1 LICENCE COMPRISING THE HOUSTON PROPERTY
Labrador Iron Mines Holdings Limited – Houston Project

Licence No.	Location	Claims	Issued	Licence Renewal[1]
020433M	Houston	112	12/04/2004	12/04/2024

Notes:
1. In 2012, previous licences were combined into one.

In addition, LIM holds the title to Mining Lease 216 (20433M) covering approximately 352 ha over the Houston 1 and 2 deposits, Surface Lease 135 (Houston 1 and 2 Project) covering approximately 1,062 ha, Surface Lease 139 (Houston Discharge) covering approximately 83 ha, and Surface Lease 140 (Houston Pipeline) covering approximately 22 ha, each issued by the Department of Natural Resources, Province of Newfoundland and Labrador.

February 2021

Source: Map Resources, 2020.

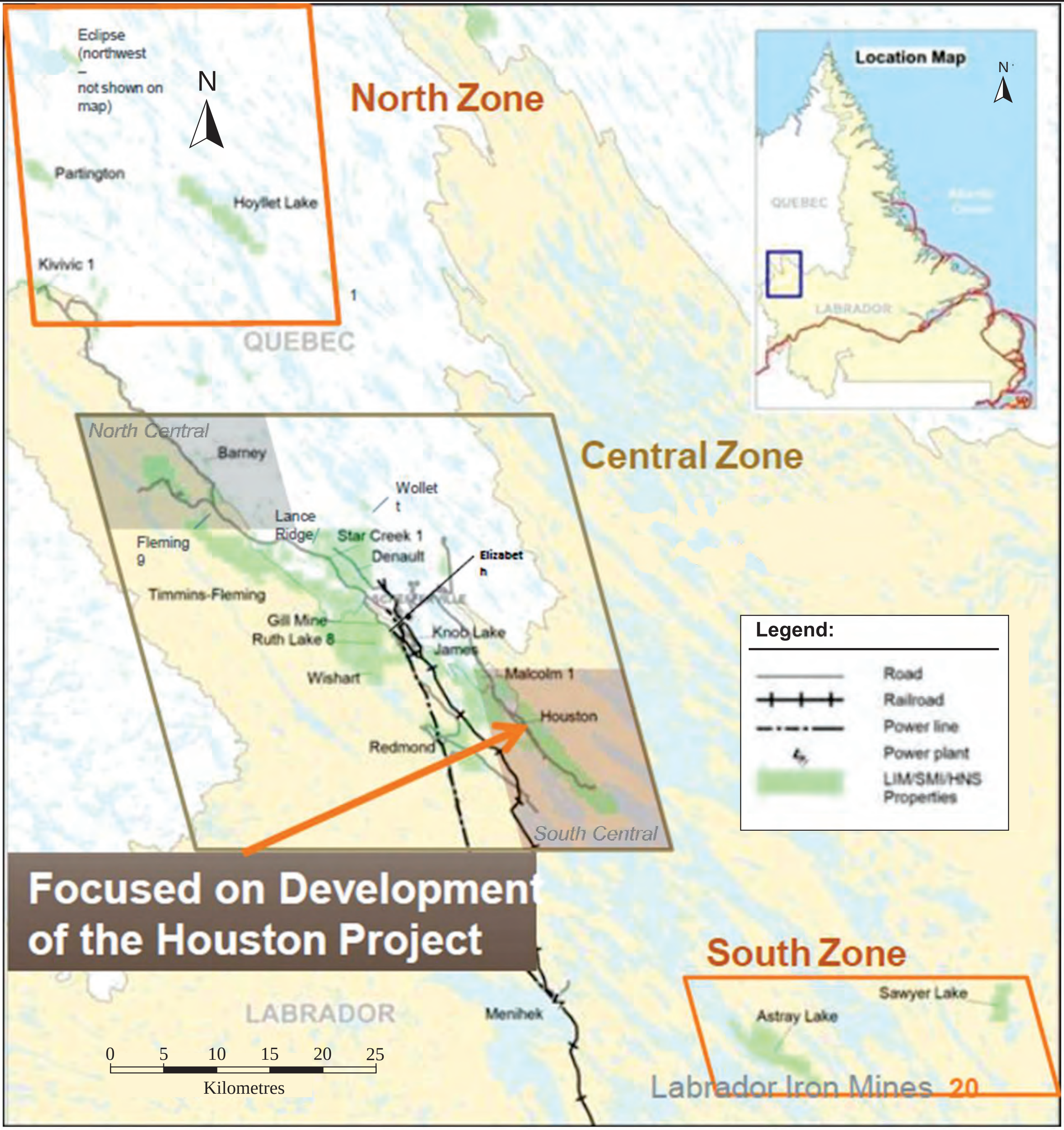


Figure 4-2

Labrador Iron Mines Holdings Limited

Houston Project
Provinces of Newfoundland and Labrador and Québec, Canada

Map of LIM Mining Licences and Claims

February 2021

Source: LIMH, 2020.

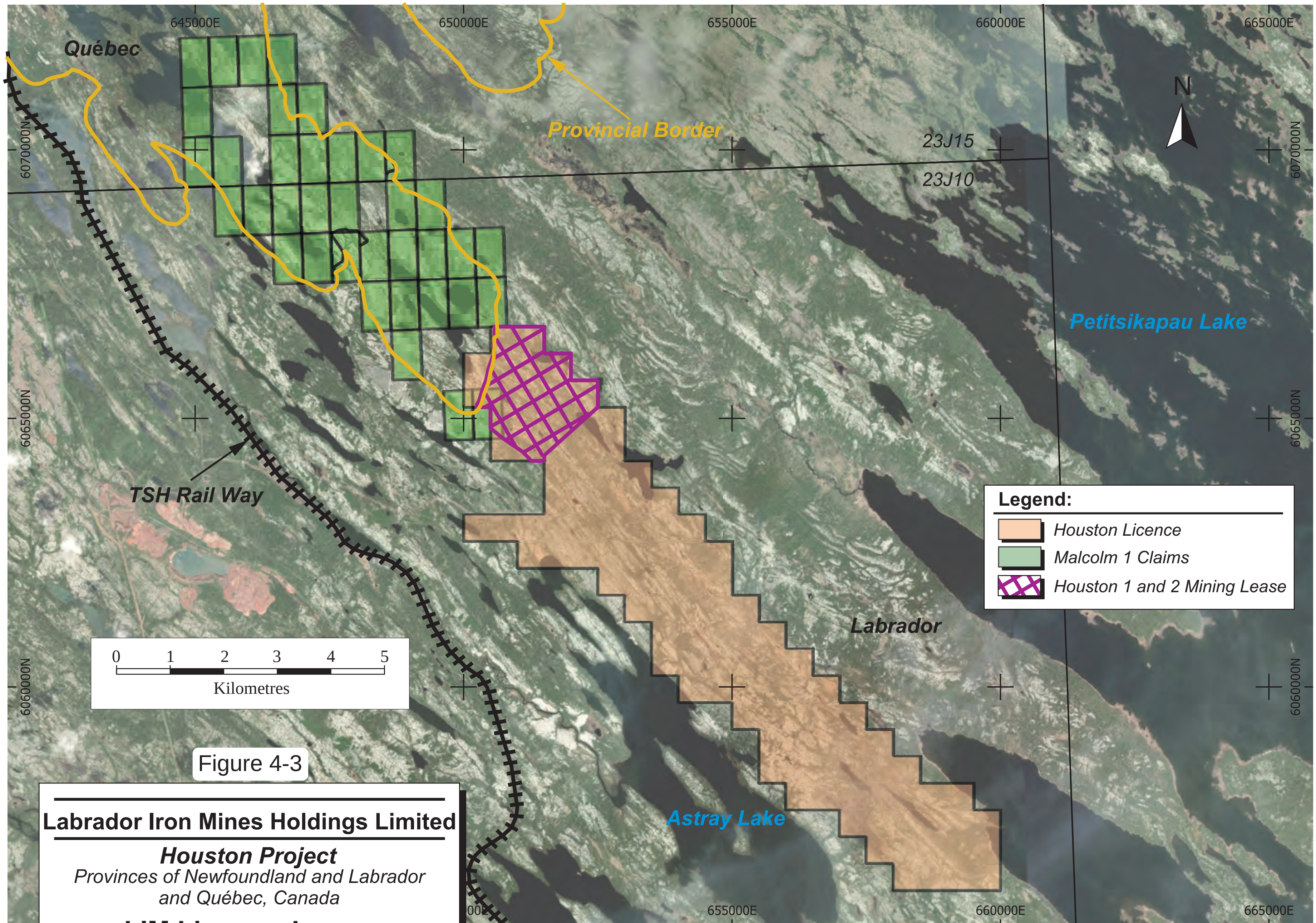


Figure 4-3

Labrador Iron Mines Holdings Limited

Houston Project

Provinces of Newfoundland and Labrador and Québec, Canada

LIM Licence, Lease, and Claim Map

February 2021

Source: RPA, 2021.

ROYALTIES AND OTHER ENCUMBRANCES

Under the terms of a royalty agreement dated October 1, 2011, between Fonteneau Resources Limited (Fonteneau) and LIM, as amended and assigned, a royalty in the amount of 3.0% of the selling price FOB port per tonne of iron ore produced and shipped from the Houston property payable to Fonteneau, capped at US$1.50 per tonne.

HIRL was formed in December of 2016 and holds the right to receive a royalty equal to 2.0% of the sales proceeds (FOB Port of Sept-Îles) received by LIM from sales of iron ore from LIM's Houston property.

There are four minor royalties negotiated in the First Nations Impact Benefits Agreements (IBAs) included in the economic analysis. Two are net profits royalties and two are net smelter royalties.

Except for the royalties mentioned above, the QP is not aware of any other royalties due, back-in rights, or other obligations or encumbrances by virtue of any underlying agreements.

MALCOLM 1 PROPERTY

LOCATION

The Malcolm property is located in the Province of Québec contiguous to the northwest of the Houston property. The Malcolm deposit is believed to be the northwest extension of the Houston deposits, and lies on gently westward sloping land approximately 12 km southeast of Schefferville (see Figure 4-1 for general location).

LAND TENURE

The Malcolm property includes 41 claims issued by the Québec government, covering approximately 1,842 ha in Québec. LIM, through its subsidiary SMI, holds title to the Malcolm claims in Québec. Table 4-2 lists the 41 claims of the Malcolm property and Figure 4-3 shows the claim limits.

TABLE 4-2 LIST OF MALCOLM 1 CLAIMS
Labrador Iron Mines Holdings Limited – Houston Project

	Claim No.	Renewal Date	Expiry Date	Area (ha)
CDC	58039	Dec 23, 2021	Feb 23, 2022	49.81
CDC	58040	Dec 23, 2021	Feb 23, 2022	49.81
CDC	58045	Dec 23, 2021	Feb 23, 2022	49.76
CDC	58048	Dec 23, 2021	Feb 23, 2022	47.86
CDC	2183173	Mar 6, 2022	May 7, 2022	49.74
CDC	2183174	Mar 6, 2022	May 7, 2022	49.74
CDC	2188826	Jul 16, 2022	Sep 16, 2022	49.77
CDC	2233265	Mar 9, 2023	May 10, 2023	49.80
CDC	2233266	Mar 9, 2023	May 10, 2023	49.79
CDC	2233267	Mar 9, 2023	May 10, 2023	49.79
CDC	2233268	Mar 9, 2023	May 10, 2023	49.79
CDC	2233269	Mar 9, 2023	May 10, 2023	48.00
CDC	2233270	Mar 9, 2023	May 10, 2023	49.78
CDC	2259638	Sep 7, 2021	Nov 8, 2021	49.77
CDC	2279509	Jan 21, 2022	Mar 24, 2022	49.76
CDC	2298702	Apr 20, 2022	Jun 21, 2022	49.78
CDC	2298703	Apr 20, 2022	Jun 21, 2022	49.78
CDC	2298704	Apr 20, 2022	Jun 21, 2022	11.13
CDC	2298705	Apr 20, 2022	Jun 21, 2022	49.77
CDC	2298706	Apr 20, 2022	Jun 21, 2022	49.77
CDC	2298707	Apr 20, 2022	Jun 21, 2022	49.76
CDC	2298708	Apr 20, 2022	Jun 21, 2022	49.75
CDC	2298709	Apr 20, 2022	Jun 21, 2022	49.75
CDC	2298710	Apr 20, 2022	Jun 21, 2022	49.74
CDC	2317779	Aug 11, 2022	Oct 12, 2022	49.79
CDC	2317780	Aug 11, 2022	Oct 12, 2022	49.79
CDC	2317781	Aug 11, 2022	Oct 12, 2022	49.78
CDC	2317782	Aug 11, 2022	Oct 12, 2022	49.78
CDC	2317783	Aug 11, 2022	Oct 12, 2022	49.78
CDC	2317784	Aug 11, 2022	Oct 12, 2022	49.77
CDC	2317785	Aug 11, 2022	Oct 12, 2022	49.77
CDC	2317786	Aug 11, 2022	Oct 12, 2022	3.61
CDC	2317787	Aug 11, 2022	Oct 12, 2022	46.15
CDC	2375170	Nov 12, 2021	Jan 13, 2022	49.74
CDC	2375171	Nov 12, 2021	Jan 13, 2022	49.76
CDC	2375172	Nov 12, 2021	Jan 13, 2022	49.75
CDC	2375173	Nov 12, 2021	Jan 13, 2022	49.75
CDC	2375174	Nov 12, 2021	Jan 13, 2022	49.75
CDC	2386623	Apr 16, 2022	Jun 17, 2022	38.65
CDC	2386624	Apr 16, 2022	Jun 17, 2022	1.78
CDC	2386625	Apr 16, 2022	Jun 17, 2022	1.91
Total				**1,841.51**

ROYALTIES AND OTHER ENCUMBRANCES

LIM, through its subsidiary SMI, holds a 100% right to the Malcolm claims in Québec, subject to a royalty of $2.00 per tonne payable to Hollinger North Shore Exploration Company Limited (Hollinger).

HIRL was formed in December of 2016 and holds the right to receive a royalty equal to 2.0% of the sales proceeds (FOB Port of Sept-Îles) received by LIM from sales of iron ore from SMI's Malcolm property.

Under the various IBAs with neighbouring indigenous groups, LIM has agreed to pay certain royalties or profit participations included in the economic analysis. Two agreements provide for net profits royalties and two for net smelter royalties.

Except for the royalties mentioned above, the QP is not aware of any other royalties due, back-in rights, or other obligations or encumbrances by virtue of any underlying agreements.

The QP is not aware of any environmental liabilities on the properties or any other significant factors and risks that may affect access, title, or the right or ability to perform the proposed work program on the properties.

5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

ACCESSIBILITY

The Houston Project's Houston and Malcolm properties are located in the west central part of the Labrador Trough iron range. The properties are located approximately 1,140 km northeast of Montreal and adjacent to, or within, 15 km of the town of Schefferville, Québec (Figure 4-1).

While both the Houston and Malcolm properties can be reached by all-weather exploration gravel roads from the town of Schefferville, there are no roads connecting this area to western Labrador or elsewhere in Québec. Access from the southern areas of the provinces of Québec and Newfoundland and Labrador to the Houston Project area is either by rail from Sept-Îles to Schefferville or by air from Montreal, Québec City, Sept-Îles, Wabush, Goose Bay, or St. John's.

A mine haul road was previously permitted and the right-of-way cleared of trees to connect the Houston 1 and Houston 2 areas of the Houston Project to a previously permitted rail siding along the existing Tshiuetin Rail Transportation Inc. (TSH) mainline rail, which provides service to Schefferville. The Houston Project proposes to complete construction of this previously permitted infrastructure.

CLIMATE

The Schefferville area and vicinity have a sub-arctic continental taiga climate with very severe winters. Daily average temperatures exceed 0°C for only five months a year. Daily mean temperatures for Schefferville average -24.1°C and -22.6°C in January and February respectively. Mean daily average temperatures in July and August are 12.4°C and 11.2°C respectively. Snowfall can occur any month of the year, however, the months of October through April see the greatest quantities, ranging from 43 cm to 71 cm per month on average, with total annual accumulation averaging approximately 440 cm. The wettest months of the year are June through September, ranging from 65 mm to 107 mm on average, with total annual accumulation averaging approximately 408 mm (source: Environment Canada).

Exploration work in the area can typically be carried out year-round, however, reverse circulation (RC) drilling and trenching programs are typically preferred during the months of May to November.

Mine development operations can be carried out year-round as well. Operations during extreme cold conditions can stop intermittently. Production and shipping by rail of iron ore products have historically been limited to the months of April through November. This is due to the iron ore product potentially freezing in the rail cars in the winter months during transport from the Schefferville area to port, negatively impacting unloading operations, along with consideration for potential rail damage with heavy-haul operations in the colder months and during freshet, though the freight and passenger operations operate year-round.

LOCAL RESOURCES

It is assumed that approximately 20% of the workforce will come from the local area including Schefferville, Québec, as has been the case for previous LIM mining operations (James Mine). The remaining 80% will likely be sourced from further afield in the Labrador City / Wabush / Goose Bay areas, other parts of Newfoundland and Labrador and parts of Québec (Sept-Îles, Québec City, or Montreal) and will fly in and fly out of the operations. The fly in and fly out personnel are proposed to be accommodated in a mine camp (the Bean Lake camp) previously owned by LIM, but sold to a local group who now operates it. Additional trailer camp style accommodations and two commercial hotels exist in Schefferville. The majority of personnel would work on a two-week-on two-week-off schedule, working for 12 hours a day, with day and night shift coverage as required.

INFRASTRUCTURE

The town of Schefferville has a Fire Department with mainly volunteer firefighters, a fire station, and fire-fighting equipment. The Sûreté du Québec Police Force is present in the town of Schefferville and the Matimekush-Lac John reserve. There is a clinic in Schefferville with limited medical facilities. Schefferville also has a municipal garage, a small motor repair shop, a local hardware store, a mechanical shop, a local convenience store, two hotels, numerous outfitters accommodations, a community radio station, recreation centre, parish hall, gymnasium, playground, childcare centre, and drop-in centre.

Schefferville has a modern airport, which includes a 2,000 m paved runway and navigational aids for passenger jet aircraft. Regular air service is provided to and from St. John's and Goose Bay, via Wabush, Labrador, and to Montreal and Québec City, via Sept-Îles.

The railway station in Schefferville provides services for both passenger and freight trains. There is a bulk fuel storage facility at the station where fuel for the Houston Project will be sourced, with daily delivery by a contracted service. There is yard space for limited off-loading of freight. The road to the railway station is populated with light commercial enterprises. TSH Railway maintains a maintenance shop at the rail station yard (Garage Bleu).

The Menihek power plant is located 35 km southeast of Schefferville. The hydro power plant was built to support iron ore mining and services in Schefferville. Back-up diesel generators are also present. The Houston Project as proposed will be self-contained with its own diesel-powered generators and the proposed contracted Bean Lake Camp facilities will also use diesel-powered generators. LIM owns the electrical substation/transformer station that was previously used to operate a wet iron ore processing plant at Silver Yards (2010-2013), which is located near the Bean Lake camp. This system is currently not energized, however, a power purchasing agreement is in place with Nalcor, the provincial power authority. RPA notes there is a potential opportunity to relocate this substation to the vicinity of the Houston Project or to extend the existing power line from the Bean Lake Camp facilities to the Houston Project's proposed dry sizing plant location to reduce reliance on diesel powered generators.

RAILROAD

Schefferville is accessible by train via the approximately 560 km main rail line between Schefferville and Sept-Îles. The rail line was originally constructed for the shipment of iron ore from the Schefferville area and has been in continuous operation for over sixty-five years. The Québec North Shore and Labrador (QNS&L) railway, a wholly-owned subsidiary of Iron Ore Company of Canada (IOC), was established in 1954 to haul iron ore from the Schefferville area mines to the port of Sept-Îles. After the shutdown of IOC's Schefferville operations in 1982, QNS&L maintained a passenger and freight service between Sept-Îles and Schefferville up to 2005.

In 2005, QNS&L sold the section of the railway known as the Menihek Division (213 km) between Emeril Yard at Emeril Junction and Schefferville to TSH (Figure 5-1). TSH now owns and operates the approximately 213 km main line track between Schefferville and Emeril Junction where it connects to IOC's QNS&L Railroad, which connects the remaining approximately 360 km to Sept-Îles.

TSH is owned equally by a consortium of three local Aboriginal First Nations, Naskapi Nation of Kawawachikamach, Nation Innu Matimekush-Lac John, and Innu Takuaikan Uashat Mak Mani-Utenam (collectively, the TSH Shareholders). TSH operates passenger and freight service between Schefferville and Sept-Îles twice per week. LIM and TSMC contributed capital to the TSH Railway to ensure the rail line was suitable for heavy iron ore haulage.

Iron ore rail shipments resumed after 29 years in 2011 with LIM's operations at the James Mine. Tata Steel Minerals Canada Limited (TSMC) currently uses the rail line for shipment of its direct shipping ore from it's Schefferville operation.

Currently six major rail-way companies operate in the area:

1. TSH runs passengers, iron ore, and freight from Schefferville to Emeril/Ross Bay Junction. Freight and passenger service continues on to Sept-Iles, Québec, while iron ore traffic is transferred to QNS&L power for service to the vicinity of Sept-Iles.
2. QNS&L hauls iron concentrates and pellets from Labrador City/Wabush area via Ross Bay Junction to Sept-Îles.
3. Bloom Lake Railway hauls iron concentrates from the Bloom Lake mine to Wabush.
4. Arnaud Railways hauls iron ore for Wabush Mines Ltd. and the Bloom Lake Mine between Arnaud Junction and Pointe Noire.
5. Labrador Iron Mines/Timmins Railway Line, a spur line held under a surface lease in the joint names of LIM and TSMC, which runs from the Knob Lake Junction on the TSH main line, through Silver Yards, to the Labrador/Québec provincial boundary where it connects with the Timmins rail spur, which runs to the TSMC plant site. This spur line and its extension to the TSMC DSO operations is currently operated by Genesee & Wyoming for TSMC. The TSMC DSO rail loop at the Timmins plant site in Labrador is a separate rail company registered in Newfoundland and Labrador.
6. The Cartier Railway Company (CRC) is owned by Arcelor Mittal and hauls iron concentrates from the Fermont area to Port-Cartier. This railway is not connected to TSH, QNS&L, Bloom Lake, or Arnaud.

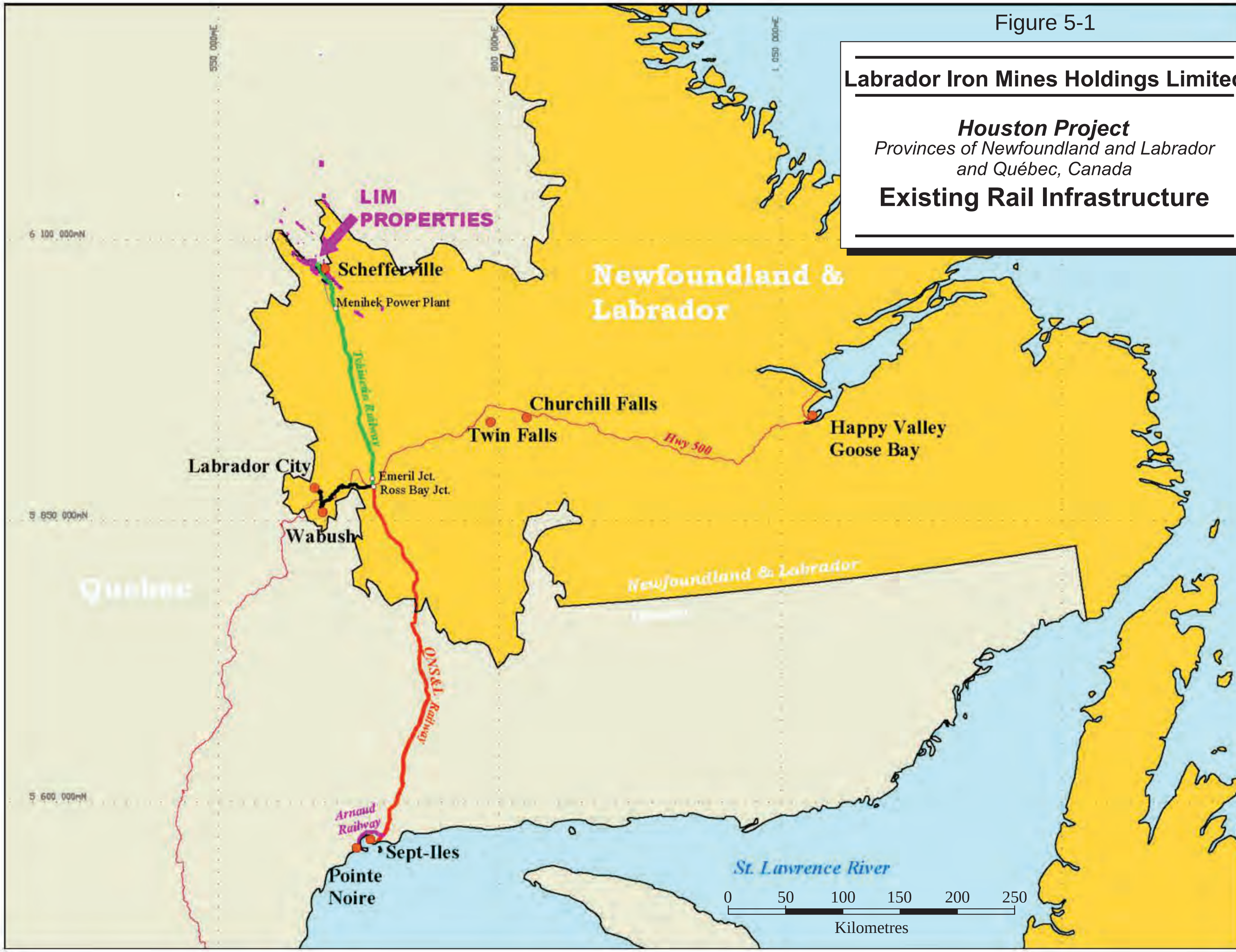
Figure 5-1

Labrador Iron Mines Holdings Limited

Houston Project

Provinces of Newfoundland and Labrador and Québec, Canada

Existing Rail Infrastructure



February 2021

Source: LIM, 2013.

www.rpacan.com

PHYSIOGRAPHY

The topography of the Schefferville area is bedrock controlled with the average elevation of the properties varying between 500 MASL and 700 MASL. The terrain is generally gently rolling to flat, sloping northwesterly, with a total relief of approximately 50 m to 100 m. In the main mining district, the topography consists of a series of northwest-southeast trending ridges while the Astray Lake and Sawyer Lake areas are within the Labrador Lake Plateau. Topographic highs in the area are normally formed by more resistant quartzites, cherts, and silicified horizons of the iron formation itself. Lows are commonly underlain by softer siltstones and shales.

Generally, the area slopes gently west to northeast away from the land representing the Québec-Labrador border and towards the Howells River valley parallel to the dip of the deposits. The finger-shaped area of Labrador that encloses the Howells River drains southwards into the Churchill River watershed and from there into the Atlantic Ocean. Streams to the east and west of the height of land in Québec flow into the Kaniapiskau watershed, which flows north into Ungava Bay.

The mining district is within a "zone of erosion" where the last period of glaciation has eroded away any pre-existing soil/overburden cover, with the zone of deposition of these sediments being well away from the area of interest. Glaciation ended in the area as little as 10,000 years ago and there is very little subsequent soil development. Vegetation commonly grows directly on glacial sediments and the landscape consists of bedrock, a thin veneer of till, as well as lakes and bogs.

The thin veneer of till in the area is composed of both glacial and glacial fluvial sediments. Tills deposited during the early phases of glaciations were strongly affected by later sub-glacial melt waters during glacial retreat. Commonly, the composition of till is sandy gravel with lesser silty clay, mostly preserved in topographic lows. Glacial melt water channels are preserved in the sides of ridges both north and south of Schefferville. Glacial ice flow in the area has been recorded as an early major northwest to southeast flow and a later less pronounced southwest to northeast flow. The early phase was along strike with the major geological features and the final episode was against the topography. The later northeast flow becomes more pronounced towards the southern end of the district near Astray Lake or Dyke Lake.

The Houston Project is at the PEA stage of project development. The QP is of the opinion that, to the extent relevant to the Houston Project and its current stage of development, there is a sufficiency of surface rights.

6 HISTORY

PRIOR OWNERSHIP

The Labrador Trough, which forms the central part of the Québec-Labrador Peninsula in eastern Canada, is the largest iron ore producing region in Canada and one of the largest iron ore producing regions in the world, and has a tradition of iron ore mining since the early 1950s.

The region remained largely unexplored until the late 1930s and early 1940s when the first serious mineral exploration was initiated by Labrador Mining and Exploration Company Limited (LM&E), which acquired large mineral concessions in northwestern Labrador. Hollinger was then established in 1941 to acquire concessions across the border in Québec. Initially, the emphasis was on exploring for precious metals, however, as the magnitude of the iron deposits in the area became apparent, development of these resources became the priority.

After World War II, Hollinger attracted the interest of MA Hanna, a large U.S. mining company, and the Iron Ore Company of Canada (IOC) was formed in 1949 by a consortium of U.S. steel companies to explore and develop the iron deposits with the objective of suppling iron ore to the U.S. steel industry from what would become known as the Schefferville region. IOC, operating under subleases from Hollinger and LM&E, conducted large exploration programs and outlined iron ore resources totalling approximately 400 million tons in a series of DSO deposits of varying sizes.

To support its operations, IOC established the town of Schefferville in Québec, and built extensive supporting infrastructure in the area, including an airport and a railway that provided a direct transportation link from Schefferville to Sept-Iles, on the north shore of the St. Lawrence River. IOC also built extensive infrastructure in Sept-Iles, including a deep seaport with shipping access to both the Great Lakes and the Atlantic Ocean.

In 1954, IOC started to operate open pit mines in the Schefferville region containing 56% to 58% natural iron and exported it as a DSO product to steel companies in the U.S. and Western Europe. Starting in 1963, IOC also developed the larger but lower grade Carol Lake deposit in the Labrador City-Wabush region, approximately 200 km south of Schefferville, and started to produce concentrates and pellets with +64% Fe to supply its customers with higher-grade concentrate products.

As the technology of the steel industry changed over the ensuing years, more emphasis was placed on the concentrating ores of the Labrador City region. Subsequently, interest in and markets for the Schefferville region DSO declined. In addition, high growth in the demand for steel, which began after the end of World War II, came to an abrupt end in the early 1980s due to the impact of increasing oil prices. The energy crisis affected steel production in the U.S. and Western Europe as consumers switched to energy-efficient products. In 1982, IOC closed its DSO operations in the Schefferville region, focusing thereafter on iron ore concentrate and pellet production in the Labrador City region.

From 1954 to 1982, IOC's DSO operations in the Schefferville region produced approximately 150 million tons of lump and sinter fines from approximately 400 million tons of reserves and resources identified by IOC in the region, leaving approximately 250 million tons identified but undeveloped. The historical reserve and resource estimates identified by IOC were based on work completed prior to 1983 and were not prepared in accordance with NI 43-101 standards. The historical IOC estimates are not considered current mineral resources or reserves and should not be relied upon, however, they do provide an indication of the potential of the region and are considered relevant to ongoing exploration.

Following the closure of the IOC mining operations in 1982, the mining rights in Labrador, which were part of IOC's Schefferville DSO operations, reverted to LM&E, and ownership of the leases in Québec reverted back to Hollinger, at that time a subsidiary of Norcen Energy Ltd. Over the following years, most of the underlying mineral claims were allowed to lapse and reverted to the Crown.

In the early 1990s, Hollinger was acquired by La Fosse Platinum Group Inc. (La Fosse) which conducted studies on marketing, bulk sampling, metallurgical test work, and carried out some stripping of overburden at the James deposit. La Fosse sought and was granted a project release under the Environmental Assessment Act for the James deposit in June 1990 but did not proceed with project development and the claims subsequently were permitted to lapse.

Between 2003 and 2006, Fenton and Graeme Scott (the principals of La Fosse and Fonteneau Resources Limited (Fonteneau)), Energold Minerals Inc. (Energold) (controlled by John

Kearney, later Chairman of LIM), and New Millennium Iron Corp. (NML) began staking open claims over the former IOC iron ore deposits in the Schefferville region, in both Labrador and Québec.

Recognizing a need to consolidate the mineral ownership, Energold entered into agreements with Fonteneau and formed a joint venture with Anglesey Mining plc, a UK public company listed on the London Stock Exchange, through its then subsidiary LIM. In 2007, all the properties, which at the time comprised approximately 50 million tons of historical resources, were consolidated into LIM and the project was taken public by the flotation of LIMH on the Toronto Stock Exchange. LIM subsequently acquired additional properties in Labrador by staking.

In October 2009, LIM entered into an agreement with NML to exchange certain of their respective mineral licences in Labrador. The exchange eliminated the fragmentation of the ownership of certain mining rights in the Schefferville region enabling both parties to separately study and potentially develop their respective mineral licences in as efficient a manner as possible. As part of the agreement, NML transferred to LIM 125 ha in five mineral licences in Labrador that adjoin or form part of the Houston property.

In December 2009, LIM, through its subsidiary SMI, acquired control over a large package of mineral claims in the Schefferville region in Québec, containing approximately 50 million tons of historical resources, from Hollinger/La Fosse.

During the period from 2007 to 2012, LIM carried out extensive exploration of its various deposits in the Schefferville region and upgraded some of the historical resources to current Mineral Resources. Such work consisted of geological evaluation, sampling, geophysical surveys, trenching, drilling, bulk sampling, assaying, metallurgical test work, mine planning, community consultation, transportation studies, and other work.

LIM also completed development and other work, including metallurgical test work, marketing studies, environmental studies, rail transport and port handling agreements, and negotiated IBAs with local indigenous groups.

LIM's original plans for its Schefferville Projects envisioned the development and mining of the various deposits in stages. Stage 1 comprised the deposits closest to existing infrastructure and principally involved development and mining of the James deposit in Labrador.

LIM commenced construction of its James Mine in 2010, constructed a processing plant at Silver Yards near Menihek in Labrador, and built other infrastructure in support of the mine. Mining of the James deposit commenced in 2011, and in the three-year period of 2011, 2012, and 2013, LIM mined approximately 4.6 Mt of iron ore from the James Mine, producing a total of 3.6 million dry metric tonnes (dmt) of DSO product, all of which was railed to Sept-Îles and sold in 23 cape-size shipments into the China spot market.

LIM has not undertaken mining operations since 2013, primarily due to volatile iron ore market conditions, but has maintained its properties on a stand-by care and maintenance basis. The former James Mine and the Silver Yards processing facility have been in progressive reclamation since 2014, following termination of mining at the James Mine, and LIM has now substantially completed its environmental regulatory requirements relating to rehabilitation of the former James Mine, the Silver Yards processing site, and related infrastructure.

In light of recent stronger iron ore prices, LIM is now working to advance Stage 2 of its planned DSO mining operations, which involves the development of the Houston Project. The properties and iron deposits that currently form LIM's Schefferville Projects, including the Houston and Malcolm properties of the Houston Project, were part of the original IOC Schefferville region operations and form part of the remaining 250 million tons of historical resource identified by IOC in the Schefferville region, but were not part of IOC's producing properties.

Meanwhile, NML, which had staked other deposits in the region previously identified by IOC, entered into a joint venture with TSMC (a member of the Tata Group, the world's sixth largest steel producer) to develop an adjacent DSO project on various deposits, in both Labrador and Québec, centered approximately 25 km northwest of Schefferville. TSMC commenced production in 2013 and has been in continuous production on a seasonal basis since that time, producing 1 Mt to 2 Mt of DSO per year.

In a two-part transaction in 2013 and 2015, LIM sold its Howse deposit to TSMC.

Meanwhile, extensive production of iron ore concentrate and pellet production has continued uninterrupted in the Labrador City-Wabush / Fermont region of the Labrador Trough. There are currently four iron ore concentrate producers in this region, namely IOC (Labrador City) and Tacora Resources Inc. (Wabush Mines) in Labrador, and Arcelor Mittal Mines Canada (Québec Cartier) and Champion Iron Limited (Bloom Lake) in Québec. Collectively, these companies produced and shipped almost 60 Mt of iron ore product from the Labrador Trough in 2020. All iron ore produced by IOC, Tacora, and Champion is railed on the same railway, as previously used by LIM, to the port of Sept-Îles.

EXPLORATION AND DEVELOPMENT HISTORY

HISTORICAL EXPLORATION – SCHEFFERVILLE AREA

In 1929, a party led by J.E. Gill and W.F. James explored the geology around Schefferville, Québec, and named the area Ferrimango Hills. In the course of their field work, the party discovered enriched iron ore mineralization, or DSO deposits west of Schefferville, which they named Ferrimango Hills 1, 2, and 3. These were later renamed the Ruth Lake 1, 2, and 3 deposits by J.A. Retty.

In 1936, J.S. Wishart, a member of the 1929 mapping expedition, mapped the area around Ruth Lake and Wishart Lake in greater detail, with the objective of outlining new iron occurrences.

In 1937, W.C. Howells traversed the area of the Ruth Lake Property as part of a watercourse survey between the Kivivic and Astray lakes, now known as Howells River.

A report by LM&E describes the work of A.T. Griffis in the “Wishart – Ruth – Fleming” area carried out in 1945. The report includes geological maps and detailed descriptions of the physiography, stratigraphy, and geology of the area, and of the Ruth Lake 1, 2, and 3 iron deposits. Griffis recognized that the iron unit (Sokoman Formation) was structurally repeated by folding and faulting and remarked that “the potential tonnage of high-grade iron deposits is considered to be great.”

HOUSTON

In 1946 and 1947, geological mapping of the southeast area of the Wishart-Knob Lake area towards Astray Lake carried out by LM&E noted a number of areas with potential economic mineralization, which led to the discovery of the Houston 1 and Houston 2 deposits in 1950.

Most exploration on the properties was carried out by IOC from 1954 until the closure of their Schefferville operations in 1982. Much of the data used in the current evaluation status was provided in the numerous documents, sections and maps produced by IOC or by consultants working for them.

MALCOLM

Work by IOC in the 1960s and 1970s delineated a 1,000 m long by up to 90 m wide zone of iron enrichment, which had a northwest-southeast trend and dipped at 60° to 70° to the northeast. Malcolm was mapped, sampled, and drilled by IOC in several phases from the 1960s to 1982. To date, drill holes at Malcolm have been drilled as deep as 112 m and iron enrichment appears to continue to depth. A second smaller area of iron enrichment measuring 70 m by 160 m occurs to the southeast along strike from the former.

The enrichment appears to occur mainly within the Ruth member and Lower Iron Formation (LIF) of the Sokoman Iron Formation and would be similar to the enrichment encountered on the Houston property showings, approximately five kilometres to the southeast and occurring on the same band of iron formation.

HISTORICAL RESOURCE ESTIMATES

HOUSTON

In March 2012, SGS Canada Inc. (SGS) prepared a Mineral Resource estimate reporting 22.9 Mt at an average grade of 57.3% Fe in the Measured and Indicated categories and 3.7 Mt at an average grade of 56.5% Fe in the Inferred category.

In April 2013, SGS published an updated Mineral Resource estimate reporting 30.1 Mt at an average grade of 57.7% Fe in the Measured and Indicated categories and 2.7 Mt at an average grade of 57.5% Fe in the Inferred category. The manganiferous Mineral Resources were stated at 1.2 Mt at 53.6% Fe and 5.1% Mn in the Measured and Indicated categories and 0.5 Mt averaging 53.4% Fe and 4.9% Mn in the Inferred category (SGS, 2013).

Both of the Mineral Resource estimates were prepared in accordance with NI 43-101 regulations and are superseded by the Mineral Resource estimate reported in Section 14.

MALCOLM

A 1982 resource for Malcolm is listed in IOC records as being 2.9 Mt at 56.2% Fe. A manganiferous component of the resource is 0.4 Mt grading 51.4% Fe and 5.8% Mn. IOC reported its resources on a "natural" basis, including moisture content. SMI has a partial database of historical IOC fieldwork including a geological map showing geology and the surface location of the occurrence. The estimate was prepared according to the standards used by IOC and, while still considered relevant, pre-dates NI 43-101, is historical in nature, and should not be relied upon.

In April 2013, SGS prepared a Mineral Resource estimate for Malcolm reporting 9.1 Mt at an average grade of 57.9% Fe in the Measured and Indicated categories and 0.5 Mt at an average grade of 56.4% Fe in the Inferred category. The manganiferous portion of the Mineral Resource estimate is reported at 0.2 Mt at an average grade of 54.5% Fe and 4.5% Mn in the Measured and Indicated category. The estimate was reported in compliance with NI 43-101 (SGS, 2013).

PAST PRODUCTION

There has been no past production from the Houston or Malcolm properties of the Houston Project.

In the Schefferville region, LIM has three years, from 2011 through 2013, of operating experience at the James Mine. During this period approximately 4.6 Mt of iron ore was mined in an open pit operation, along with 8.2 Mt of waste rock. Ore was processed primarily through a dry crushing and screening plant and in part through a wet beneficiation process plant at the Silver Yards site. Approximately 3.6 million dmt of iron ore product was loaded onto trains at Silver Yards and transported to the Port of Sept-Îles for sale to China.

7 GEOLOGICAL SETTING AND MINERALIZATION

REGIONAL GEOLOGY

The following summarizes the general geological settings of the Houston and Malcolm properties and the other properties making up LIM's Schefferville Projects in western Labrador and northeastern Québec. The regional geological descriptions are based on published reports by Gross (1965), Zajac (1974), Wardel (1979) and Neale (2000) and were first prepared by LIM for an internal scoping study report in 2006.

At least 45 hematite-goethite iron deposits have been discovered in an area 20 km wide that extends 100 km northwest of Astray Lake, referred to as the Knob Lake Iron Range. The range consists of tightly folded and faulted iron formation exposed along the height of land that forms the boundary between Québec and Labrador. The iron deposits occur in deformed segments of the iron formation, and iron mineralization of interest in individual deposits varies from one million to more than 50 Mt.

The Knob Lake Iron Range properties are located on the western margin of the Labrador Trough adjacent to Archean basement gneisses. The Labrador Trough, also known as the Labrador-Québec Fold Belt, extends for more than 1,000 km along the eastern margin of the Superior craton from Ungava Bay to Lake Pletipi, Québec. The belt is approximately 100 km wide in its central part and narrows considerably to the north and south.

The western half of the Labrador Trough, consisting of a thick sedimentary sequence, can be divided into three sections based on changes in lithology and metamorphism (North, Central, and South). The Labrador Trough comprises a sequence of Proterozoic sedimentary rocks including iron formation, volcanic rocks, and mafic intrusions known as the Kaniapiskau Supergroup (Gross, 1968). The Kaniapiskau Supergroup consists of the Knob Lake Group in the western part of the trough and the Doublet Group, which is primarily volcanic, in the eastern part.

The Central or Knob Lake Iron Range section of the Labrador Tough extends for 550 km south from the Koksoak River to the Grenville Front located 30 km north of Wabush Lake. The principal iron formation unit, the Sokoman Formation, part of the Knob Lake Group, forms a continuous stratigraphic unit that thickens and thins from sub-basin to sub-basin throughout the fold belt.

The southern part of the Labrador Trough is crossed by the Grenville Front. Trough rocks in the Grenville Province to the south are highly metamorphosed and complexly folded. Iron deposits include Lac Jeannine, Fire Lake, and Mounts Wright and Reed in the Grenville part of the Labrador Trough and the Luce, Humphrey, and Scully deposits in the Wabush area. The high-grade metamorphism of the Grenville Province is responsible for recrystallization of both iron oxides and silica in primary iron formation producing coarse grained sugary quartz, magnetite, and specular hematite schists (meta-taconites) that are of improved quality for concentrating and processing.

The main part of the Labrador Trough north of the Grenville Front is in the Churchill Province and has been subjected to low-grade (greenschist facies) metamorphism. In areas west of Ungava Bay, metamorphism increases to lower amphibolite grade. The mines developed in the Schefferville area by IOC exploited residually enriched earthy iron deposits derived from taconite-type protores.

Geological conditions throughout the central division of the Labrador Trough are generally similar to those in the Knob Lake Iron Range. A general geological map of the Schefferville region is shown in Figure 7-1.

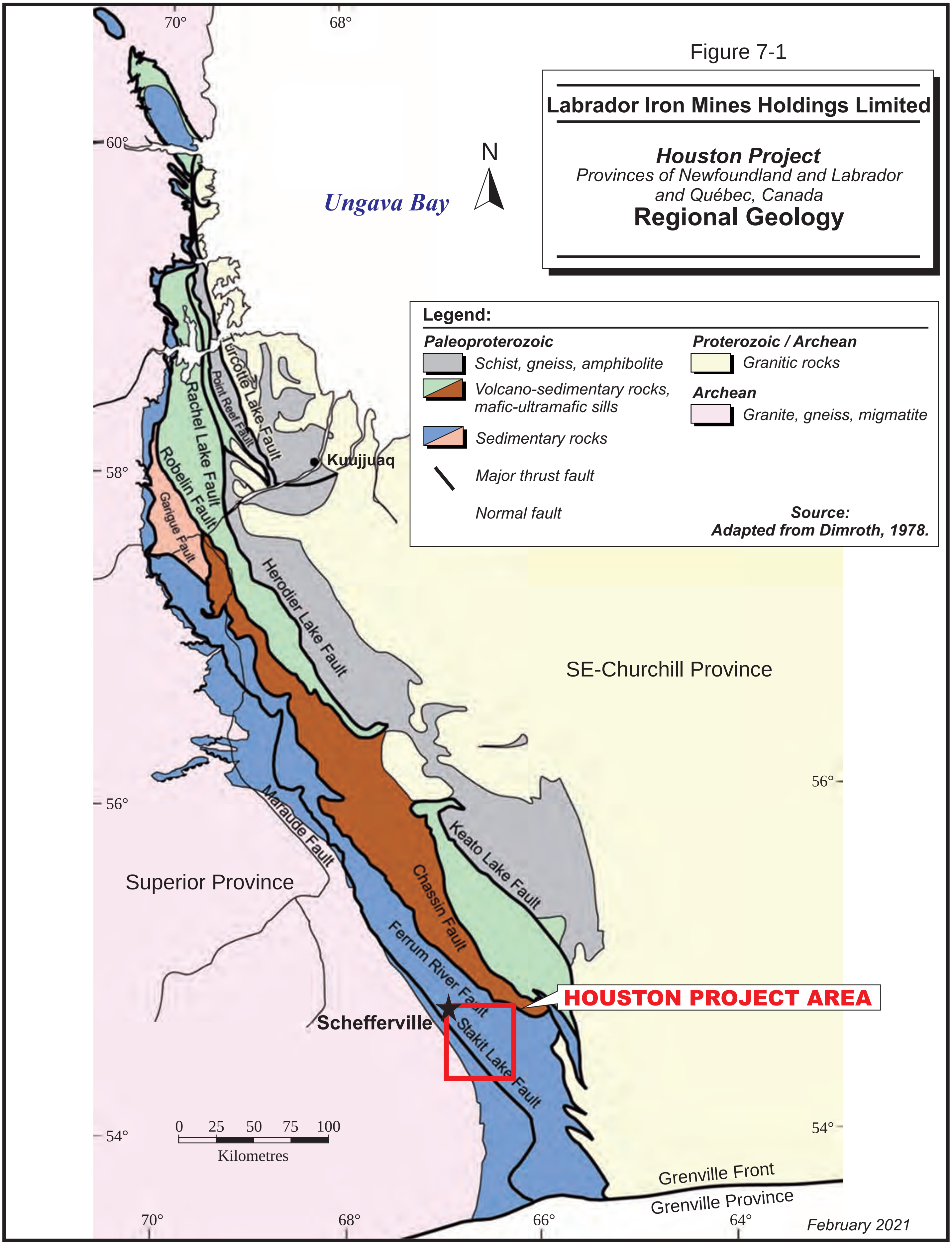


Figure 7-1
Labrador Iron Mines Holdings Limited
Houston Project
Provinces of Newfoundland and Labrador and Québec, Canada
Regional Geology
Legend:
Paleoproterozoic
Schist, gneiss, amphibolite
Volcano-sedimentary rocks, mafic-ultramafic sills
Sedimentary rocks
Major thrust fault
Normal fault
Proterozoic / Archean
Granitic rocks
Archean
Granite, gneiss, migmatite
Source: Adapted from Dimroth, 1978.
N
Ungava Bay
Kuujjuaq
Turcotte Lake Fault
Point Reef Fault
Rachel Lake Fault
Robelin Fault
Garigue Fault
Herodier Lake Fault
SE-Churchill Province
Keato Lake Fault
Maraude Fault
Superior Province
Chassin Fault
Ferrum River Fault
Stakit Lake Fault
HOUSTON PROJECT AREA
Schefferville
0 25 50 75 100
Kilometres
Grenville Front
Grenville Province
70° 68° 66° 64°
60° 58° 56° 54°
February 2021

LOCAL GEOLOGY

The general stratigraphy of the Knob Lake area is representative of most of the Knob Lake Iron Range, except that the Denault dolomite and Fleming Formation are not uniformly distributed. The Knob Lake Iron Range occupies an area of 100 km in length by eight kilometres in width. The sedimentary rocks, including the cherty iron formation, are weakly metamorphosed to greenschist facies. In the structurally complex areas, leaching and secondary enrichment have produced earthy textured iron deposits. Unaltered, banded, magnetite iron formation, often referred to as taconite, occurs as gently dipping beds west of Schefferville, in the Howells River area.

The sedimentary rocks in the Knob Lake Iron Range strike northwest, and their corrugated surface appearance is due to parallel ridges of quartzite and iron formation which alternate with low valleys of shales and slates. The Hudsonian Orogeny compressed the sediments into a series of synclines and anticlines, which are cut by steep angle reverse faults that dip primarily to the east.

Most of the secondary, earthy textured iron deposits occur in canoe shaped synclines; some are tabular bodies extending to a depth of at least 200 m, and one or two deposits are relatively flat lying and cut by several faults. In the western part of the Knob Lake Iron Range, the iron formation dips gently eastward over the Archean basement rocks for approximately 10 km to the east, then forms an imbricate fault structure with bands of iron formation, repeated up to seven times.

Subsequent, supergene processes converted some of the iron formations into high-grade mineralization, preferentially in synclinal depressions and/or down-faulted blocks. Original sedimentary textures are commonly preserved by selected leaching and replacement of the original deposits. Jumbled breccias of enriched iron deposits and altered iron formations, locally called rubble ores, are also present. Fossil trees and leaves of Cretaceous age have been found in rubble ores in some of the deposits (Neal, 2000).

PROPERTY GEOLOGY

The geology of the Houston and Malcolm properties is illustrated in Figure 7-2.

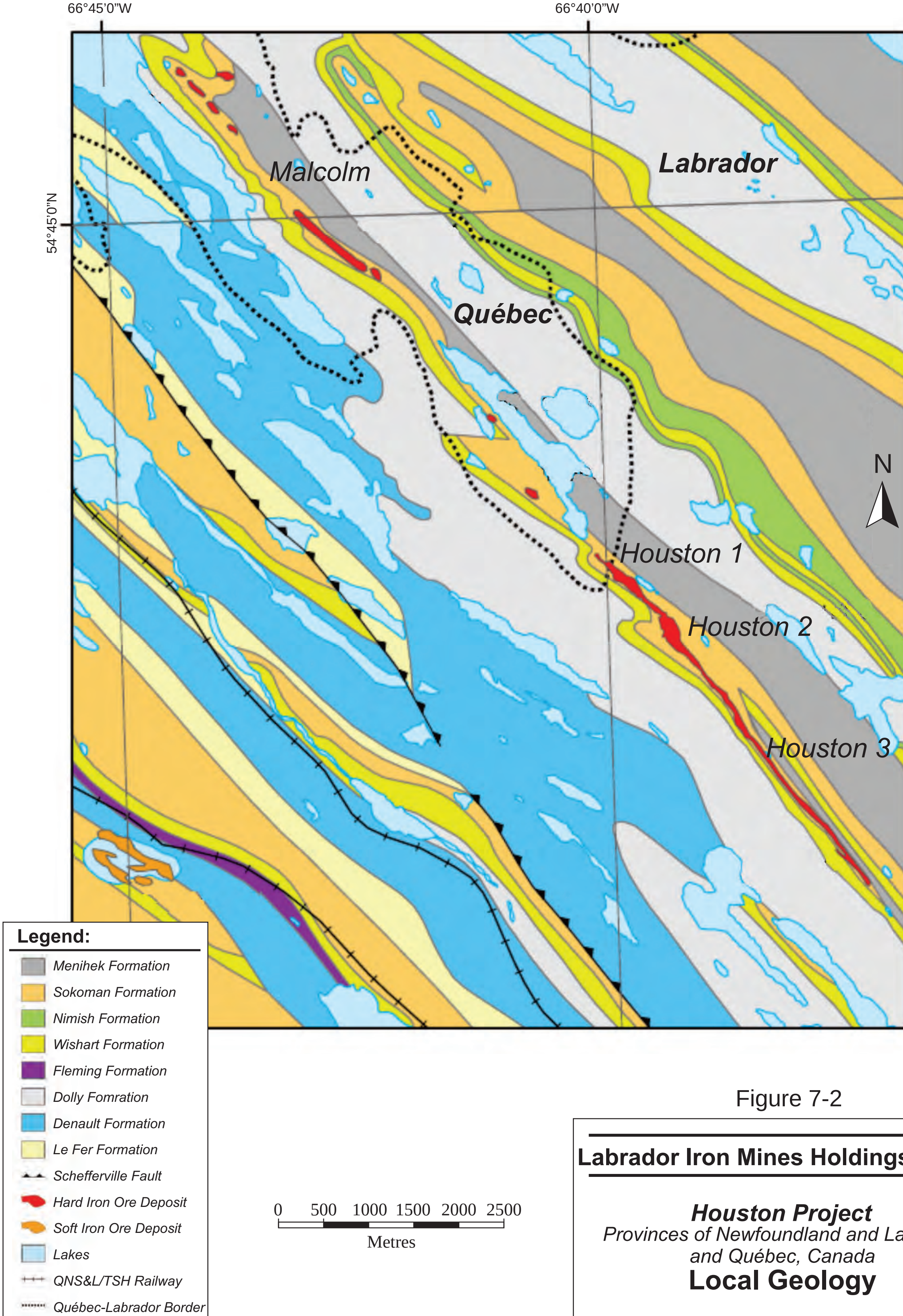


Figure 7-2

Labrador Iron Mines Holdings Limited

Houston Project

Provinces of Newfoundland and Labrador and Québec, Canada

Local Geology

February 2021

Source: Modified after Wardle, 1982a.

The stratigraphy of the properties is described as follows:

ATTIKAMAGEN FORMATION

This formation is exposed in folded and faulted segments of the stratigraphic succession where it varies in thickness from 30 m near the western margin of the belt to more than 365 m near Knob Lake. The lower part of the formation has not been observed. It consists of argillaceous material that is thinly bedded (2 mm to 3 mm), fine grained (0.02 mm to 0.05 mm), greyish green, dark grey to black, or reddish grey. Calcareous or arenaceous lenses as much as 30 cm in thickness occur locally interbedded with the argillite and slate, and lenses of chert are common. The formation grades upwards into the Denault dolomite, or into the Wishart quartzite in the areas where the dolomite is absent. Beds are intricately drag folded, and cleavage is well developed parallel with axial planes, perpendicular to axial lines of folds, and parallel with bedding planes.

DENAULT FORMATION

This formation is interbedded with the slates of the Attikamagen Formation at its base and grades upwards into the chert breccia or quartzite of the Fleming Formation. The Denault Formation consists primarily of dolomite, which weathers buff-grey to brown. Most of it occurs in fairly massive beds which vary in thickness from a few centimetres to approximately one metre, some of which are composed of aggregates of dolomite fragments.

Near Knob Lake, the formation appears to have a maximum thickness of 180 m, while in many other places it forms discontinuous lenses that are no more than 30 m thick. Leached and altered beds near the iron deposits are rubbly, brown, or cream coloured and contain an abundance of chert or quartz fragments in a soft white siliceous matrix.

FLEMING FORMATION

This formation occurs a few kilometres southwest of Knob Lake and only above dolomite beds of the Denault Formation. It has a maximum thickness of approximately 100 m and consists of rectangular fragments of chert and quartz within a matrix of fine chert. In the lower part of the formation, the matrix is dominantly dolomite grading upwards into chert and siliceous material.

WISHART FORMATION

Quartzite and arkose of the Wishart Formation form one of the most persistent units in the Kaniapiskau Supergroup. Thick beds of massive quartzite are composed of well-rounded fragments of glassy quartz and 10% to 30% rounded fragments of pink and grey feldspar, well cemented by quartz and minor amounts of hematite and other iron oxides. Fresh surfaces of the rock are medium grey to pink or red. The thickness of the beds varies from a few centimetres to approximately one metre, however, exposures of massive quartzite with no apparent bedding occur most frequently.

RUTH FORMATION

Overlying the Wishart Formation is a black, grey-green or maroon ferruginous slate, three metres to 36 m thick. This thinly banded, fissile material contains lenses of black chert and various amounts of iron oxides. It is composed of angular fragments of quartz with K-feldspar sparsely distributed through a very fine mass of chlorite, white mica, iron oxides and abundant finely disseminated carbon and opaque material. Much of the slate contains more than 20% iron.

SOKOMAN FORMATION

More than 80% of the iron deposits in the Knob Lake Iron Range occurs within the Sokoman Formation. Lithologically the iron formation varies in detail in different parts of the range and the thickness of individual members is not consistent. A thinly bedded, slaty facies at the base of the formation consists largely of fine chert with an abundance of iron silicates and disseminated magnetite and siderite. Fresh surfaces are grey to olive green and weathered surfaces brownish yellow to bright orange where minnesotaite is abundant.

Thin banded oxide facies of iron formation occurs above the silicate-carbonate facies in nearly all parts of the area. The jasper bands, which are 1.25 cm or less wide and deep red, or in a few places greenish yellow to grey, are interbanded with hard, blue layers of fine grained hematite and a little magnetite.

The thin jasper beds grade upwards into thick massive beds of grey to pinkish chert and beds that are very rich in blue and black iron oxides. These massive beds are commonly referred to as “cherty metallic” iron formation and make up most of the Sokoman Formation. The iron oxides are usually concentrated in layers a few centimetres thick interbedded with leaner cherty beds. In many places, iron rich layers and lenses contain more than 50% hematite and magnetite.

The upper part of the Sokoman Formation comprises beds of dull green to grey or black massive chert that contain considerable siderite or other ferruginous carbonate. Bedding is discontinuous and the rock as a whole contains much less iron than the lower part of the formation.

MENIHEK FORMATION

A thin banded, fissile, grey to black argillaceous slate conformably overlies the Sokoman Formation in the Knob Lake area. Total thickness is not known, as the slate is only found in faulted blocks in the main zone of mineralization. East or south of Knob Lake, the Menihek Formation is more than 300 m thick, although tight folding and lack of exposure prevent determination of its true thickness.

The Menihek shale is mostly dark grey or jet black. It has a dull sooty appearance but weathers light grey or becomes buff coloured where leached. Bedding is less distinct than in the slates of other slate formations but thin laminae or beds are visible in thin sections.

MINERALIZATION

IRON

The earthy bedded iron deposits are a residually enriched type within the Sokoman iron formation that formed after two periods of intense folding and faulting, followed by the circulation of meteoric waters in the fractured rocks. The enrichment process was caused largely by leaching and the loss of silica, resulting in a strong increase in porosity. This produced a friable, granular, and earthy textured iron mineralization. The siderite and silica minerals were altered to hydrated oxides of goethite and limonite. The second stage of enrichment included the addition of secondary iron and manganese, which appear to have moved in solution and filled pore spaces with limonite-goethite. Secondary manganese minerals, i.e., pyrolusite and manganite, form veinlets and vuggy pockets. The types of iron mineralization developed in the deposits are directly related to the original mineral facies. The predominant blue granular iron mineralization was formed from the oxide facies of the middle iron formation. The yellowish-brown iron mineralization, composed of limonite-goethite, formed from the carbonate-silicate facies, and the red painty hematite iron mineralization originated from mixed facies in the argillaceous slaty members. The overall ratio of blue to yellow to red iron mineralization in the Schefferville area deposits is approximately 70%:15%:15% but can vary widely within and between the deposits.

The Houston Project focusses on LIM's more advanced deposits with iron mineralization that is amenable to potential production of lump and sinter products by dry sizing only. Historically, this mineralization was categorized by IOC based on chemical, mineralogical, and textural compositions summarized as follows:

- The blue ores, which are composed mainly of the hematite and martite minerals, are generally coarse grained and friable. They are usually found in the middle section of the iron formation.
- The yellow ores, which are made up of the limonite and goethite minerals, are located in the lower section of the iron formation in a unit referred to as the silicate carbonate iron formation (SCIF).
- The red ore is predominantly a red earthy hematite. It forms the basal layer that underlies the lower section of the iron formation. Red ore is characterized by its clay and slate-like texture.

The historic IOC category types are detailed in Table 7-1.

TABLE 7-1 CATEGORIZATION OF MATERIAL TYPES FROM IOC
Labrador Iron Mines Holdings Limited – Houston Project

Type	Colour	Fe%	Mn%	SiO_2%	Al_2O_3
NB (Non-Bessemer)	Blue, Red, Yellow	≥55	<3.5	<10	<5
LNB (Lean Non-Bessemer)	Blue, Red, Yellow	≥50	<3.5	<18	<5
HMN (High Manganiferous)	Blue, Red, Yellow	(Fe+Mn) ≥50	≥6	<18	<5
LMN (Low Manganiferous)	Blue, Red, Yellow	(Fe+Mn) ≥50	3.5-6	<18	<5
$HiSiO_2$ (High Silica)	Blue	≥50		18-30	<5
TRX (Treat Rock)	Blue	40-50		18-30	<5
HiAl (High Aluminum)	Blue, Red, Yellow	≥50		<18	>5
Waste	All material that does not fall into any of these categories.				

DSO and lean ores mined in the Schefferville area during the period 1954-1982 amounted to approximately 150 million tons. Based on the original ore definition of IOC (+50% Fe <18% SiO_2 dry basis), approximately 250 million tons of historic iron resources remain in the Schefferville area, exclusive of magnetite taconite. LIM has acquired the rights to approximately 50% of IOC's remaining historic iron resource in the Schefferville region. These numbers are based on historic estimates made in compliance with the standards used by IOC, the estimates are considered to be historical in nature and should not be relied upon, however, they do give an indication of iron ore mineralization in the area.

MANGANESE

For an economic manganese deposit, there needs to be a minimum primary manganese content at a given market price (generally greater than 5% Mn); also the manganese oxides must be amenable to concentration (beneficiation) and the resultant concentrates must be low in deleterious elements such as silica, aluminum, phosphorus, sulphur, and alkalis. Beneficiation involves segregating the silicate and carbonate lithofacies and other rock types interbedded within the manganese rich oxides. The principal manganese occurrences found in the Schefferville area can be grouped into three types:

Manganiferous iron that occurs within the lower Sokoman Formation. These are associated with in-situ residual enrichment processes related to downward and lateral percolation of meteoric water and ground water along structural discontinuities such as faults and fractures, penetrative cleavage associated with fold hinges, and near surface penetration. These typically contain 5% Mn to 10% Mn.

Ferruginous manganese generally contains 10% Mn to 35% Mn. These types of deposits are also associated with structural discontinuities (e.g., fault, well developed cleavage, fracture-zones) and may be hosted by the Sokoman (iron) Formation (e.g., the Ryan, Dannick and Avison deposits), or by the stratigraphically lower silica rich Fleming and Wishart formations (e.g., the Ruth A, B, and C deposits). These are the result of residual and supergene enrichment processes.

The so-called ***manganese ore*** contains at least 35% Mn. These occurrences are the result of secondary (supergene) enrichment and are typically hosted in the Wishart and Fleming formations, stratigraphically below the iron formation.

8 DEPOSIT TYPES

IRON DEPOSITS

The Labrador Trough contains four main types of iron deposits:

1. Soft iron deposits formed by supergene leaching and enrichment of the weakly metamorphosed cherty iron formation; they are composed mainly of friable fine grained secondary iron oxides (hematite, goethite, limonite).
2. Taconites, the fine grained, weakly metamorphosed iron formations with above average magnetite content, which are also commonly called magnetite iron formation.
3. More intensely metamorphosed, coarser grained iron formations, termed metataconites; which contain specular hematite and subordinate amounts of magnetite as the dominant iron minerals.
4. Occurrences of hard high-grade hematite iron ore mineralization occurring southeast of Schefferville at Sawyer Lake, Astray Lake, and in some of the Houston deposits.

The LIM deposits are composed of iron formations of the Lake Superior type. The Lake Superior type iron formation consists of banded sedimentary rocks composed principally of bands of iron oxides, magnetite, and hematite within quartz (chert) rich rock, with variable amounts of silicate, carbonate, and sulphide lithofacies. Such iron formations have been the principal sources of iron throughout the world.

The Sokoman Formation was formed as chemical sediment under varied conditions of oxidation-reduction potential (Eh) and hydrogen ion concentrations (pH) in varied depth of seawater. The resulting irregularly bedded, jasper bearing, granular, oolite, and locally conglomeratic sediments are typical of the predominant oxide facies of the Superior type iron formations, and the Labrador Trough is the largest example of this type.

The facies changes consist commonly of carbonate, silicate, and oxide facies. Typical sulphide facies are poorly developed. The mineralogy of the rocks is related to the change in facies during deposition, which reflects changes from shallow to deep water environments of sedimentation. In general, the oxide facies are irregularly bedded, and locally conglomeratic, having formed in oxidizing shallow water conditions. Most carbonate facies show deep water features, except for the presence of minor amounts of granules. The silicate facies are present between the oxide and carbonate facies, with some textural features indicating deep water formation.

Facies contains typical primary minerals, ranging from siderite, minnesotaite, and magnetite-hematite in the carbonate, silicate, and oxide facies, respectively. The most common mineral in the Sokoman Formation is chert, which is closely associated with all facies, although it occurs in minor quantities with the silicate facies. Carbonate and silicate lithofacies are present in varying amounts in the oxide members.

The sediments of the Labrador Trough were initially deposited in a stable basin which was subsequently modified by penecontemporaneous tectonic and volcanic activity. Deposition of the iron formation indicates intraformational erosion, redistribution of sediments, and local contamination by volcanic and related clastic material derived from the volcanic centres in the Dyke-Astray area.

HOUSTON AND MALCOLM

The Houston area is composed of what appears to be at least three separate areas of iron enrichment with a continuously mineralized zone of over three kilometres in strike length, which remains open to the south. These three areas of enrichment are referred to as the Houston 1, Houston 2, and Houston 3 deposits. Houston 3 is currently less well explored and there appears to be significant additional potential to the south of Houston 3, which requires additional drilling.

The Houston and Malcolm property iron deposits are stratigraphically and structurally controlled, and consist of hard and friable banded, blue and red hematite that locally becomes massive. Airborne magnetometer survey data available from the Geoscience Data Repository of Natural Resources Canada suggests that the iron mineralization is concentrated along the western flank (gradient) of a modest to strong magnetic feature, which trends approximately 330°. The Houston 1 and Houston 2 deposits are not coincident with the strongest magnetic features, due to the poor magnetic susceptibility of this type of mineralization. IOC drilled and trenched the Houston deposits and prepared reserve and resource estimates, which were contained in their Statement of Reserves at December 31, 1982.

LIM carried out drilling during the 2006 and 2008 to 2012 programs at Houston, which indicated that the majority of the potentially economic iron mineralization is hosted within the Ruth Chert Formation, within the lower iron formation (LIF) and middle iron formation (MIF).

Striking northwest and dipping to the northeast, both Houston 1 and Houston 2 deposits have been found to extend down dip to the northeast. These down dip extensions had not been previously tested by IOC. At the present time there remains potential for additional mineralization believed to be extending to the southeast of the main deposit of Houston 1 and east of Houston 3.

The Houston 3 deposit appears to be more vertical in nature and drill holes testing the eastern margin of the known deposit have not intercepted any eastward extensions. However, this deposit has yet to be tested to its maximum vertical depth or for at least an additional two kilometres of strike to the south.

MANGANESE DEPOSITS

The manganese deposits in the Schefferville area were formed by residual and second stage (supergene) enrichment that affected the Sokoman Formation, some members of which contain up to 1% Mn in their unaltered state. The residual enrichment process involved the migration of meteoric fluids circulated through the protore sequence oxidizing the iron formation, recrystallizing iron minerals to hematite, and leaching silica and carbonate. The result is a residually enriched iron formation that may contain up to 10% Mn. The second phase of this process, where it has occurred, is a true enrichment process (rather than a residual enrichment), whereby iron oxides (goethite, limonite), hematite, and manganese are redistributed laterally or stratigraphically downward into the secondary porosity created by the removal of material during the primary enrichment phase.

Deposition along faults, fractures and cleavage surfaces, and in veins and veinlets, is also seen, and corroborates the accepted belief that the structural breaks act as channel ways for migrating hydrothermal fluids causing metasomatic alteration and formation of manganiferous deposits. All the manganese occurrences in the Labrador Trough are considered to have been deposited by the processes described above.

The manganese mineralization on the Houston and Malcolm properties is present in relatively low concentrations (approximately 1% average) with sporadic concentrations of up to 24%, apparently structurally controlled by folding and faulting along the western block of the east dipping reverse fault system.

9 EXPLORATION

EXPLORATION BY LIM

Exploration work was performed by LIM between 2005 and 2013. Initial exploration was conducted by and over LIM's Labrador properties during the summer of 2005, including the Houston property. The work consisted of surveying old workings (trenches, pits, and drill holes), prospecting, mapping, and collecting rock samples. Between 2006 and 2013 inclusively, in addition to drilling programs, LIM carried out the following work for the Houston and Malcolm properties.

2006

A short program of bulk sampling was carried out consisting of 75 m of trenching for bulk sampling at the Houston 1 deposit.

2007

The exploration program only comprised prospecting and trenching.

2008

LIM contracted Eagle Mapping Ltd. of Port Coquitlam, British Columbia, to carry out an aerial topographic survey flown over its properties in the Schefferville area, including the Houston property. The survey covered an area of 16,230 ha and 233,825 ha at a map scale of 1:1,000 and 1:5,000 respectively.

Using a differential global positioning system (GPS) with an accuracy within 40 cm, LIM surveyed the 2008 RC drill holes, as well as the trenches and a total of 90 old IOC RC drill hole collars that were still visible and could be located.

A bulk sampling program was carried out with material from the Houston property, along with bulk sampling at the James, Redmond, and Knob Lake deposits. The material was excavated with a T330 backhoe and a 950G front end loader and loaded into 25 tonne dump trucks for transport to their individual stockpiles at the Silver Yards site where crushing and screening activities were carried out. The samples were crushed and screened to produce two products:

- Lump Ore (- 50 mm + 6 mm)
- Sinter Fines (- 6 mm)

Representative samples of 200 kg of each iron ore mineralization type were collected and sent to SGS laboratories in Lakefield, Ontario (SGS Lakefield) for metallurgical test work and assays. Representative samples of two kilograms of each product were collected and sent to SGS Lakefield for assays. Other samples were collected for additional screening tests. Five train cars were used for the transport of the samples to Sept-Îles; the rest of the sample material remained at Silver Yards.

2009

LIM completed a survey of the 2009 RC drill holes, trenches, as well as any historical IOC RC drill holes using a differential GPS. A Houston property trenching program focused on the Houston 3 deposit, where 439 m in eight trenches was completed.

The exploration programs were intended to confirm and validate historic resources reported by IOC and to bring them into compliance with NI 43-101.

2010

The work carried out during the 2010 exploration program included RC drilling on the Houston property totalling 1,804 m in 26 drill holes.

Drilling on the Houston property focused on three areas. The first was the ground between Houston 1 and Houston 2. The goal of this work was to link these two deposits together as insufficient work had been done in the past to demonstrate this. The second area was the north end of Houston 2 (approaching the Labrador-Québec border). In this area confirmation drilling was carried out in order to test the size and location of the iron mineralization as modelled by IOC and more recent LIM drilling. The third area covered was along the eastern margin of the Houston 1 deposit. Work here was intended to test the down dip extensions of the deposit.

In addition to the RC drilling, an airborne gravity and magnetic survey was flown over four claim blocks of LIM's Schefferville area properties centred on the Howse, Houston/Redmond, Astray, and Sawyer Lake areas. High gravity anomalies associated with lower magnetism are considered prospective for DSO deposits. In total, 1,896 line km were flown for the gravity and magnetic surveys, of which 852 line km were surveyed over the Houston/Redmond areas.

An interim interpretation and evaluation of the processed and plotted airborne gravity gradiometer and magnetic data has confirmed the utility of the survey in detecting and outlining iron deposits and identified a number of new drill targets with the potential to expand currently known resources.

2011

The 2011 exploration program consisted of RC drilling at Houston and Malcolm, with additional trenching and bulk sampling at Houston. Drilling was conducted to infill the Houston deposits and upgrade areas within Houston's Inferred Mineral Resources as defined in the SGS report dated March 2011.

Trenching was used to confirm the limits of the Houston deposit and to collect samples of potential plant feed and DSO quality for metallurgical test work from both the hanging wall and footwall of the Houston deposit.

2012

For the 2012 exploration program, LIM conducted a RC drill program at Houston and Malcolm, and a re-instituted diamond drill program at Houston. New techniques were used that rectified past historical recovery problems associated with diamond drilling with these types of deposits. In total, 24 RC holes (1,468 m) were drilled along with 42 diamond drill holes (4,503 m). The diamond drill holes included 27 exploration and metallurgical holes and 15 geotechnical holes (1,386 m) at Houston 1 and Houston 2.

2013

Between September 10 and December 15, 2013, a total of 40 HQ3 size core diamond drill holes totalling 3,857 m were completed on the Houston deposits. The drill program was divided between exploration, metallurgical, and geotechnical drilling. The 40 diamond drill holes consisted of:

- 30 exploration holes (2,719 m) with metallurgical samples being drawn from these holes. Sampling and assaying of these diamond drill holes was left incomplete because of a halt in company spending in 2014 due to financial circumstances. Samples collected for assaying were sent to Activation Laboratories Ltd. in

Ancaster, Ontario (Actlabs). Samples collected for metallurgical test work were shipped to SGS Lakefield, and are reportedly still in storage.

  - RPA recommends LIM investigate completing sampling and assaying of as many of the 2013 exploration holes as possible, for use in future Mineral Resource updates.

- 9 holes (1,138 m) were drilled and logged for geotechnical investigations. Geotechnical drilling was supervised by Piteau Associates Engineering Ltd. (Piteau) out of Vancouver, British Columbia. Piteau supplied two technicians to log core geotechnically.

10 DRILLING

Traditionally IOC used a combination of RC drilling, diamond drilling, and trenching to generate data for reserve and resource estimation. A large number of original IOC data have been recovered and reviewed by LIM and are included in the database that is used for the estimation of current resources. Diamond drilling of the Schefferville iron deposits has been historically challenging as the alternating hard and soft mineralization zones tend to preclude good core recovery. In 2012, diamond drilling was re-introduced by LIM into the program as newer techniques rectified past historical challenges.

LIM carried out exploration programs in the 2006 and 2008 to 2013 summer-fall seasons. The drill holes details are discussed on an individual basis for Houston and Malcolm hereafter.

HOUSTON DEPOSITS

In 2006, five diamond drill holes of BQ (36.5 mm core diameter) size were drilled totalling 253 m on the Houston property using Cartwright Drilling Inc. of Goose Bay, of which only one drill hole was successfully completed.

Between 2008 and 2012, LIM used Acker RC tricone drill rigs from Forages Cabo (Cabo) of Chambly, Québec using 75 mm diameter rods. The drill rigs were mounted on Flex Trac Nodwell carriers or skids and outfitted with sample cyclones. In 2012, LIM started using HQ3 (61.1 mm core diameter) diamond drilling from Major Drilling out of Val D'Or, Québec on skid mounted drilling rigs. Among the 2012 diamond drill holes, a number of metallurgical and geotechnical holes were drilled, the latter under the supervision of Piteau out of Vancouver, British Columbia.

In 2013, Houston drilling was completed by Major Drilling with HQ3 (61.1 mm core diameter) diamond drill holes. The drill program was divided between exploration, metallurgical, and geotechnical drilling.

The drill holes and trenches location maps of the Houston deposits are shown in Figures 10-1 and 10-2. Table 10-1 summarizes LIM's drilling programs at Houston to date.

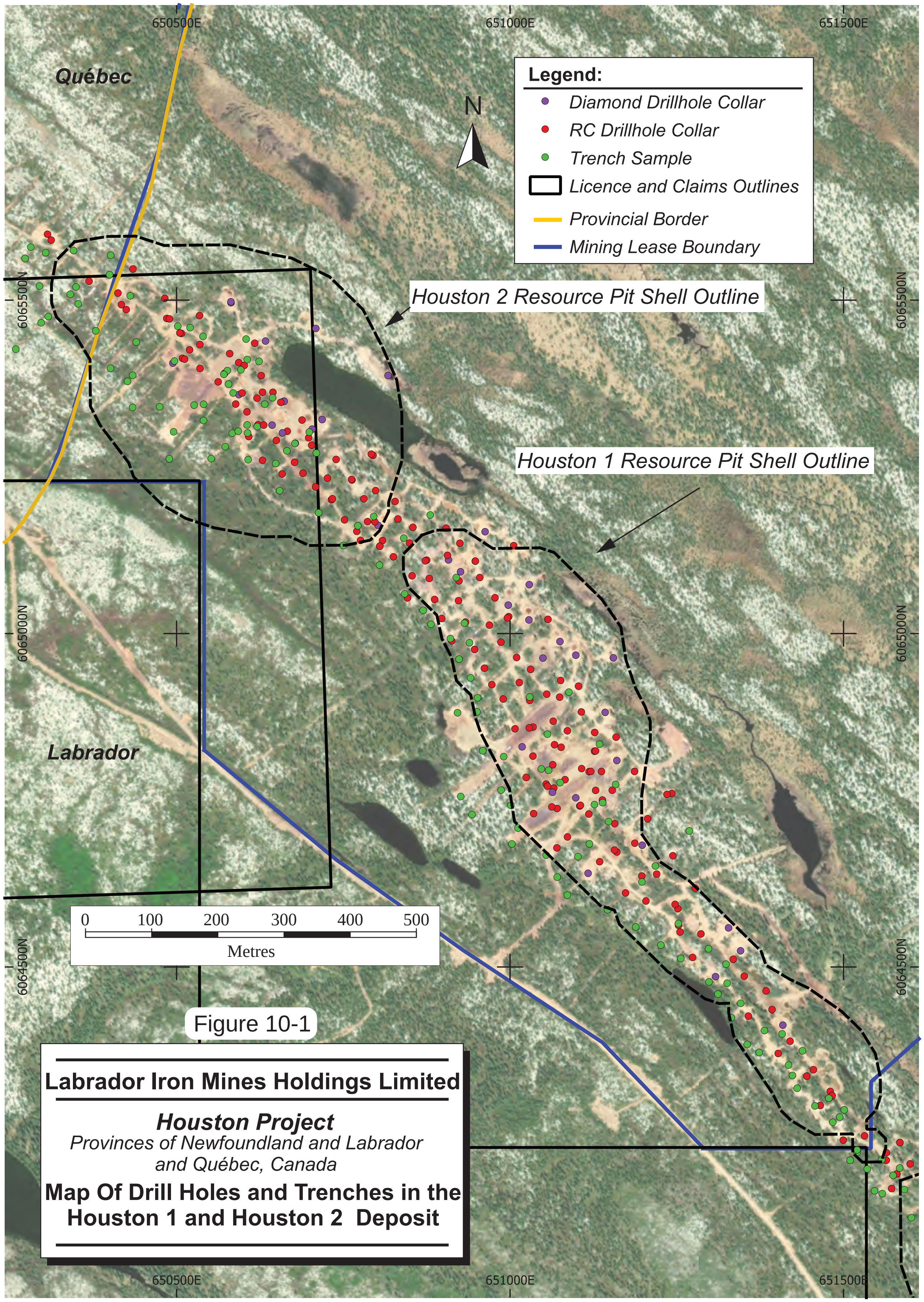


Figure 10-1

Labrador Iron Mines Holdings Limited

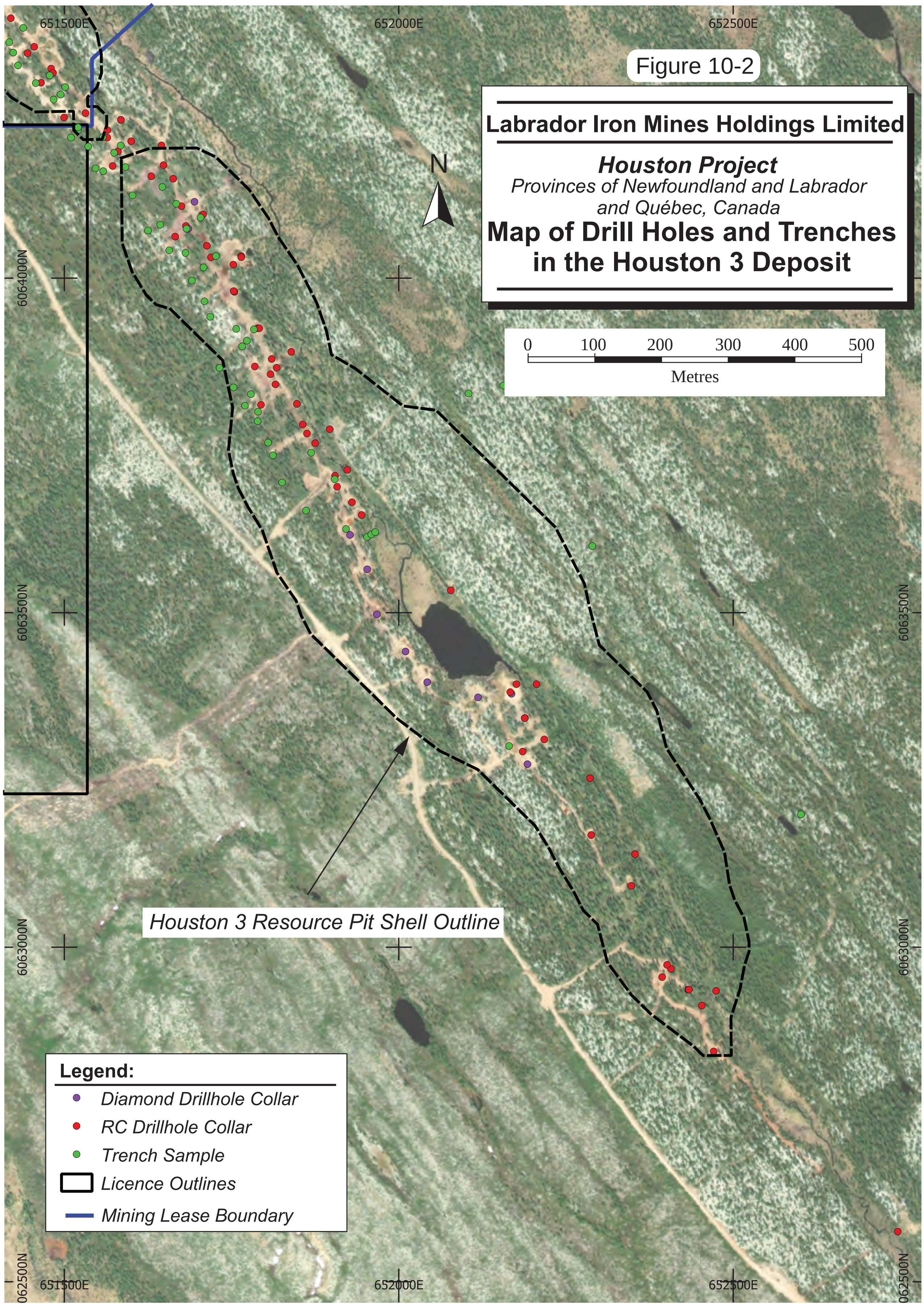
Houston Project

Provinces of Newfoundland and Labrador and Québec, Canada

Map Of Drill Holes and Trenches in the Houston 1 and Houston 2 Deposit

February 2021

Source: LIMH, 2020.



February 2021

Source: LIMH, 2020.

TABLE 10-1 HOUSTON RC AND DIAMOND DRILLING PROGRAMS
Labrador Iron Mines Holdings Limited – Houston Project

Company	Year	Diamond Drill Holes	RC Drill Holes	Length (m)	Samples	Assays
IOC	Historical	-	86	4,418	1,496	1,496
	2006	5	-	253	-	-
	2007	-	-	-	-	-
	2008	-	12	791	304	304
LIM	2009	-	46	3,136	1,098	1,092
	2010	-	26	1,804	627	625
	2011	-	44	3,118	1,064	1,064
	2012	42	24	5,970	2,523	2,523
	2013	40	-	3,857	Incomplete	Incomplete
Total		**87**	**238**	**19,490**	**7,112**	**7,104**

Sampling and assaying of 2013 diamond drill holes was left incomplete as a result of a halt in company spending in 2014 due to financial circumstances.

MALCOLM DEPOSIT

The locations of the drill holes and trenches at the Malcolm deposit are shown in Figure 10-3, while Table 10-2 summarizes SMI's drilling programs at Malcolm to date.

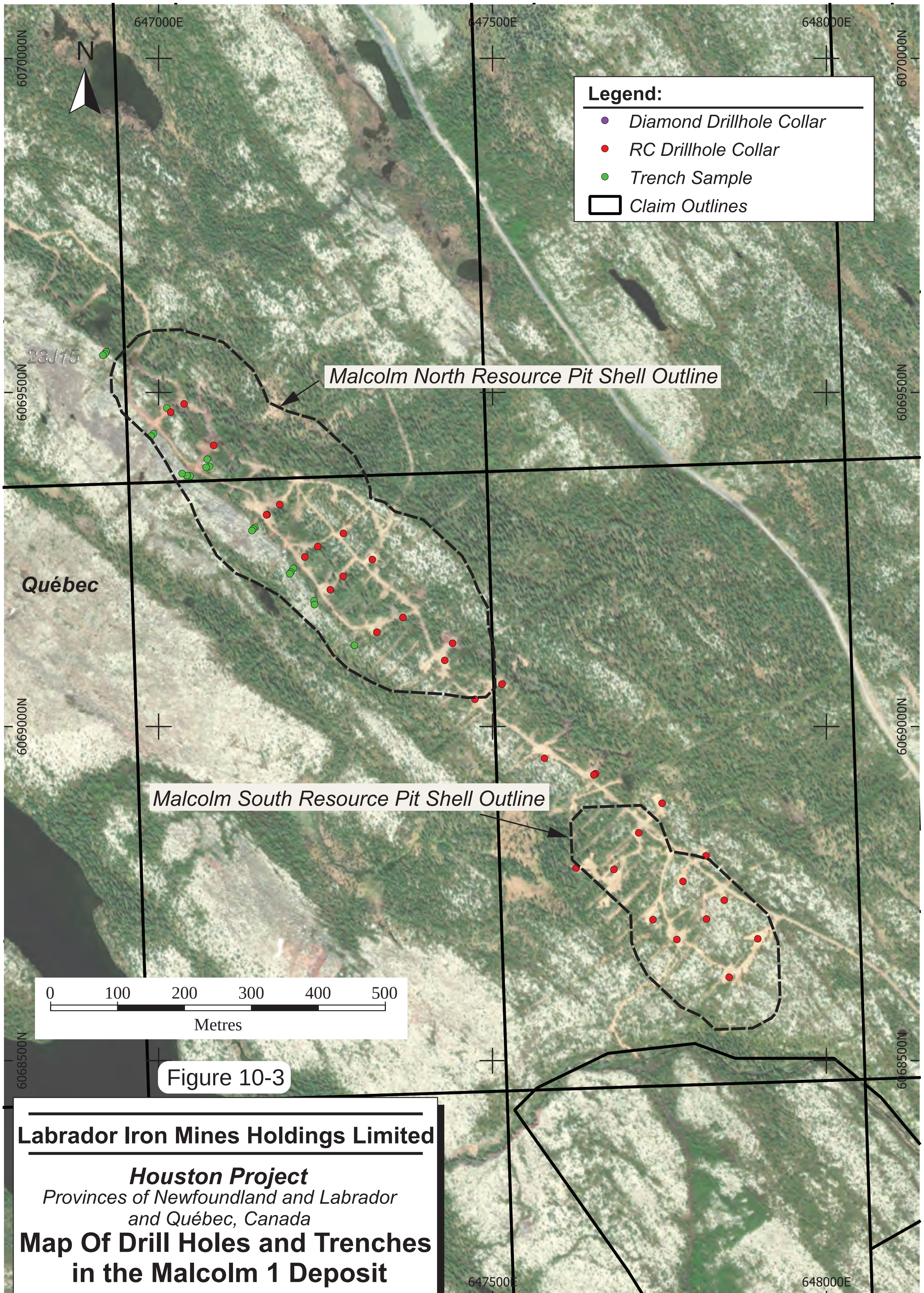


Figure 10-3

Labrador Iron Mines Holdings Limited

Houston Project

Provinces of Newfoundland and Labrador and Québec, Canada

Map Of Drill Holes and Trenches in the Malcolm 1 Deposit

February 2021 ***Source: LIMH, 2020.***

TABLE 10-2 MALCOLM RC AND DIAMOND DRILLING PROGRAMS
Labrador Iron Mines Holdings Limited – Houston Project

Company	Year	Diamond Drill Holes	RC Drill Holes	Length (m)	Samples	Assays
IOC	Historical	-	1	71	25	25
SMI	2006	-	-	-	-	-
	2007	-	-	-	-	-
	2008	-	-	-	-	-
	2009	-	-	-	-	-
	2010	-	-	-	-	-
	2011	-	18	1,379	480	480
	2012	-	14	1,599	563	563
Total		**-**	**33**	**3,049**	**1,068**	**1,068**

DRILLING PROCEDURES

DIAMOND DRILLING PROCEDURES

In 2012, LIM started drilling diamond drill holes in addition to RC holes. HQ3 core drilling was performed, which resolved historic core recovery issues with diamond drilling. A geotechnician observed the drilling process and conducted basic geotechnical descriptions of the core at the drill. The drill core was boxed and tied with metal wire. The core was delivered to the LIM core shed on a regular basis by LIM employees or the drill contractors.

RC DRILLING PROCEDURES

LIM used RC drill rigs from Cabo. Cabo's RC drills include the Acker long stroke drills which, when mounted on one of the Flex TracNodwell carriers or fly skids, provided LIM with highly mobile and stable drilling platforms with relatively small footprints. LIM's drill rigs from Cabo were outfitted with a sample cyclone, housed within the drill enclosure. The drills allow the driller and the geologist to coordinate the production and collection of samples efficiently and cost effectively. Additional information on RC drilling procedures is described in Section 11. Based on RC drill supervision by SGS in 2008 and 2012 and by LIM, the recovery from RC drilling was estimated to be of sufficient quantity.

11 SAMPLE PREPARATION, ANALYSES, AND SECURITY

The following description of sample preparation, analyses, and security was taken mostly from SGS, 2013.

SAMPLING

2006-2011 TRENCH SAMPLING

In 2006, 2008, and 2009, trenches were dug in several locations for definition of surface mineralization and use in Mineral Resource estimates. The trenches were excavated with a Caterpillar 330 excavator with a three cubic yard bucket. The excavator was able to dig a one metre wide trench with depths to three metres, which was sufficient to penetrate the overburden.

After cleaning the exposure, geological mapping was carried out to determine the lithologies and samples were collected on three metre intervals from the sides of the trenches. Samples were collected with a small rock pick along a line designated by the supervising geologist. In most cases the material sampled was soft and friable. The sample length of three metres was considered to be representative of the mineral content over that interval.

RC SAMPLING

The sampling procedures described below were designed by SGS.

The entire length of the RC drill holes was sampled, with RC sample lengths averaging three metres. A description of the cuttings was made at every metre drilled. A representative sample was collected and placed in plastic chip trays for every metre drilled. The chip trays were labelled with Hole ID and the interval represented in each compartment. The drilled lengths with no recovery were marked with an “X” inside the chip tray compartment.

RC sampling and logging was done at the drill site by LIM geologists. Sealed boxes and sample bags were handled by authorized personnel and sent to the preparation laboratory in Schefferville.

RC SAMPLE SIZE REDUCTION

2008

In order to reduce the size of the sample at the RC drill site to approximately 7.5 kg, the drill cuttings were split four ways after leaving the cyclone. The cuttings from three of the exit ports were discarded and the cuttings from the fourth exit were collected in five gallon buckets. As part of the Quality Assurance/Quality Control (QA/QC) program, the cuttings from three of the four exits were routinely sampled.

Samples were taken by truck directly to the preparation laboratory in Schefferville (the Schefferville laboratory) under supervision of SGS. Upon arrival at the preparation laboratory, samples came under the care of SGS personnel.

2009-2012

During the 2009 through 2012 RC drill campaigns, the drill cuttings were split with a rotary splitter mounted directly under the cyclone. The rotary splitter was divided into pie shape spaces and was equipped with a hydraulic motor. The speed of the rotation of the splitter and the closing of the pie shape spaces was set to produce a 7.5 kg to 10 kg sample from the three metre rod sample.

In the QP’s opinion, the RC sample size reduction protocols were appropriate for Mineral Resource estimation.

DIAMOND DRILL CORE SAMPLING

Since 2012, the core has been delivered to the LIM core shed on a regular basis by LIM employees or the drill contractors. Geotechnicians estimate core recovery and photograph the core. A geologist logs the core and marks out sample intervals. Geotechnicians split and sample the core for assaying leaving a half split in the core box for reference.

SAMPLE PREPARATION

2008 - 2011

SCHEFFERVILLE

Prior to sending the samples for preparation and assaying, sample logging and batching were carried out at LIM’s Schefferville laboratory, which was operated by SGS personnel.

At the end of every shift, the samplers and/or geologist delivered the trench and RC samples to LIM's Schefferville laboratory. Sample bags were placed in sequential order on a draining table and a "Sample Drop Off" form was completed noting the date, time, person, number of samples, and sample sequence.

The majority of samples were three metres long, equal to the length of the drill rods. Upon delivery to the preparation lab, the samples became the responsibility of SGS. Samples were dried and reduced by riffle splitting and then sent to the assay laboratory; SGS Lakefield in 2008 and Activation Laboratories (Actlabs) in Ancaster, Ontario, from 2009 through 2011. A witness portion of the samples was kept in Schefferville.

SGS LAKEFIELD, 2008

Sample preparation at SGS Lakefield in 2008 comprised the following:

- Crush up to 3 kg of sample to 75% passing 2 mm.
- Pulverize up to 250 g of riffle split sample to 75 µm.

ACTLABS, 2009-2011

Sample preparation at Actlabs from 2009 through 2011 comprised the following:

- Crush (< 5 kg) up to 75% passing 2 mm.
- Riffle to 250 g.
- Pulverize 95% passing 150 µ.
- Clean with sand between each sample.

2012

For the 2012 season, two types of samples were gathered; RC drill cuttings and diamond drill half core. RC drill cuttings and diamond drill core followed previously established procedures from prior years, however, all samples were delivered to LIM's James Mine Laboratory for sample preparation. The James Mine laboratory prepared a coarse reject and a pulp of each sample. The pulp was shipped via Canada Post to Actlabs and the coarse reject was stored on site for future reference.

SAMPLE ANALYSIS

SGS LAKEFIELD, 2008

All the 2008 RC drilling and trenching program samples were sent for analysis to SGS Lakefield. The analysis was by Borate fusion whole rock X-Ray Fluorescence (XRF). The reporting limits are summarized in Table 11-1. The following is a description of the exploration drill hole analysis protocols as provided by SGS Lakefield.

- XRF Analysis Code: SGS-Lakefield Procedure XRF76Z.
- Parameters measured; SiO_2, Al_2O_3, Fe_2O_3, MgO, CaO, Na_2O, K_2O, P_2O_5, MnO, TiO_2, Cr_2O_3, Ni, Co, La_2O_3, Ce_2O_3, Nd2O3, Pr_2O_3, Sm_2O_3, BaO, SrO, ZrO_2, HfO_2, Y_2O_3, Nb_2O_5, ThO2, U_3O_8, SnO_2, WO_3, Ta_2O_5, LOI; %.
- Typical sample size: 0.2 g to 0.5 g.
- Type of sample applicable (media): rocks, oxide ores, and concentrates.
- Method of analysis: the disk specimen is analyzed by wavelength dispersive XRF (WDXRF) spectrometry.
- Data transmission: the results are exported via computer, online, data fed to the Laboratory Information Management System with secure audit trail.
- Corrections for dilution and summation with the loss of ignition (LOI) are made prior to reporting.

TABLE 11-1 BORATE FUSION WHOLE ROCK XRF REPORTING LIMITS
Labrador Iron Mines Holdings Limited – Houston Project

Element	Limit (%)
SiO_2	0.01
Al_2O_3	0.01
Fe total as Fe_2O_3	0.01
P_2O_5	0.01
Na_2O	0.01
TiO_2	0.01
Cr_2O_3	0.01
V_2O_5	0.01
CaO	0.01
MgO	0.01
K_2O	0.01
MnO	0.01

Note: Includes LOI

SGS Lakefield is independent of LIM.

SAMPLE ANALYSIS AT ACTLABS, 2009-2012

The exploration analysis protocols used at Actlabs were as follows.

X-RAY FLUORESCENCE ANALYSIS - CODE 4C

To minimize the matrix effects of the samples, the heavy absorber fusion technique of Norrish and Hutton (1969) are used for major element oxide analysis. Prior to fusion, the LOI, which includes H_2O+, CO_2, S, and other volatiles, can be determined from the weight loss after roasting the sample at 1,050°C for two hours. The fusion disk is made by mixing a 0.5 g equivalent of the roasted sample with 6.5 g of a combination of lithium metaborate and lithium tetraborate with lithium bromide as a releasing agent. Samples are fused in platinum crucibles using an AFT fluxer and automatically poured into platinum molds for casting. Samples are analyzed on a Panalytical-Axios Advanced XRF. The intensities are then measured, and the concentrations are calculated against the standard G-16 provided by Dr. K. Norrish of Commonwealth Scientific and Industrial Research Organization (CSIRO), Australia. Matrix corrections were done by using the oxide alpha – influence coefficients provided also by K. Norrish. In general, the limit of detection is approximately 0.01 wt% for most of the elements.

The elements analyzed are: SiO_2, Al_2O_3, Fe_2O_3 (T), MnO, MgO, CaO, Na_2O, K_2O, TiO_2, P_2O_5, Cr_2O_3, and LOI. The detection limits by oxide are shown in Table 11-2.

TABLE 11-2 CODE 4C OXIDES AND DETECTION LIMITS
Labrador Iron Mines Holdings Limited – Houston Project

Oxide	Detection Limit (%)
SiO_2	0.01
TiO_2	0.01
Al_2O_3	0.01
Fe_2O_3	0.01
MnO	0.001
MgO	0.01
CaO	0.01
Na_2O	0.01
K_2O	0.01
P_2O_5	0.01
Cr_2O_3	0.01
LOI	0.01

Actlabs is independent of LIM.

SAMPLE SECURITY

Sealed RC sample bags were handled by authorized personnel and sent to the Schefferville laboratory in Québec, a warehouse facility rented by LIM, or the James Mine laboratory in Labrador. Starting in 2012, diamond drill core boxes were also brought to the facility on a regular basis by LIM personnel. Core boxes were stacked either in cross-box formation or on core racks. All core boxes had been sealed with wire before transport from the drill site.

The Schefferville laboratory was locked during the night. Sample batches were sealed and sent by train or by express airmail to the preparation and assay laboratory. Traceability was present throughout the shipment to SGS Lakefield and/or Actlabs.

QUALITY ASSURANCE AND QUALITY CONTROL

The QA/QC program for samples used in the Mineral Resource estimate included the insertion of blank, reference, and duplicate samples into the sample stream. Table 11-3 summarizes the total samples and insertion rate of QA/QC samples.

TABLE 11-3 QA/QC SUMMARY
Labrador Iron Mines Holdings Limited – Houston Project

Year	Total Samples	Insertion Rate (% of Total)		
		Blanks	CRM	Duplicates
2006	Unknown	Unknown	Unknown	Unknown
2008	304	20	0	7
2009	1,098	4	Unknown	Unknown
2010	627	10	Unknown	9
2011	1,544	5	3	4
2012	3,086	3	2	2

Samples from the 2011 and 2012 RC and diamond drill campaigns accounted for 57% of the data and therefore RPA's review focused on those years. 2013 drilling was not included in the current Mineral Resource estimate as sampling was incomplete as previously noted.

BLANK SAMPLES

Blank samples are used to check for contamination in sample preparation and analyses in the assay laboratories and identify sample switching. Blank samples were created on site in

Schefferville from barren slates located southeast of the town. SGS homogenized an average 200 kg of material on site at the Schefferville laboratory. Samples were sent to SGS Lakefield, Corem, in Québec City, Québec, and ALS-Chemex, in Vancouver, British Columbia, for verification of the average grade in the blanks. LIM and SGS also sent two separate batches of 15 blank samples to Corem and ALS-Chemex for analysis.

Assays from the four laboratories ranged from 4.2% to 5.4% Fe and 61.4 to 62.6% SiO_2. The weighted average was 4.3% Fe and 62.4% SiO_2. Consequently, these samples are, by definition, not blank samples but should be considered low-grade reference samples. SGS recommended that subsequent drill campaigns should incorporate commercially supplied blank samples with zero Fe content. The QP concurs with this recommendation.

Since the original batch of 200 kg, LIM has collected more blank material from the same location and homogenized the material using similar techniques; a further sample was retrieved in 2010 and 2012 field seasons.

The protocol for blank sample insertion rates during the 2011 and 2012 RC and diamond drill campaigns was one blank in 50 (2%) and one in 20 (5%) samples, respectively. Blank sample insertion for previous years ranged from 4% to 10%. LIM considered the assay from the blank samples a failure if it was greater than or less than three standard deviations (SD) from the expected values. Figures 11-1 and 11-2 illustrate the results of the 2011 drilling campaigns.

FIGURE 11-1 Fe BLANKS – 2011

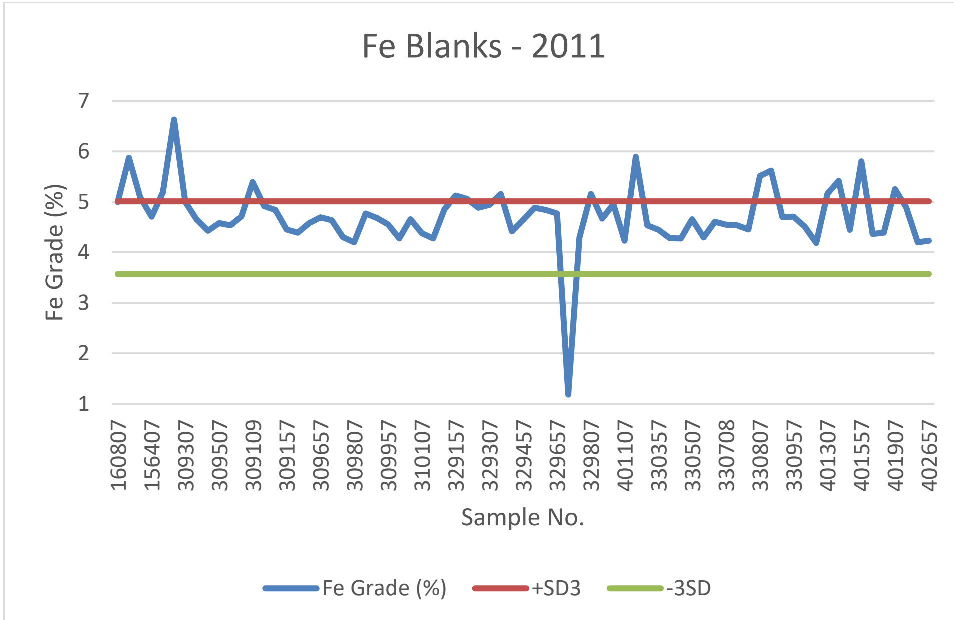
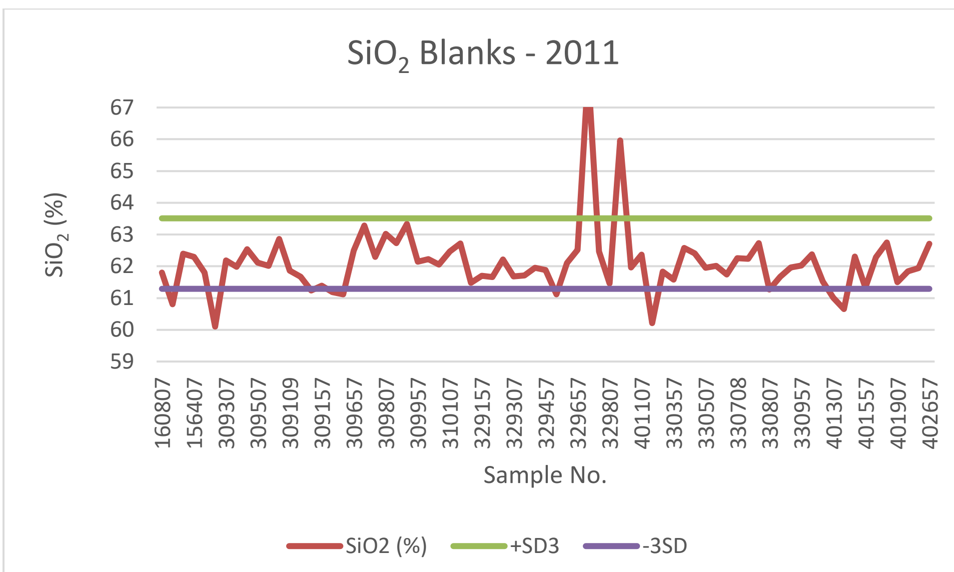


FIGURE 11-2 SiO_2 BLANKS – 2011



Figures 11-3 and 11-4 illustrate the results of the 2012 blank samples.

FIGURE 11-3 Fe BLANKS - 2012

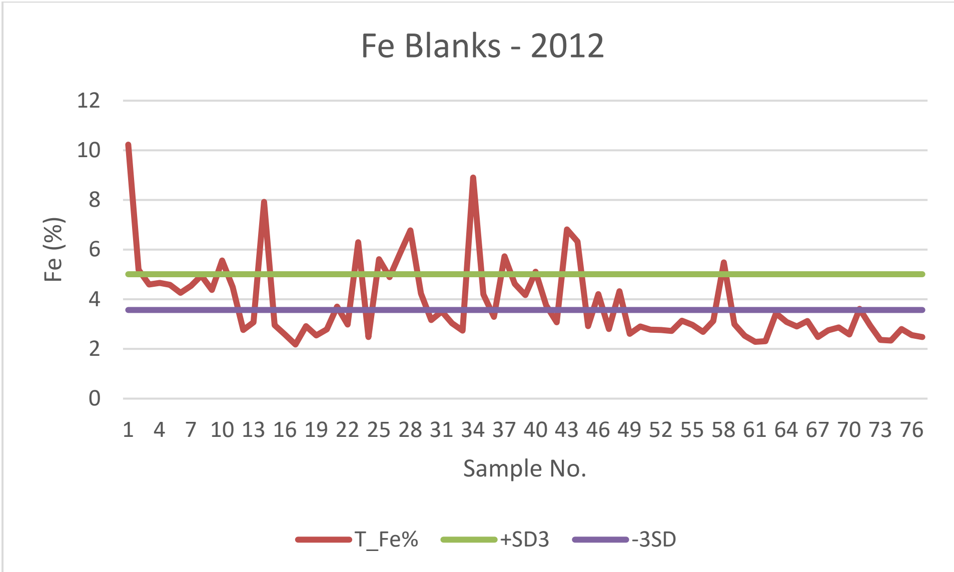
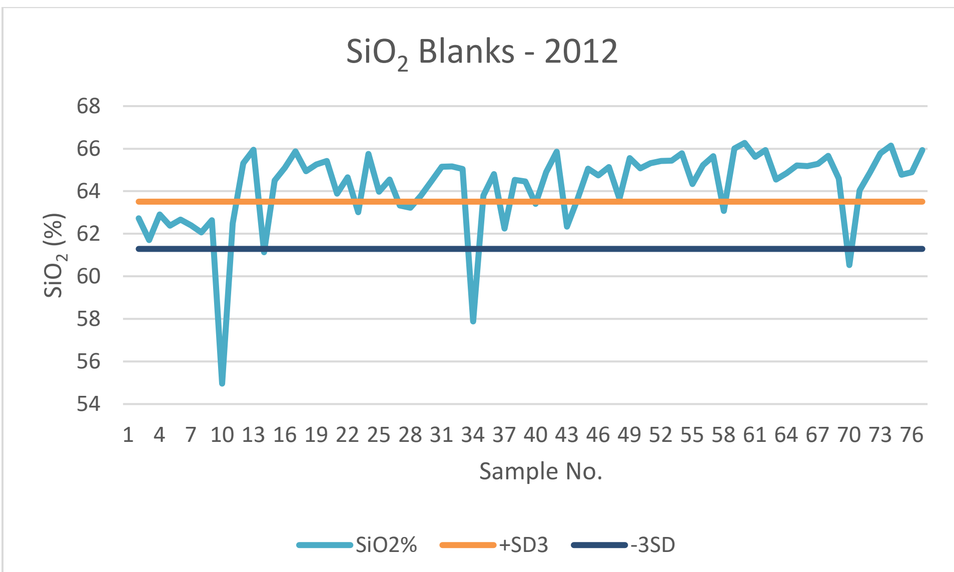


FIGURE 11-4 SiO_2 BLANKS – 2012



The 2011 results for the blank samples are reasonable and the failures may be due to poor homogeneity of the slate samples. The poor results from the 2012 blanks are likely a result of a new batch of slate collected during 2012.

CERTIFIED REFERENCE MATERIAL

Certified reference material (CRM) is a sample of a known grade and is used to assess the accuracy of the assay laboratory. Two different reference samples in addition to the blank samples were inserted into the sample stream to check for accuracy of the analytical results.

The "James" reference material was collected from a bulk sample in 2008. In 2009, twenty samples of James mineralized material were sent to Actlabs and ten samples were sent to both SGS Lakefield and ALS-Chemex. In 2010, an additional 30 samples of the high-grade James reference material was sent to Actlabs and 40 samples were sent to both SGS Lakefield and ALS-Chemex.

In 2010, a second reference sample was produced composed of medium grade "Knob Lake" mineralized material with 50 samples sent to SGS Lakefield, Actlabs, and ALS-Chemex.

Table 11-4 summarizes the results of the statistical analysis for each of the reference materials.

TABLE 11-4 STATISTICAL ANALYSIS OF LIM REFERENCE MATERIAL
Labrador Iron Mines Holdings Limited - Houston Project

Sample ID	Expected Fe Grade (%)		Expected SiO_2 Grade (%)	
	Average	Std. Dev.	Average	SD
Blank	4.3	0.24	62.4	0.37
James	61.333	0.96	9.5	1.09
Knob Lake	56.5	0.60	8.3	0.54

The 2011 and 2012 drill campaigns accounted for 57% of the total samples for the Mineral Resource estimate. During this period, CRMs were inserted into the RC sample stream at a rate of 1:50 (2%) and into the diamond drill sample stream at a rate of 1:20 (5%). Figures 11-5 and 11-6 illustrate the results of the James and Knob Lake CRMs for Fe for the 2011 and 2012 drilling campaigns.

FIGURE 11-5 JAMES CRM – Fe 2011-2012

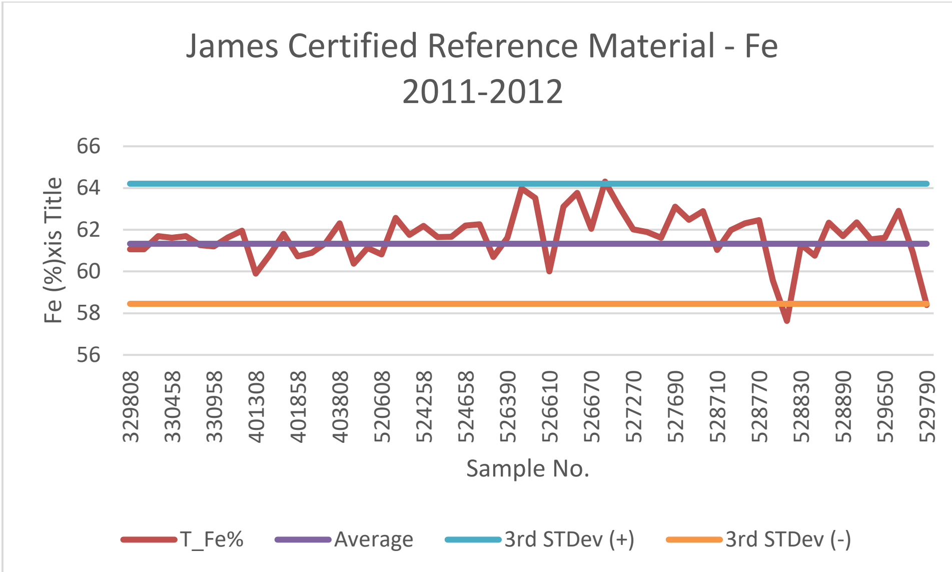
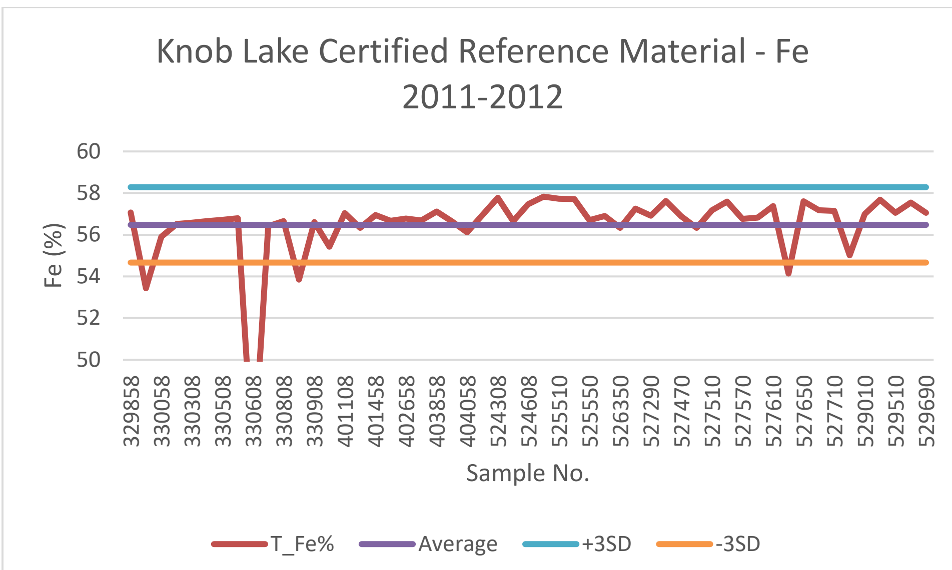


FIGURE 11-6 KNOB LAKE CRM – Fe 2011-2012



The analysis of the Fe CRMs indicates reasonable accuracy of the Fe analytical results for the 2011 and 2012 drilling campaigns. One CRM that returned a grade of 44.9% Fe is believed to be the result of a sample mix-up.

Figures 11-7 and 11-8 illustrate the results of the James and Knob Lake CRMs for SiO_2.

FIGURE 11-7 JAMES CRM – SiO_2 2011-2012

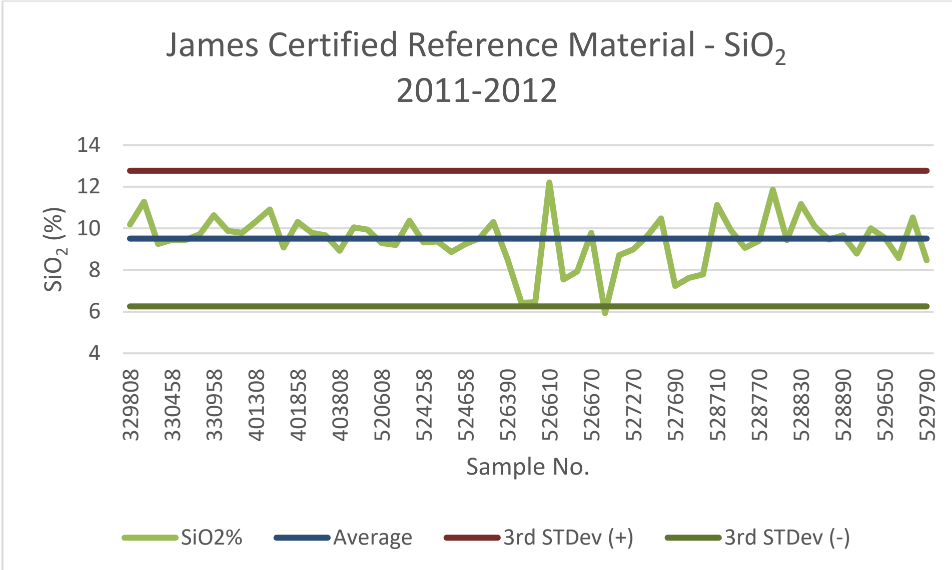
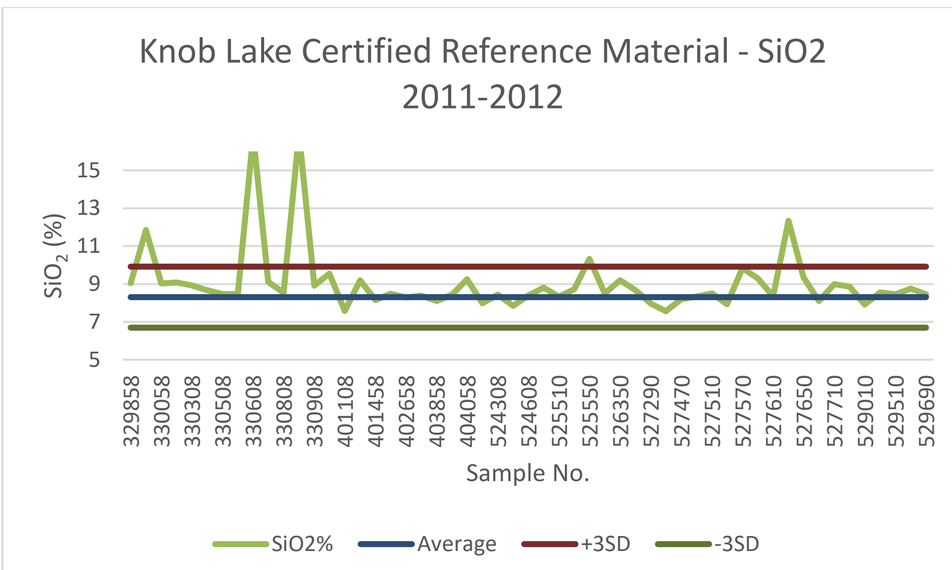


FIGURE 11-8 KNOB LAKE CRM – SiO_2 2011-2012



The analysis of the CRMs indicates reasonable accuracy of the SiO_2 analytical results for the 2011 and 2012 drilling campaigns. Two CRMs that returned grades of 16.9% and 17.0% SiO_2 are believed to be the result of sample mix-ups.

DUPLICATE SAMPLES

RC FIELD DUPLICATES

The procedure included the systematic insertion of field duplicates of RC cuttings into the sample stream at a rate of approximately one per 25 sample batch sent for analysis to the laboratory. In 2008, the samples were collected from a different splitter exit than the official three metre samples. These samples went through the same sample preparation, analysis, and security procedures and protocols as the regular three metre samples. From 2009 through 2012, the sample was split by a cyclone rotary splitter. One half of the material was discarded outside the drill and the second half was sent into sampling buckets underneath the splitter. The field duplicate was taken from the material discarded outside the rig at a rate of one in every 25 samples.

There were no field duplicates included in the 2012 diamond drilling campaign.

LIM submitted 58 (4%) field duplicate samples in the 2011 RC drilling campaign and 40 (2%) in the 2012 RC drilling campaign. Figures 11-9 and 11-10 are scatterplots for the Fe and SiO_2 duplicates, respectively.

FIGURE 11-9 FIELD DUPLICATE SAMPLES – FE 2011-2012

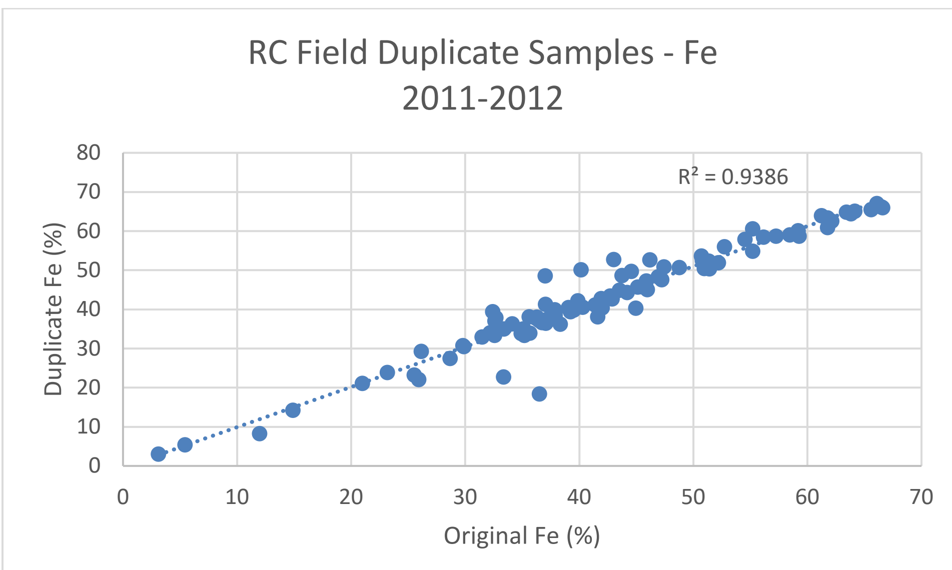
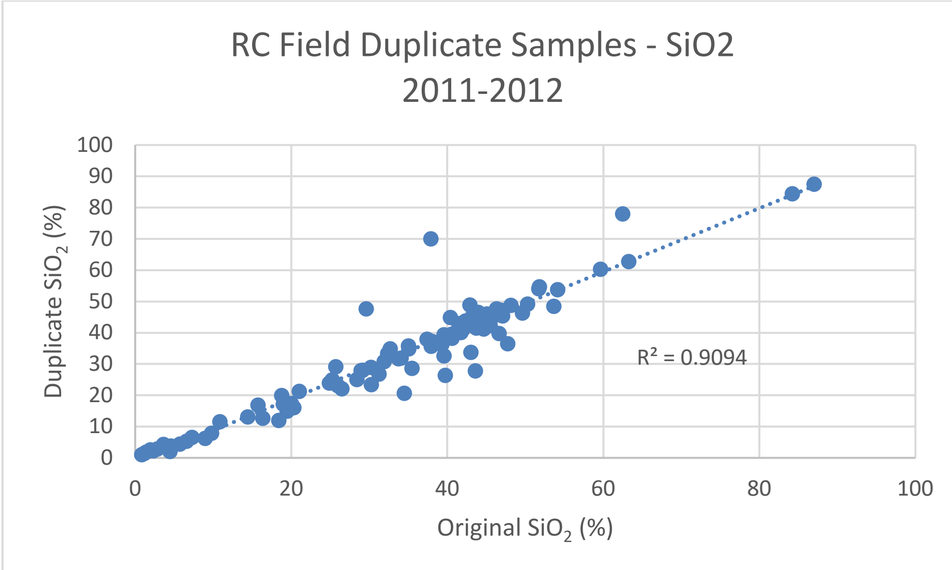


FIGURE 11-10 FIELD DUPLICATE SAMPLES – SiO_2 2011-2012



The analysis of the RC field duplicates for 2011 and 2012 illustrates reasonable agreement between the original and duplicate results for Fe and SiO_2.

DIAMOND DRILLING REJECT DUPLICATE SAMPLES – 2012

LIM did not collect field duplicate samples from the 2012 diamond drilling campaign. Thirty-two crushed reject samples were re-inserted for analysis. The results are illustrated in Figures 11-11 and 11-12.

FIGURE 11-11 DIAMOND DRILL DUPLICATE REJECT SAMPLES – FE - 2012

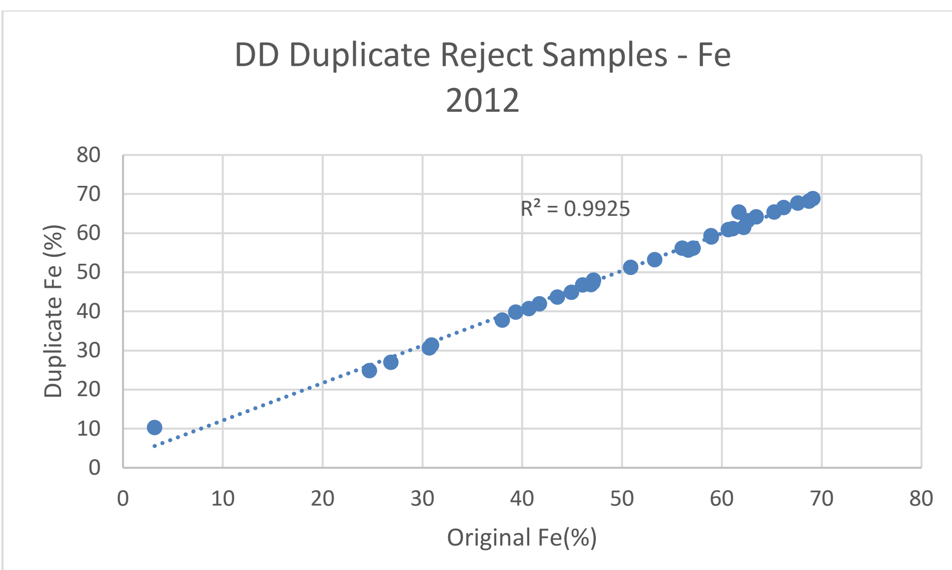
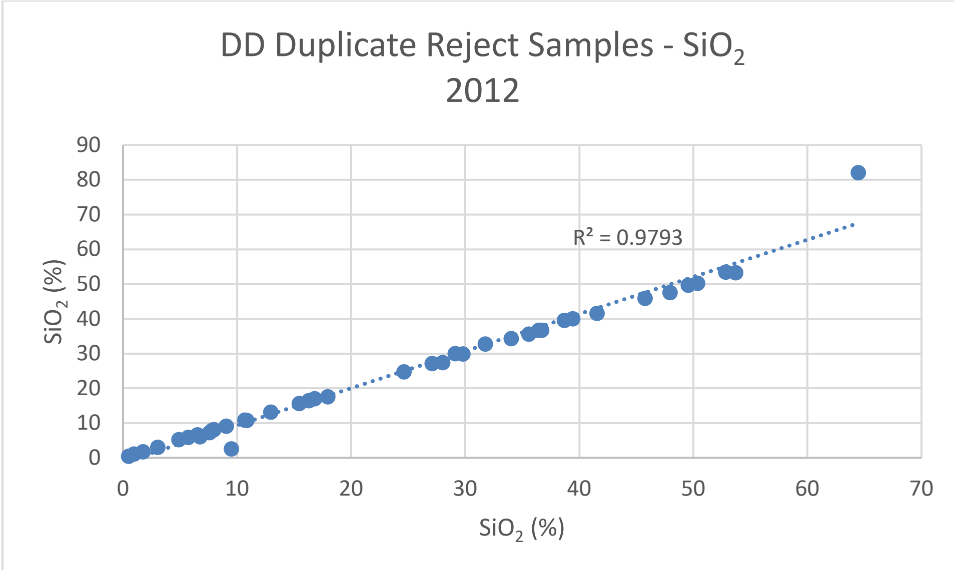


FIGURE 11-12 DIAMOND DRILL DUPLICATE REJECT SAMPLES – SiO_2 - 2012



INTERLABORATORY CHECKS

In 2012, LIM submitted 82 samples to ALS-Chemex for Fe and SiO_2 checks. Figures 11-13 and 11-14 are scatterplots that illustrate very good agreement between the two data sets.

FIGURE 11-13 ACTLABS VS. ALS CHEMEX - FE

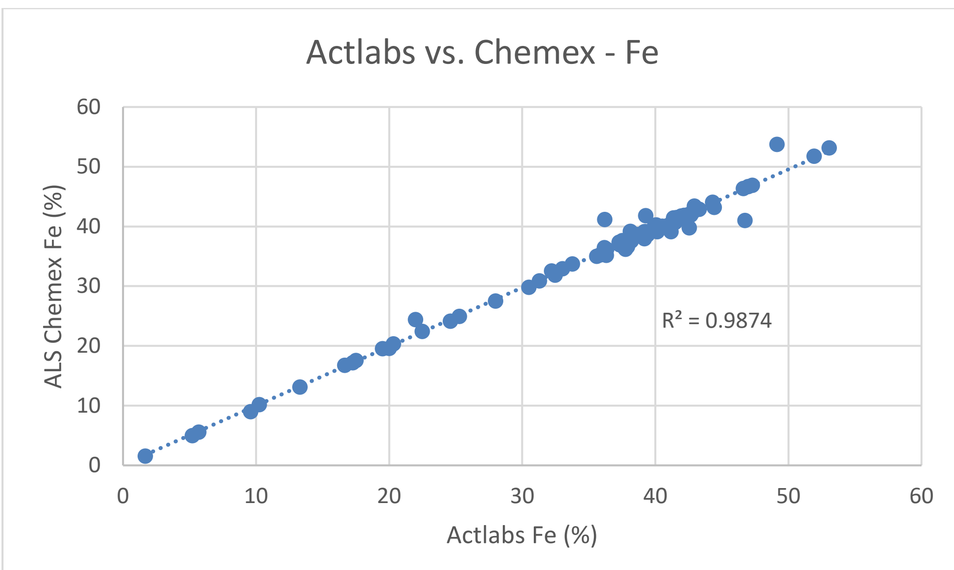
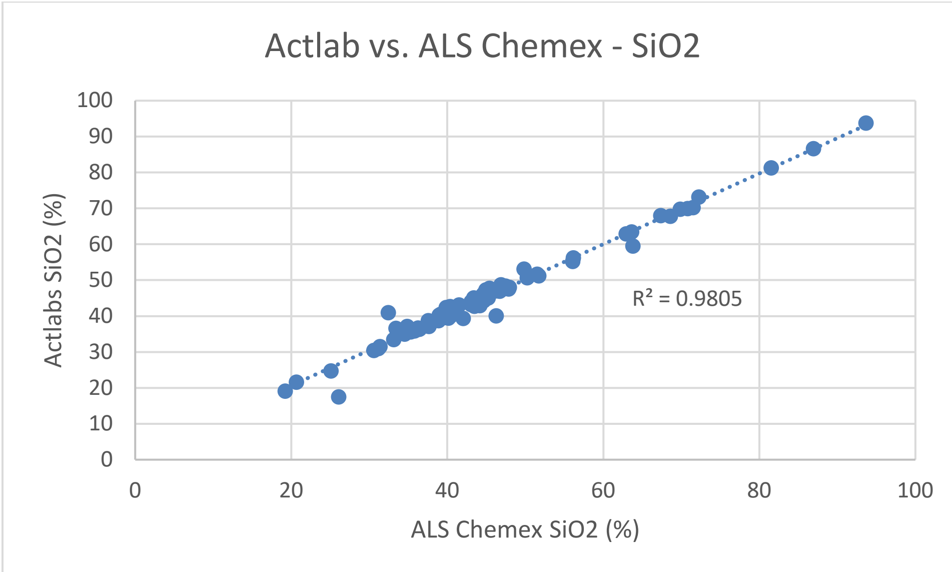


FIGURE 11-14 ACTLABS VS. ALS CHEMEX – SIO2



ASSAY CORRELATION OF TWINNED HOLES

The following description is taken from SGS, 2013.

The data verification was carried out on the Fe and SiO_2 assay results from the IOC historical RC drilling and the 2008-2010 RC drilling programs. LIM twinned some IOC RC holes in order to verify the Fe content. A total of six paired RC holes from the Houston property were considered. Correlation coefficients showed adequate correlation, as illustrated in Figures 11-15 and 11-16.

FIGURE 11-15 GRAPHIC OF FE ASSAY CORRELATION OF TWINNED HOLES

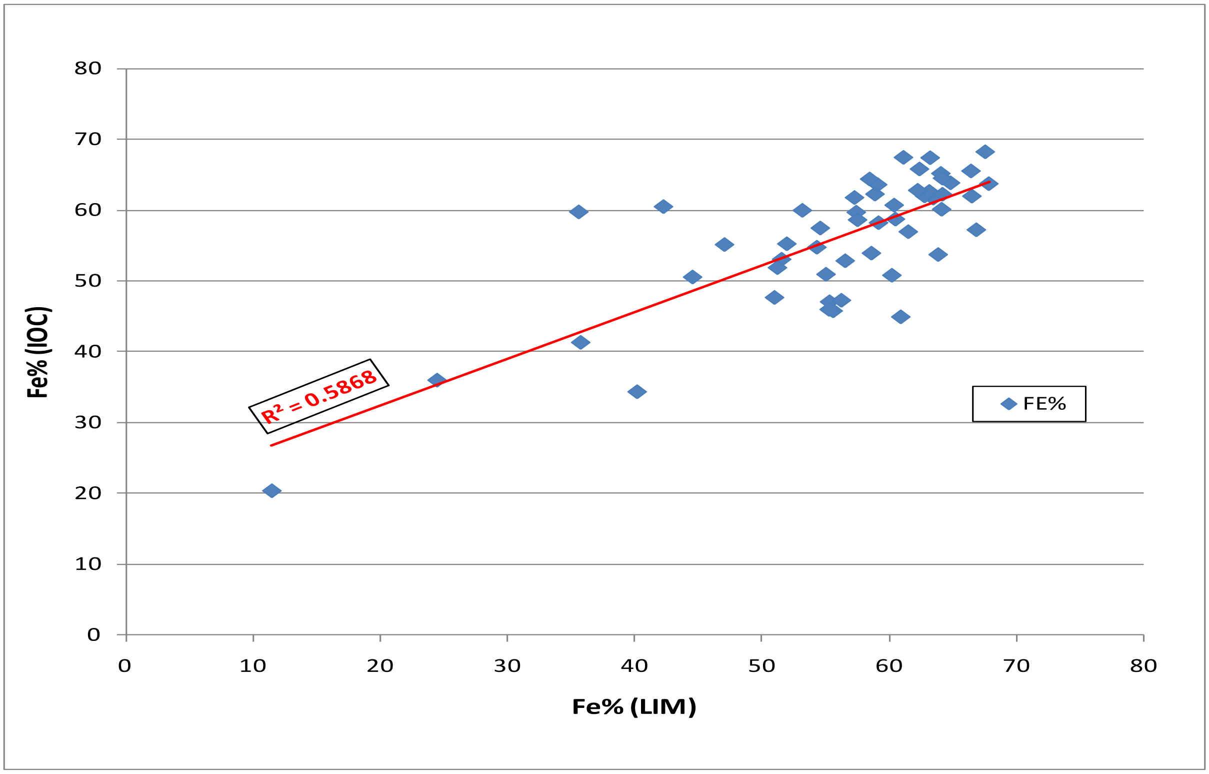
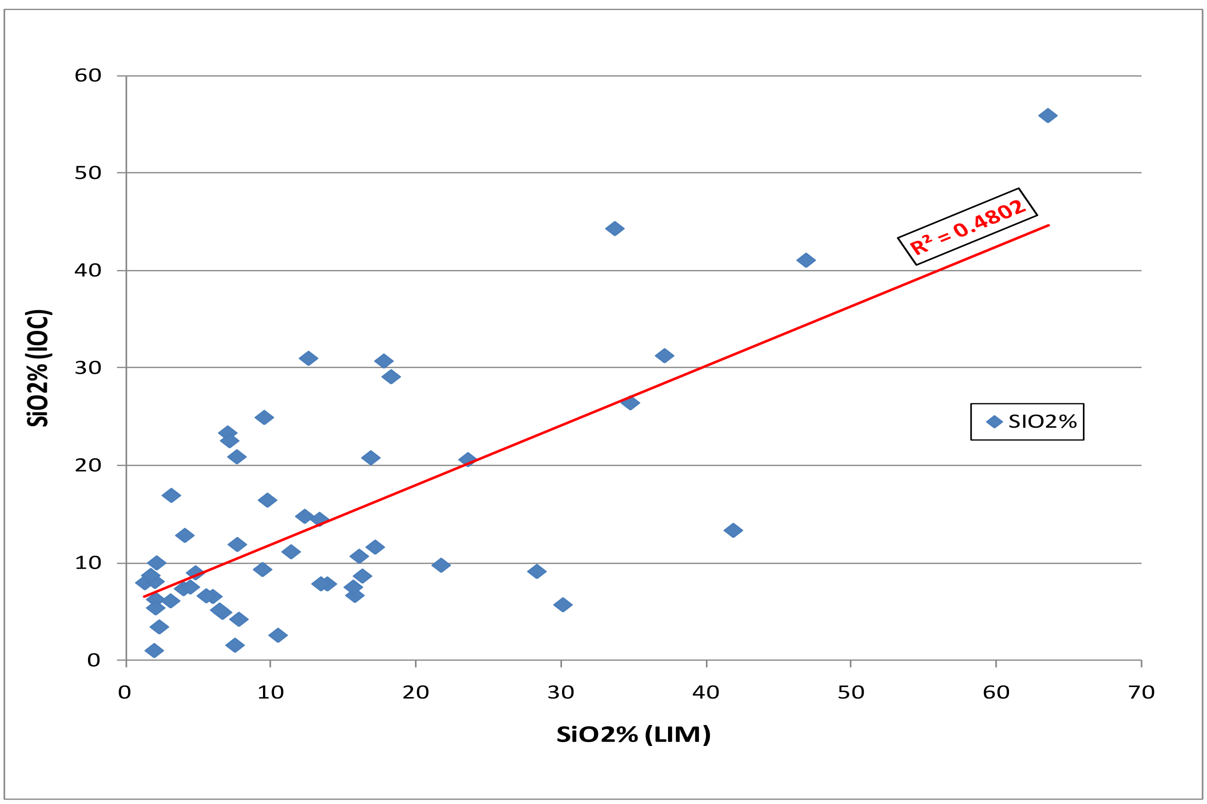
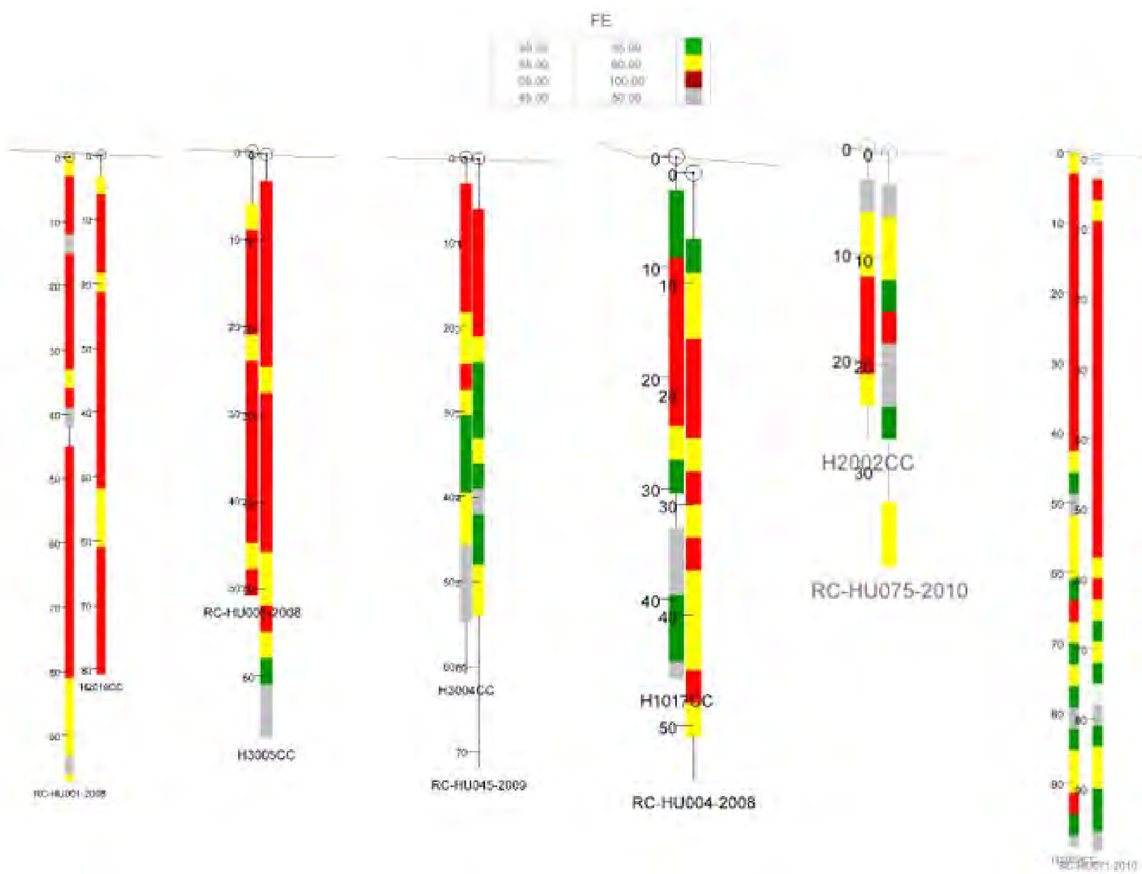


FIGURE 11-16 GRAPHIC OF SIO_2 ASSAY CORRELATION OF TWINNED HOLES



Visual analyses of the selected pairs also show satisfactory correlation. A hole showing lower correlation due to low-grade ore layers within the deposit and sharp changes because of the structural complexity is illustrated in Figure 11-17.

FIGURE 11-17 VISUAL COMPARISON OF FE GRADES OF SIX PAIRS OF HOLES



QP OPINION ON ADEQUACY OF WORK

In the QP's opinion, the sample preparation, analysis, QA/QC program, and security procedures for LIM's Houston Project are adequate for use in the estimation of Mineral Resources.

12 DATA VERIFICATION

The Houston property digital database supplied by LIM has been validated for the following fields: collar location, azimuth, dip, hole length, survey data, and analytical values. The validation did not return any significant issues. As part of the data verification, the analytical data from the database has been validated with values reported in the laboratory analytical certificates by SGS and Actlabs. The laboratory certificates verified amounts by RPA total to approximately 4% of the overall laboratory certificates available for the Houston Project. No errors or discrepancies were noted during the validation.

The Malcolm drill hole database was not verified by SGS until 2012. SMI followed the sampling and RC drilling procedures described above. The digital Malcolm database supplied by LIM has been validated for the following fields: collar location, azimuth, dip, hole length, survey data and analytical values. The validation did not return any significant issues. As part of the data verification, the analytical data from the database has been validated with values reported in the laboratories analytical certificates by SGS and Wahl. The total laboratory certificates verified amounts to approximately 10% of the overall laboratory certificates available for the Malcolm property. No errors or discrepancies were noted during the validation.

SGS DATA VALIDATION PRIOR TO 2012

For the 2008 RC drilling program, data validation was carried out on the Fe, P, Mn, SiO_2, and Al_2O_3 assay results. SGS supervised the RC sampling and introduced a series of quality control procedures including the addition of preparation laboratory duplicates, exit 2 duplicates, exit 3 duplicates, and blanks. In 2008, a total of 166 duplicates were taken and analyzed. SGS followed the QA/QC protocol and considered the data to be precise and reliable.

During the 2009 program, a total of 46 blanks were inserted. The analysis of data showed that the results remained within ±1%, which is relatively good and unbiased. The repeatability of results was considered acceptable and the process of taking duplicates was reliable. There was very little variation in the data except for a few outliers, which could be a result of contamination while processing or taking the sample.

During the 2010 program, a total of 62 samples of blank material were systematically inserted in the sample batches sent for analyses. The results remained within the zone between the average value and 2 SDs, which indicates that the sampling procedures within the laboratory were very good, and there was very little to no bias. Blank sample 329707, which fell outside the ±3 SD range, is possibly related to a contaminated blank since the standards and duplicates included in the same batch showed no apparent issues.

The assay results of the 2010 SGS check sampling campaign confirmed the presence of Fe and SiO_2 in the selected samples, as well as the integrity of the sample results used in the 2010 Houston resource estimation. Except for a limited number of assays with a significant difference, results were considered to be adequate. Sign tests and Student normal tests were performed on a small amount of samples.

In March 2011, SGS sent a total of 51 samples for analysis from four drill holes: RC-HU-053-2010, RC-HU-061-2010, RC-HU-064-2010, and RC-HU-074-2010. The samples were sent to SGS Lakefield for analysis following the sample preparation and analytical procedures described in Section 11.

Overall, the data verification results showed good assay correlation. The Mn, Al_2O_3 and P Sign tests and Student normal t-tests were inconclusive, however, the average difference of LIM and SGS sample results were low for Mn (1%). The difference of the average grades for P (16%) and Mn (13%) appears high. SGS recommended the continuation of the QA/QC procedures in order to verify more precisely these differences.

During the site visit conducted from August 1 to 5, 2011, by Maxime Dupéré, P.Geo. (SGS), a total of 78 mineralized field duplicates from the Houston deposit were collected from holes RC-HU091-2011, RC-HU094-2011, RC-HU095-2011, RC-HU077-2011, RC-HU104A-2011, RC-HU106-2011, and RC-HU081-2011 under the supervision of SGS and submitted for whole rock analysis at SGS Lakefield. The duplicate samples were processed using the assay procedures described in Section 11.

A statistical analysis of the selected 2011 original and duplicate analytical results from a series of tests (Sign test, Student logarithmic test, Student normal test) shows a potential bias as 72% of the original values for Fe were greater than the duplicate values.

There was a poor correlation ($R2=0.4$ for total Fe (Tot Fe) and $R2=0.3$ for SiO_2) between check and original assays both for Fe and SiO_2 in 2011. If the high Fe (Fe_2O_3) values are taken out from the graph, the correlations improve. The mean averages of the check and original samples assays do not differ significantly.

SGS INDEPENDENT CHECK SAMPLES – 2012

During the 2012 exploration drilling campaign SGS collected 30 duplicate samples of diamond drill split core from the Houston drilling and 29 samples from riffle-split witness samples from RC drilling. The original samples were collected by LIM and analyzed at Actlabs while the SGS check samples were analyzed at SGS Lakefield. Table 12-1 summarizes the mean, minimum, and maximum values for Fe_Tot and SiO_2 for the split core samples at the Houston deposit.

TABLE 12-1 SUMMARY STATISTICS - HOUSTON INDEPENDENT SAMPLING
Labrador Iron Mines Holdings Limited – Houston Project

	Total Iron		SiO_2	
	Original Actlabs (% Tot Fe)	SGS Check (% Tot Fe)	Original Actlabs (% SiO_2)	SGS Check (% SiO_2)
Count	30	30	30	30
Mean	59.89	61.05	13.11	11.67
Minimum	34.41	50.64	4.78	3.24
Maximum	66.17	67.22	49.64	25.7

RPA notes that the analyses of the split core check samples from the 2012 DD campaign in the Houston deposit demonstrate a reasonable comparison with the original results, with the exception of one sample with an anomalous minimum Fe_Tot grade for the original Actlabs analysis. The SGS Technical Report suggests a possible sample mix-up, however RPA was unable to confirm this.

Table 12-2 summarizes the mean, minimum, and maximum values for Fe_T and SiO_2 for the riffle split witness samples at the Malcolm deposit.

TABLE 12-2 SUMMARY STATISTICS – MALCOLM INDEPENDENT SAMPLING
Labrador Iron Mines Holdings Limited – Houston Project

Total Iron	SiO_2

	Original Actlabs (% Tot Fe)	SGS Check (% Tot Fe)	Original Actlabs (% SiO_2)	SGS Check (% SiO_2)
Count	29	29	29	29
Mean	35.12	35.38	43.47	43.92
Minimum	9.51	9.58	6.10	6.19
Maximum	59.85	60.85	60.18	61.7

RPA notes that the analyses of the check samples from the 2012 RC drilling campaign in the Malcolm deposit demonstrate a good comparison with the original results.

In the QP's opinion the SGS check sampling from the 2012 DD and RC drilling campaigns confirmed the presence of potentially economic iron grades for the Houston and Malcolm mineralization, however, the check samples are not statistically representative of the deposits as they represent less than one percent of the total resource database.

2020 DATA VERIFICATION

RPA was provided with nine assay certificates in digital format (Excel files). The assay data was compiled and then compared against the Houston and Malcolm property assay data tables. The drill hole database assay value of the matched sample was then checked against the assay certificate.

The compiled assay certificate data matched 255 samples out of 975 assays in the Malcolm database, representing approximately 25% of the records; no errors were identified. For Houston, a total of 168 samples were matched out of 9,153 assays in the database, representing approximately 2% of the records; no errors were identified.

The assay certificates provided reported the iron content as Fe_2O_3 value. RPA verified the conversion value used for the values present in the database and calculated an average value of 1.429. This is in line with the value of 1.430 recommended by commercial laboratories.

The QP is of the opinion that the database is adequate for the purpose of Mineral Resource estimation.

13 MINERAL PROCESSING AND METALLURGICAL TESTING

Considerable test work has been completed on trench samples from the Houston property obtained in 2011. This test work included physical characterization, scrubbing and comminution tests, density, gravity, and magnetic separation tests, and settling and filtration tests. While RPA reviewed reports describing this test work, RPA was not provided with and therefore did not review test work data for test work conducted prior to 2012. A brief description of test work prior to 2012 was provided in the 2013 technical report on the Houston and Malcolm 1 Property (SGS, 2013) and is summarized in the following section.

METALLURGICAL TEST WORK PRIOR TO 2012

MIDREX TEST PROGRAM

In 1989 Midrex Technologies Inc. (Midrex), an international iron and steel making technology company based in Charlotte, North Carolina, sampled and tested lump iron ore mineralization sample No. 625 from the Houston 1 deposit for standard raw material evaluation purposes. The sample analyses are presented in Table 13-1. All lump iron ore mineralization samples were estimated by Midrex to be suitable for commercial production using its technology.

TABLE 13-1 MIDREX LUMP IRON ORE MINERALIZATION SAMPLES ANALYSES
Labrador Iron Mines Holdings Limited – Houston Project

Sample No.	Dry Wt% Yield at +6.7 mm	Fe%	S%	P%
625/Houston 1	92.33	68.32	0.007	0.057

2006 BULK SAMPLING BY LIM

Bulk samples from trenches at Houston 1 were collected during the summer of 2006 from two trenches of 113 m and 78 m long respectively. Three bulk samples of some 600 kg each were collected from the two trenches for testing. The testing for compressive strength, crusher index, and abrasion index were done at SGS Lakefield. The composite crushing, dry and wet screen analysis, washing and classification tests were done at RPC - The Technical Solutions Centre, in Fredericton, New Brunswick. An additional five composite samples from different mineralization zones in the trenches were collected and tested in the ALS Chemex Lab in Sudbury for chemical testing.

The bulk sampling tests produced data for rock hardness and work indices for crushing and grinding, average density data for the various mineralization zones as well as chemical data. The specific gravity (SG) tests, completed on the bulk samples, have shown that there was a possibility that the average SG is higher than the 3.5 g/cc which was used in previous IOC calculations. Additional SG testing was completed during the 2009 exploration program, obtaining a Fe-dependent variable SG.

The SG data have been used in the calculation of deposit tonnages while the chemical test results will be used to compare them with the historical IOC data from neighboring drill holes (adjusted for natural basis reporting by IOC). Table 13-2 shows the summary of the results of the tests on the 2006 bulk samples for the various mineralization types.

TABLE 13-2 SUMMARY OF TESTS BY SGS LAKEFIELD
Labrador Iron Mines Holdings Limited – Houston Project

Sample Name	CWI (kWh/t)	AI (g)	UCS (Mtpa)	Density CWI (g/cm^3)	Density UCS (g/cm^3)
NB-Houston A	8.2	0.187	106.4	4.26	4.61
NB-Houston B	-	0.213	48.9	-	4.42
LNB-Houston A	7.3	0.108	-	3.95	-
LNB-Houston B	-	0.189	-	-	-
TRX-Houston A	6.7	0.098	22.3	3.47	3.00
TRX-Houston B	-	0.067	-	-	-
NB4-Houston A	5.7	0.086	73.0	3.77	4.36
NB4-Houston B	-	0.080	-	-	-

SGS LAKEFIELD PROGRAM - 2008

A bulk sample program was undertaken during the summer of 2008. Two thousand tonnes of samples were excavated with a CAT-330 type excavator from the Houston 1 deposit. The excavated material was hauled to the Silver Yard site for crushing and screening. The raw material was screened at approximately 6 mm into two products – a lump product (-50 mm +6 mm) and a sinter fines product (-6 mm). The material excavated from each deposit and the products produced from each deposit were kept separate from the others.

Representative 200 kg samples of each mineralization type were collected and sent to SGS Lakefield for metallurgical tests and other test work (angle of repose, bulk density, moisture, and direct head assay and particle size analysis determinations).

Preliminary scrubber tests were performed. The potential of beneficiation by gravity was explored by heavy liquid separation. Vacuum filtration test work was also carried out. The results of the bulk sample test are shown in Table 13-3 and Table 13-4.

TABLE 13-3 CALCULATED GRADES FROM 2008 BULK SAMPLES (SGS LAKEFIELD)
Labrador Iron Mines Holdings Limited – Houston Project

Houston Deposit	
Mineralization Type	Blue Ore
Fe1	66.1
SiO_2	2.22
P1	0.07
Al_2O_3	0.30
LOI	1.33

1 Calculated from WRA oxides

TABLE 13-4 2008 BULK SAMPLES TEST RESULTS (SGS-LAKEFIELD)
Labrador Iron Mines Holdings Limited – Houston Project

Houston (Blue Ore)		Assays (%)					Distribution
		Fe	SiO_2	Al_2O_3	P	LOI	
Lump	50 mm +6.7 mm	68.1	1.08	0.20	0.060	1.00	33.9
Sinter Feed	-6.7 mm +150 µm	66.2	3.30	0.41	0.078	1.22	35.5
Pellet Feed	-150 µm +38 µm	65.8	3.84	0.38	0.082	1.37	6.43
Slimes	-38 µm	63.7	1.99	0.54	0.089	2.17	24.1
Calc. Head	-	66.2	2.27	0.37	0.075	1.38	100.0

DERRICK CORPORATION - 2008

The material collected from the 2008 bulk samples at both Houston and the James deposits was sent to a number of other laboratories for additional test work, including Derrick Corporation (Derrick) in Buffalo, NY, for screening tests.

Eight 45-gallon drums of the sample were sent to Derrick for screening test work. The purpose of the test work was to determine optimum screen capacity and design for sinter fines production. Different screen openings were used to investigate the dependence of the recovery from the size of the product. The test results demonstrated that both 300 µm and 600 µm openings gave promising recoveries, as shown in Table 13-5.

TABLE 13-5 DERRICK SCREEN TESTS RESULTS
Labrador Iron Mines Holdings Limited – Houston Project

Screen Openings	Feed (Fe_{tot} %)	Oversize (Fe_{tot} %)	Undersize (Fe_{tot} %)	Efficiency (%)
300 µm Screen	61.23	68.26	58.91	99.2
600 µm Screen	61.23	66.62	59.28	99.6

TRENCH SAMPLES AND POST 2011 TEST WORK

In the fourth quarter of 2011, LIM collected bulk trench samples from the Houston property (two bulk trench samples from Houston 1 and one bulk trench sample from Houston 2) and they were classified as Hanging Wall (HU1), Footwall (HU2), and DRO. The test work completed by various testing facilities on the trench samples and reviewed by RPA is described in this section. The test work programs are summarized in Table 13-6. LIM provided the results and engineering reports of these investigations to DRA, and these became the reference for most of the criteria used in the design of a conceptual iron wet beneficiation plant. This work is not discussed here as the wet beneficiation plant is not relevant to the current Houston Project, as there is no wet beneficiation plant specified.

TABLE 13-6 TEST WORK PROGRAMS
Labrador Iron Mines Holdings Limited – Houston Project

Headings	Date	Test Work	No. of Samples	Sample ID
MBE Coal & Minerals Technology	Jan-Feb 2012	Jigging Magnetic Separation	2	Redmond HU1 - hanging wall HU2 - footwall
MBE Coal & Minerals Technology	Jul-Aug 2013	Magnetic Separation	1	Unknown
Met-Solve	2012	Scrubber Settling Mineralogy	3	HU1 - hanging wall HU2 – footwall DRO
Outotec	2012	Density separation	3	Hanging wall Footwall DRO
RPC Science and Engineering	2012	Scrubbing Heavy liquid separation Magnetic separation	3	HU1 (hanging wall) HU2 (footwall) DRO
RPC Science and Engineering	2013	Mineralogy Abrasion index Size analysis and assaying Scrubbing	29	Unknown
RPC Science and Engineering (via Derrick Corporation)	2013	Size analysis and assaying of dewatered samples	4	WHIMS product fines
SGS	2012/2013	Mineralogy Physical characterization Grindability Scrubbing Heavy liquid separation Gravity separation Magnetic separation Settling	3	Direct Rail Ore (DRO) Hanging Wall (HW) Footwall (FW)
SGS	2014	Size by size analysis Grindability	9	3 samples from each of north, central, and south zones of the Houston deposit
WesTech Engineering Inc.	2012	Sedimentation Filtration	3	Tailings: DRO Hanging Wall Footwall
WesTech Engineering Inc.	2013	Sedimentation Filtration	1	Unknown
Chemical Plant & Engineering	2013	Filtration		Unknown

In 2012, MBE Coal & Minerals Technology GmbH (MBE) conducted jigging and wet high intensity magnetic separation (WHIMS) on two samples identified as being Redmond hanging wall and footwall material. This test work is not discussed here as the Redmond samples are not relevant to the current Houston Project, as there is no jigging or WHIMS specified.

RPA did not review results for dewatering of four WHIMS product fines samples using high frequency screens conducted by Derrick in 2013 as the data was not available, nor is it relevant to the current Houston Project, as there is no WHIMS specified.

MBE COAL & MINERALS TECHNOLOGY GMBH – 2013

In 2013, MBE completed WHIMS tests on a sample identified only as being from the Houston deposit. The sample was supplied to MBE pre-crushed to -1 mm, and the -20 µm portion made up approximately 35% of the sample. The sample assayed 53.3% iron and 21.4% silica. The tests demonstrated that it was possible to upgrade the -1 mm sample from approximately 53% iron to > 62% iron, although at a low recovery of approximately 50%. The -20 µm material reported mainly to the non-magnetic fraction of the WHIMS product.

MET-SOLVE LABORATORIES INC. – 2012

In 2012, Met-Solve Laboratories Inc. (Met-Solve) completed scrubber, settling, and mineralogy test work on three samples (drums) labelled HU1 (hanging wall), HU2 (footwall), and DRO. The objective of the scrubber test work was to investigate how well the adherent fines could be scrubbed away from the rocks, as well as determining the size distribution of scrubbed material, conducting mineralogy on different size fractions, and determining the settling characteristic of the scrubbed -150 µm fraction.

The head grades of the three samples were:

- Hanging Wall (HU1): 63.3% Fe
- Footwall (HU2): 54.2% Fe
- DRO: 60.2% Fe

The scrubber test work was carried out using a Sepro Scrubber (2.2 kW, 125 cm length by 77 cm inner diameter, 100 litre slurry capacity). The extent of scrubbing was quantified by weighing the remaining agglomerates. To obtain a standardized mass of the remaining agglomerates, they were all lightly spray washed and air dried overnight before weighing. The scrubber tests were conducted at 50%, 60%, and 65% pulp density for each sample. The test products from the 60% pulp density tests were used for screen analysis to determine the particle size distribution and are summarized in Table 13-7. For the screen analysis, the entire oversize fraction (+850 µm) was screened, but only a representative cut of the undersize was screened; the undersize values were then normalized to obtain the corresponding mass. The head material was screened at 2,360 µm and 850 µm to produce three size fractions for mineralogy and assay. Subsamples from the -150 µm size fractions from the 60% pulp density test were used for settling tests for each sample.

For each test, an insignificant amount of agglomerates was noted during an intermediate examination of the slurry after 30 seconds of scrubbing and the tests were judged to be essentially complete. There was a significant amount of friable rocks observed in the samples which could be easily broken up with a hammer. These were difficult to distinguish from regular rocks and were not monitored during the scrubbing tests, however, it did appear that there was little attrition of these particles in the short residence time. The slurry solutions had a specific gravity ranging from 1.04 g/cc to 1.17 g/cc, indicating small to moderate amounts of solids were suspended in solution.

TABLE 13-7 SCRUBBER PRODUCT SIZE DISTRIBUTION
Labrador Iron Mines Holdings Limited – Houston Project

Sieve Size (µm)	Mass Retained (%)		
	Footwall	Hanging Wall	DRO
32,000	22.86	5.60	3.14
19,000	12.16	12.49	6.80
13,200	6.78	9.14	6.32
9,520	6.61	9.73	8.13
6,700	4.78	7.24	8.09
4,000	5.14	8.37	10.41
3,350	1.46	2.14	2.82
2,800	1.08	2.21	3.27
2,360	0.85	2.50	3.47
2,000	1.06	1.08	1.78
1,700	0.48	1.03	1.67
1,400	0.67	1.32	2.11
1,180	0.52	1.11	1.74
850	0.62	1.45	2.18
600	1.91	2.20	1.32
425	2.71	3.60	2.56
300	2.37	3.33	2.58
212	2.01	2.97	2.18
150	2.10	3.01	2.01
106	1.92	2.64	2.11
75	2.08	2.54	1.72
53	2.05	2.36	2.18
37	1.47	2.23	2.07
-37	16.30	9.71	19.35
Total	**100.0**	**100.0**	**100.0**

The scrubber products were analyzed for iron content by size fraction and the results are summarized in Table 13-8. In general, iron content increased with increasing size.

TABLE 13-8 SCRUBBER PRODUCT IRON CONTENT BY SIZE FRACTION
Labrador Iron Mines Holdings Limited – Houston Project

Sieve Size (µm)	Footwall		Hanging Wall		DRO	
	Mass (%)	Fe (%)	Mass (%)	Fe (%)	Mass (%)	Fe (%)
+32,000	22.9	60.4	5.6	68.5	3.1	62.7
+6,700 / -32,000	30.3	58.7	38.6	68.2	29.3	63.0
+1,180 / -6,700	11.3	57.6	19.8	67.1	27.3	61.8
+600 / -1,180	2.5	55.6	3.7	63.4	3.5	55.9
+150 / -600	9.2	45.2	12.9	52.6	9.3	51.3
-150	23.8	44.1	19.5	55.1	27.4	58.7
Total	**100.0**	**54.2**	**100.0**	**63.2**	**100.0**	**60.2**

Mineralogical analysis of the three samples showed that iron mineralization was present mainly as hematite and goethite, with minor magnetite in the DRO sample. A significant amount of the iron in the DRO samples was present in a manganese oxide mineral (FeMnO(OH)), indicating the potential for elevated levels of manganese.

Static settling tests were conducted on the -150 µm size fractions of the scrubber products. All three samples settled quickly with the inflection point reached in less than 2 hours. Although the DRO sample settled the slowest and by the least amount overall, it was the only one that left a clear supernatant. The hanging wall sample, HU1, settled quickly, but the supernatant remained cloudy even after 1 month of settling. The footwall sample, HU2, had a somewhat cloudy to clear supernatant.

OUTOTEC (USA) INC. – 2012

Outotec (USA) Inc completed tests using a Floatex Density Separator to upgrade three samples in 2012. The samples were identified as hanging wall (HU1), foot wall (HU2), and DRO. The samples delivered were as raw mineralization containing very large rocks down to fine sand, and therefore samples were screened to recover the -2,360 µm material suitable for Floatex Feed, amounting to 28% of the sample mass for HU1, 22% for HU2, and 19% for the DRO sample. Several tests were to be performed on each sample to determine the best setting to reduce the silica content. The set point and teeter water were varied for each set of tests. The tests with the lower set point and lowest teeter water produced the highest-grade underflow at the best recovery. Table 13-9 shows the best results for each sample tested.

TABLE 13-9 FLOATEX DENSITY SEPARATION TEST RESULTS
Labrador Iron Mines Holdings Limited – Houston Project

Sample	Conditions	Stream	wt%	Fe_2O_3 (%)	Fe (%)	SiO_2 (%)	Fe Rec (%)
	Set Point 40	Feed	100	75.5	52.85	22.0	100
HU1	1.0 gpm water	OF	20.0	80.3	56.21	16.9	19.2
		UF	80.0	84.4	59.08	13.6	80.8
	Set Point 40	Feed	100	61.9	43.33	27.7	100
HU2	1.0 gpm water	OF	15.8	64.6	45.22	21.4	15.0
		UF	84.2	68.9	48.23	22.9	85.0
	Set Point 85.0	Feed	100	77.7	54.39	13.7	100
DRO	1.5 gpm water	OF	23.9	65.6	45.92	21.9	19.7
		UF	76.1	84	58.8	6.02	80.3

Outotec concluded that because the recovery of iron was close to the weight recovery, there was insufficient liberation, as numerous locked particles of iron and silica were observed.

RPC SCIENCE AND ENGINEERING – 2012

In 2012, RPC Science and Engineering (RPC) conducted scrubbing, heavy liquid separation, and wet high intensity magnetic separation (WHIMS) tests on three trench samples labelled HU1 (hanging wall), HU2 (footwall), and DSO. Head assays for the three samples are summarized in table 3-10.

TABLE 13-10 HEAD ASSAYS
Labrador Iron Mines Holdings Limited – Houston Project

Sample ID	Moisture (%) (As received)	Al_2O_3 (%)	BaO (%)	CaO (%)	Cr_2O_3 (%)	Fe_2O_3 (%)	Fe (%)	K_2O (%)	MgO (%)	MnO (%)	Na_2O (%)
HU1	7.41	0.51	0.01	0.03	0.01	89.58	62.65	0.07	0.01	0.59	0.06
HU2	10.61	1.99	0.01	0.01	<0.01	83.70	58.54	0.05	0.01	0.95	0.06
DSO	10.11	1.10	0.03	0.02	<0.01	87.87	61.46	<0.05	0.03	0.79	0.02

Sample ID	Moisture (%) (As received)	P_2O_5 (%)	SiO_2 (%)	SrO (%)	TiO_2 (%)	V_2O_5 (%)	ZrO_2 (%)	Tot S (%)	LOI (%) (1000°C)	Total (%)
HU1	7.41	0.15	8.08	<0.01	0.01	0.01	<0.01	0.004	0.71	99.85
HU2	10.61	0.20	10.23	<0.01	0.01	0.01	<0.01	0.008	2.56	99.81
DSO	10.11	0.22	4.28	0.01	0.04	0.01	0.01	0.016	5.50	99.94

Approximately 100 kilograms from each of the samples was split off for the scrubbing tests. The scrubbing tests were carried out in a tumbling mill with baffles. The feed sample was introduced at the entrance and the water was sprayed continuously inside the tumbling mill during the test. The tumbling mill rotated at approximately 25 rpm and the scrubbing took place autogenously. Baffles within the mill facilitated cascading and helped to move and mix the feed within the mill. The scrubbed slurry was allowed to flow over a weir at the exit of the mill and then was wet screened to remove most of the silt and clay. Four products were obtained in this process, +25 mm, lumps (-25 mm +8 mm), sinter fines (-8 mm +1 mm), and -1 mm fines; each was dried and submitted for whole rock analysis. Key assay results of the four scrubbed products are summarized in Table 3-11.

TABLE 13-11 SCRUBBED PRODUCT KEY ANALYSES BY SIZE FRACTION
Labrador Iron Mines Holdings Limited – Houston Project

Sample ID	Size Fraction	Weight (%)	Fe_2O_3 (%)	Fe (%)	SiO_2 (%)	MnO (%)
	+25 mm	14.2	95.88	67.06	2.88	0.46
	Lump (-25 mm +8 mm)	27.3	95.06	66.49	3.19	0.66
HU1	Sinter fines (-8 mm +1 mm)	24.1	94.45	66.06	2.7	1.01
	-1 mm	34.3	75.38	52.72	21.81	0.3
	Total	100				
	+25 mm	19.5	91.35	63.89	5.91	0.71
	Lump (-25 mm +8 mm)	29.1	89.96	62.91	5.4	1.35
HU2	Sinter fines (-8 mm +1 mm)	19.5	87.21	60.99	5.44	2.37
	-1 mm	31.9	68.93	48.21	20.92	0.88
	Total	100				
	+25 mm	7.1	92.7	64.83	1.28	1.38
	Lump (-25 mm +8 mm)	26.4	91.38	63.91	1.79	0.89
DSO	Sinter fines (-8 mm +1 mm)	32.1	88.05	61.58	4.18	0.96
	-1 mm	34.4	80	55.95	10.86	0.47
	Total	100				

More detailed size by size analysis was completed on each of the head samples and the scrubbed products from 50 mm to -20 µm and showed that the iron content decreased as size decreased, while silica content increased as size decreased, especially in the fines fractions smaller than 1 mm.

Gravity tests were initially planned to be conducted with a laboratory jig for the scrubbed lump products (-25 mm +8 mm) and the sinter fines (-8 mm +1 mm). The size by size analyses, however, showed that all three samples contained relatively high percentages of hematite and a low percentages of gangue minerals. The specific gravity of the scrubbed product particles were not significantly different, and therefore heavy liquid separation (HLS) tests were carried out prior to carrying out jig tests to verify the theoretical ratio of float and sink minerals.

Tetrabromoethane (SG 2.97 g/cc) and methylene iodide (SG 3.31 g/cc) were chosen as the heavy liquids for the float-sink tests. The float fractions of all samples were very small, even at the 3.31 SG, so the float and sink products were not assayed. Based on the heavy liquid results it was concluded that the laboratory jig separation would not be effective in separating gangue minerals for the three samples. RPC suggested that heavy media separation using ferrosilicon because of its relatively high specific gravity could be considered for further evaluation.

The three head samples, the scrubbed lump products (-25 mm +8 mm) and the sinter fines (-8 mm +1 mm) were split, crushed, and pulverized to 100% passing 0.425 mm. WHIMS were conducted on split representative samples with a BoxMag unit. Three different levels of magnetic field strength (5,000 G, 7,180 G, and 8,630 G) were chosen to assess the recovery and grade of the sample. The magnetic and non-magnetic portions of the tests were assayed by whole rock analysis, and a summary of the key results is shown in Table 13-12.

TABLE 13-12 WHIMS RESULTS
Labrador Iron Mines Holdings Limited – Houston Project

Sample ID	Sample	Magnetic Field Strength (G)	Fraction	Mass (%)	Fe_2O_3 (%)	Fe (%)	SiO_2 (%)	MnO (%)
HU1	As received	5,000	Mag	11.6	92.8	64.9	4.2	0.6
			Non-mag	88.4	89.0	62.2	8.7	0.6
		7,180	Mag	21.9	93.9	65.7	3.8	0.6
			Non-mag	78.1	88.7	62.0	9.4	0.6
		8,630	Mag	31.0	95.1	66.5	3.3	0.6
			Non-mag	69.0	87.8	61.4	10.2	0.6
	Scrubbed (-8 mm +1 mm)	5,000	Mag	26.1	94.7	66.2	1.2	1.0
			Non-mag	73.9	94.1	65.8	3.2	1.1
		7,180	Mag	38.0	94.5	66.1	1.2	1.0
			Non-mag	62.0	93.9	65.7	3.3	1.1
		8,630	Mag	42.7	96.1	67.2	1.3	1.1
			Non-mag	57.3	93.3	65.3	3.5	1.1
	Scrubbed (-25 mm +8 mm)	5,000	Mag	27.9	96.5	67.5	2.1	0.6
			Non-mag	72.1	93.5	65.4	4.2	0.7
		7,180	Mag	44.7	93.2	65.2	3.1	1.2

Sample ID	Sample	Magnetic Field Strength (G)	Fraction	Mass (%)	Fe_2O_3 (%)	Fe (%)	SiO_2 (%)	MnO (%)
			Non-mag	55.3	93.3	65.2	5.1	0.7
		8,630	Mag	44.1	96.6	67.5	2.2	0.6
			Non-mag	55.9	93.0	65.0	4.8	0.6
HU2	As received	5,000	Mag	19.1	91.2	63.8	4.9	0.9
			Non-mag	80.9	83.5	58.4	11.0	1.0
		7,180	Mag	36.5	91.0	63.6	4.5	0.9
			Non-mag	63.5	80.4	56.3	12.7	1.0
		8,630	Mag	47.6	90.9	63.6	4.8	0.9
			Non-mag	52.4	79.0	55.3	14.2	1.1
	Scrubbed (-8 mm +1 mm)	5,000	Mag	23.3	91.4	64.0	3.0	2.0
			Non-mag	76.7	86.2	60.3	5.8	2.5
		7,180	Mag	31.8	90.0	63.0	3.3	2.2
			Non-mag	68.2	85.8	60.0	6.1	2.5
		8,630	Mag	39.4	90.6	63.4	3.0	2.1
			Non-mag	60.6	85.5	59.8	6.6	2.6
	Scrubbed (-25 mm +8 mm)	5,000	Mag	23.4	92.5	64.7	3.3	1.2
			Non-mag	76.6	89.0	62.2	5.7	1.4
		7,180	Mag	44.7	96.3	67.3	1.9	0.6
			Non-mag	55.3	87.7	61.4	6.8	1.5
		8,630	Mag	46.0	92.2	64.5	3.3	1.2
			Non-mag	54.0	88.1	61.6	6.7	1.5
DSO	As received	5,000	Mag	12.9	91.3	63.8	2.5	0.9
			Non-mag	87.1	88.5	61.9	4.2	0.9
		7,180	Mag	24.7	90.9	63.5	2.1	0.9
			Non-mag	75.3	88.0	61.5	4.5	0.8
		8,630	Mag	30.9	91.4	63.9	2.1	0.9
			Non-mag	69.1	87.8	61.4	4.8	0.8
	Scrubbed (-8 mm +1 mm)	5,000	Mag	13.3	90.8	63.5	2.4	1.0
			Non-mag	86.7	88.1	61.7	4.0	1.0
		7,180	Mag	33.0	91.2	63.8	1.7	1.0
			Non-mag	67.0	87.0	60.9	4.8	1.0
		8,630	Mag	36.5	90.8	63.5	1.9	1.0
			Non-mag	63.5	87.6	61.3	4.9	1.0
	Scrubbed (-25 mm +8 mm)	5,000	Mag	20.5	93.8	65.6	1.2	0.9
			Non-mag	79.5	92.2	64.5	1.5	1.0
		7,180	Mag	46.0	93.3	65.3	1.1	1.0

Sample ID	Sample	Magnetic Field Strength (G)	Fraction	Mass (%)	Fe_2O_3 (%)	Fe (%)	SiO_2 (%)	MnO (%)
			Non-mag	54.0	91.2	63.8	1.8	0.9
		8,630	Mag	48.6	92.8	64.9	1.1	0.9
			Non-mag	51.4	90.9	63.6	1.8	0.9

The results of the WHIMS tests indicated that some rejection of silica from the samples was possible, however, there was little upgrading of the iron in the WHIMS products, except for the HU2 (footwall) as-received sample, which contained the highest levels of silica.

RPC SCIENCE AND ENGINEERING – 2013

Additional test work was completed by RPC in 2013 in a composite made up of 29 drill core samples (318 kg). This included mineralogy, abrasion index, size analysis and assaying, and scrubbing tests.

Mineralogical analysis showed that the sample consisted of iron oxide, iron hydroxides, and quartz. Other minerals including K-feldspar, plagioclase, pyrite, chalcopyrite, sphalerite, arsenopyrite, galena, iron carbonate, and psilomelane were present in trace quantities. The largest fragments (0.5 mm to 5 mm) were typically rich in mixed iron oxide and hydroxides, with minor interstitial quartz, but smaller fragments were more likely to be quartz rich. Many small fragments (<100 µm) consisted of discrete anhedral quartz grains. Discrete quartz grains ranged up to approximately 150 µm in size. Sulphide grains were rare.

The Bond abrasion index (Ai) was found to be 0.291 g. The size analysis and assay results are summarized in Table 13-13. There was no +32 mm material in the sample, and the majority of the lump fraction (approximately 89%) was smaller than 12.5 mm.

TABLE 13-13 COMPOSITE SAMPLE KEY ANALYSES BY SIZE FRACTION
Labrador Iron Mines Holdings Limited – Houston Project

Size Fraction	Weight (%)	Fe_2O_3 (%)	Fe (%)	SiO_2 (%)	MnO (%)
Lump (-32 mm +6.7 mm)	29.1	88.8	62.1	8.4	1.2
Sinter fines (-6.7 mm +1.18 mm)	38.9	87.1	60.9	9.2	1.9
-1.18 mm	32.0	68.7	48.1	27.5	1.4
Total	100	82.2	57.5	13.1	1.7

A scrubbing test was carried out using the same procedure used in the 2012 RPC test work. A summary of the results is shown in Table 13-14.

TABLE 13-14 SCRUBBED PRODUCT KEY ANALYSES BY SIZE FRACTION
Labrador Iron Mines Holdings Limited – Houston Project

Size Fraction	Weight (%)	Fe_2O_3 (%)	Fe (%)	SiO_2 (%)	MnO (%)
Lump (-32 mm +6.7 mm)	29.6	88.4	61.9	7.6	1.3
Sinter fines (-6.7 mm +1.18 mm)	38.2	87.9	61.5	9.0	1.7
-1.18 mm	32.2	68.6	48.0	27.7	1.4
Total	100	82.2	57.5	13.1	1.7

The scrubbed material closely matched the head sample, and so a second scrubbing test was conducted to see whether the sinter fines could be upgraded through longer scrubbing retention time and media addition. In the second test, the feed was retained for double the amount of time and 1" stainless steel balls were added. The milling media comprised of 8% of the total mass to ensure that scrubbing took place semi-autogenously. These results are shown in Table 13-15. The additional scrubbing did not result in any upgrade of the sinter fines fraction and it remained at 61% iron.

TABLE 13-15 SCRUBBED (WITH STEEL BALL ADDITION) PRODUCT KEY ANALYSES BY SIZE FRACTION
Labrador Iron Mines Holdings Limited – Houston Project

Size Fraction	Weight (%)	Fe_2O_3 (%)	Fe (%)	SiO_2 (%)	MnO (%)
Lump (-32 mm +6.7 mm)	29.6	89.5	62.6	8.1	1.3
Sinter fines (-6.7 mm +1.18 mm)	37.0	87.5	61.2	8.7	1.9
-1.18 mm	33.4	69.6	48.7	26.5	1.4
Total	100	82.2	57.5	13.1	1.7

SGS – 2012/13

In 2012/13, SGS Lakefield completed mineralogical analyses, physical characterization, grindability, scrubbing, heavy liquid separation, gravity separation, wet high intensity magnetic separation, and settling tests on three samples: Direct Rail Ore (DRO), Hanging Wall (HW), and Footwall (FW). Head assays for the samples are shown in Table 13-16. Mineralogy indicated that none of the samples contained magnetite and that the iron was contained in hematite and goethite. QEMSCAN data showed that in the DRO and hanging wall samples the iron oxide and silica minerals were highly liberated, even at a coarse size of +850 µm, enabling effective mineral separation. The footwall sample showed a much lower degree of mineral separation. Only when the particle size was reduced to pass 106 µm did the footwall mineral separation match those of the DRO and hanging wall samples.

TABLE 13-16 HEAD ASSAYS
Labrador Iron Mines Holdings Limited– Houston Project

Sample ID	Fe_2O_3 (%)	Fe (%)	SiO_2 (%)
Hanging Wall	90.3	63.2	8.2
Footwall	76.8	53.8	16.2
DRO	86.2	60.3	5.3

Physical characterization and comminution test results are shown in table 13-17 and 13-18.

TABLE 13-17 PHYSICAL CHARACTERISTICS
Labrador Iron Mines Holdings Limited – Houston Project

Sample ID	Angle of repose	Bulk Density (kg/l)	S.G. (g/cm^3)	Moisture (%)
Hanging Wall	37°	2.3	4.9	7.5
Footwall	37°	2.2	4.4	9.1
DRO	40°	2.0	4.6	9.6

TABLE 13-18 COMMINUTION TEST RESULTS
Labrador Iron Mines Holdings Limited – Houston Project

Sample ID	CWi (kWh/t)	RWi (kWh/t)	BWi (kWh/t)	Ai (g)
Hanging Wall	9.1	12.7	12.5	0.130
Footwall	13.0	12.9	9.6	0.051
DRO	5.8	12.6	11.9	0.048

Ore scrubbing tests were performed on the three samples crushed to pass 0.5” with the objective of creating low-grade fines rejects and producing a coarse fraction at acceptable grade. Scrubbing performed poorly in that after 120 minutes of scrubbing the products were similar to the samples having received no scrubbing at all.

HLS testing was performed on the samples after crushing to pass 0.5” and following the removal of the -840 µm fraction, thus simulating a dense media separation on pre-ground feed. Around 64% of the iron was contained in the feed to the HLS separation, and the upgrading by HLS. Upgrading was best for the hanging wall, although 18.5% of the iron in the feed was lost. Even at this loss, the SiO_2 in the product remained high. The DRO and the hanging wall samples required little upgrading as the %Fe in the HLS feed was close to or above the target of 60% Fe and the %SiO_2 was very low. Upgrading for these two samples was marginal, but iron losses were much lower than for the footwall sample. Results are summarized in Table 13-19.

TABLE 13-19 HLS TEST RESULTS
Labrador Iron Mines Holdings Limited– Houston Project

Sample ID	Fraction	Fe (%)	SiO_2 (%)	Fe Distribution (%)
Hanging Wall	HLS Feed	64.3	2.2	64.0
	HLS Product	65.3	1.6	58.4
Footwall	HLS Feed	57.0	8.6	64.0
	HLS Product	62.0	6.4	45.5
DRO	HLS Feed	59.4	2.6	64.0
	HLS Product	60.6	1.2	62.9

Gravity separation testing was performed on fine samples using a super-panner, and on coarser samples using a concentrating table. The super-panner was performed at four feed sizes, -840 µm, -420 µm, -210 µm, and -105 µm. Iron recoveries were low (12% to 57%) and upgrading was poor. The concentrating table performed better on a -1,000 µm feed. Table 13-20 compares the results from the two gravity test procedures, showing similar concentrate quality, but at a higher recovery for the Wilfley table. The exception is the DRO sample, for which the table had a slightly lower iron recovery, but at a better concentrate grade.

TABLE 13-20 GRAVITY SEPARATION TEST RESULTS
Labrador Iron Mines Holdings Limited – Houston Project

Sample ID	Fraction	Fe (%)	SiO_2 (%)	Fe Distribution (%)
Hanging Wall	-840 µm	64.5	5.72	30.7
	-420 µm	63.1	7.55	39.6
	-210 µm	66.1	2.56	37.1
	-105 µm	66.3	2.55	31.7
	Feed	62.2	8.39	
	Tabling (-1,000 µm)	64.6	5.61	68.4
Footwall	-840 µm	65.6	4.2	12.7
	-420 µm	62.3	8.2	13.9

Sample ID	Fraction	Fe (%)	SiO_2 (%)	Fe Distribution (%)
	-210 µm	61.7	7.2	33.7
	-105 µm	59.5	11.1	19.7
	Feed	53.0	15.9	
	Tabling (-1,000 µm)	61.8	7.3	59
DRO	-840 µm	61.5	4.5	57.4
	-420 µm	61.8	4.0	41.5
	-210 µm	60.6	5.7	45.8
	-105 µm	60.7	6.2	38.7
	Feed	59.9	5.3	
	Tabling (-1,000 µm)	62.9	3.7	52.5

WHIMS was tested on the same samples as used for gravity testing and the results are summarized in Table 13-21. The first series of tests yielded high recoveries and good concentrate grades, while the second series, at -1,000 µm, produced similar upgrading, but at lower recoveries. The exception, as expected from the mineralogy, was the footwall sample, which would require a finer grind to attain significant upgrading.

TABLE 13-21 WHIMS RESULTS
Labrador Iron Mines Holdings Limited – Houston Project

Sample ID	Fraction	Fe (%)	SiO_2 (%)	Fe Distribution (%)
Hanging Wall	-840 µm	66.8	2.9	92.6
	-420 µm	67.5	1.9	90.4
	-210 µm	67.4	1.7	73.5
	-105 µm	68	1.5	72.7
	Feed	62.4	8.9	
	-1,000 µm	66.8	2.5	55.6
Footwall	-840 µm	60.2	7.8	72.9
	-420 µm	61.8	6.2	76.7
	-210 µm	62.2	5.5	69.6
	-105 µm	63.5	4.4	61.3
	Feed	52.6	15.9	
	-1,000 µm	60.2	7.8	47.3
DRO	-840 µm	63.7	2.1	75.9
	-420 µm	63.5	2.4	71.6
	-210 µm	63.9	2.1	65.3
	-105 µm	64.2	2.1	51.7
	Feed	60.7	5.6	
	-1,000 µm	62.2	3.4	55.3

Settling tests were only performed on the footwall sample. Static settling tests were performed on feeds of two different size distributions: -1,000 µm and -105 µm. Both tests used a flocculant and attained low unit area results (0.013 m^2/t/d and 0.033 m^2/t/d). One dynamic settling test was performed on the -105 µm without flocculant and attained a settling rate of 0.170 m^2/t/d.

SGS – 2014

SGS Lakefield completed size by size analysis and grindability tests in 2014 on nine samples from three zones (North, Central, and South, three samples from each zone) of the Houston property. The three samples from each zone were used to produce a single composite designated as the Houston Comp. This composite was submitted for comminution testing and was screened into two fractions (+6.3 mm and -6.3 mm) and submitted for size analysis, assays, and bulk density determinations. The results of the testing on the Houston Comp are summarized in Table 13-22.

TABLE 13-22 HOUSTON COMP TEST RESULTS
Labrador Iron Mines Holdings Limited– Houston Project

Test	Units	Whole	+6.3 mm	-6.3 mm
Wt.	%	100	48.2	51.8
Ai	g	0.218	-	-
K_{80}	µm	17,923*	24,368	4,088
Fe[1]	%	63.9*	66.9	61.1
SiO_2	%	6.73*	3.44	9.8
S	%	0.10*	0.04	0.16
Bulk Density	kg/m^3	-	2,096	2,193
Apparent S.G.	g/cm^3	-	4.67	3.58
Porosity	-	-	0.55	0.39

Notes: 1 Fe grade calculated from the Fe_2O_3 whole rock analysis result
* Calc Head from +1/4" and -1/4" fractions

WESTECH ENGINEERING INC. – 2012/2013

WesTech Engineering Inc. (WesTech) was provided with iron ore tailings samples for sedimentation and vacuum filtration testing. The samples were derived from DRO, hanging wall, and footwall test work, and were all made up of material under 150 µm. An additional sample described as "Houston ore" was provided in 2013 and was coarser than the first three samples with a P_{80} of approximately 275 µm. WesTech completed flocculant screening tests and used the settling and filtration tests to estimate sizing requirements for thickening and vacuum filtration for the project.

SUMMARY OF KEY TEST WORK RESULTS

- The majority of test work was completed on three trench samples obtained in 2011 classified as Hanging Wall (HU1), Footwall (HU2), and DRO.
- Mineralogical studies indicated that iron in the samples was mainly present as hematite and goethite. Minor magnetite content was noted in the DRO sample. A significant amount of the iron in the DRO sample was present in a manganese oxide mineral (FeMnO(OH)). Quartz was the main gangue mineral present.
- Assays of different size fractions of each of the samples showed that iron content decreased with decreasing size, particularly below approximately 1 mm in size, and silica content increased with decreasing size. This implies that removal of finer material and processing it separately could be employed to improve the grade of the sinter fines (and potentially that of future concentrate produced through an upgrading process).
- The DRO and Hanging Wall samples were of acceptable quality for sale without upgrading iron content (>60% Fe) and require only crushing and screening. Potential for penalty charges exist, in particular for silica and manganese content, however, based on historic LIM sales agreements from the James Mine, these are not expected to be significant.
- The footwall sample was lower in iron content and higher in silica content and lump and sinter fines sourced from footwall material may require upgrading to produce saleable products or may be saleable as low-grade products (<58% Fe) with potential for penalty charges due to elevated silica levels.
- Splits to lump product for the DRO sample ranged from approximately 29% to 33%, and for the hanging wall sample ranged from approximately 42% to 44%. For the footwall sample the split was approximately 49% to 53% to lump product. The PEA has assumed a 30% split to lump product and 70% to sinter fines as the operating assumption.
- The QP recommends additional test work, including variability test work, to confirm results supporting dry sizing of high-grade iron ore mineralization to produce lump and sinter fines without upgrading, and to confirm and optimize the process steps required. LIM collected samples along the full strike length of the Houston 1, 2, and 3 deposits in order to undertake this variability test work. The samples are stored at SGS Lakefield.
- The QP recommends additional dry sizing test work on lower grade iron mineralization, to determine if there is potential to produce a lump product, rejecting the fines as lower grade waste.
- Various gravity upgrading techniques were tested with limited success, however the QP recommends that additional testing be conducted on gravity separation techniques to confirm whether or not gravity separation could form part of a future concentrator process.

- The samples were shown to be amenable to upgrading by WHIMS and in the QP's opinion this technique has the potential to form part of a future wet upgrading circuit, particularly for the fines (-1 mm), which are high in silica.
- The QP recommends investigating flotation as a method for upgrading fines fractions.
- In the QP's opinion, additional test work is recommended to support development of a flowsheet for a future concentrator that would upgrade lower grade ore.

14 MINERAL RESOURCE ESTIMATE

RPA audited the internal Mineral Resource estimates prepared by George H. Wahl, P.Geo., in March 2014, for the Houston 1, 2, and 3 and Malcolm deposits based on data available to March 3, 2013. RPA reviewed the data validation, resource estimation parameters and assumptions, methodology, and classification. RPA accepted most attributes of the Wahl block models, including the grade estimates, but made modifications to the Mineral Resource classification and developed a new conceptual open pit shell to constrain Mineral Resources to meet a CIM (2014) requirement of "reasonable prospects for eventual economic extraction".

Tables 14-1 and 14-2 present a summary of the Mineral Resource estimates for the Houston and Malcolm deposits, respectively, with an effective date of December 31, 2020. The data cut-off date for the current Mineral Resource estimate is March 3, 2013 for Houston and February 14, 2013 for Malcolm. As previously noted, 2013 drilling is not included in the estimate as sampling has not been completed.

Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves (CIM (2014) definitions) were used for Mineral Resource classification.

TABLE 14-1 SUMMARY OF MINERAL RESOURCES HOUSTON DEPOSITS - DECEMBER 31, 2020

Labrador Iron Mines Holdings Limited – Houston Project

Category	Tonnes (Mdmt)	Fe %	SiO_2 %	Mn %	P %	Al_2O_3 %
Measured	11.4	62.7	6.8	0.52	0.07	0.68
Indicated	6.5	62.7	7.5	0.42	0.06	0.60
M + I	**17.9**	**62.7**	**7.1**	**0.48**	**0.07**	**0.65**
Inferred	9.7	60.1	16.0	1.02	0.06	0.86

Notes:
1. CIM (2014) definitions are followed for Mineral Resources.
2. Mineral Resources are estimated based on an open pit mining scenario.
3. Mineral Resources are estimated based on a cut-off of 50% Fe.
4. Mineral Resources are estimated using a long-term benchmark iron price of US$100/dmt for 62% Fe fines CFR China and a metallurgical recovery of 50% to 100% dependent on mineralization domain.
5. Bulk density is based on a formula relating bulk density to iron content.
6. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
7. Numbers may not add due to rounding.

TABLE 14-2 SUMMARY OF MINERAL RESOURCES MALCOLM DEPOSIT - DECEMBER 31, 2020

Labrador Iron Mines Holdings Limited – Houston Project

Category	Tonnes (Mdmt)	Fe %	SiO_2 %	Mn %	P %	Al_2O_3 %
Indicated	2.6	62.6	6.9	0.38	0.05	0.39
Inferred	4.6	57.9	9.0	1.01	0.08	0.77

Notes:

1. CIM (2014) definitions are followed for Mineral Resources.
2. Mineral Resources are estimated based on an open pit mining scenario.
3. Mineral Resources are estimated based on a cut-off of 50% Fe.
4. Mineral Resources are estimated using a long-term benchmark iron price of US$100/dmt for Fe fines CFR China and a metallurgical recovery of 50% to 100% dependent on mineralization domain.
5. Bulk density is based on a formula relating bulk density to iron content.
6. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
7. Numbers may not add due to rounding.

The QP is not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other relevant factors that could materially affect the Mineral Resource estimates.

RESOURCE DATABASE

The Houston resource database provided to RPA by LIMH comprises a total of 528 collar locations (27,630 m) including 47 diamond drill holes (4,752 m), 64 test pits (200 m), 237 RC (14,843 m) drill holes, and 180 trenches (7,836 m) and contains 8,973 assay records for %Fe. The database cut-off date is March 3, 2013.

The Malcolm resource database contains a total of 54 collar locations (3,119 m) including 33 RC drill holes (3,059 m) and 21 trenches (60 m) for a total of 1,006 assay records for %Fe. The database cut-off date is February 14, 2013.

RPA conducted several checks on the resource database, including a search for unique, missing, and overlapping intervals, a total depth comparison, and a visual search for extreme or deviant survey values. As a result of the checks, one duplicate assay value was removed from the data. As part of the data review, RPA compared the MS Excel files against the scan copy of the original paper log. No errors were observed.

The resource database is considered by the QP to be reliable for grade modelling and Mineral Resource estimation.

GEOLOGICAL INTERPRETATION

Both Houston and Malcolm deposits were constrained by wireframe domains based on a 58% Fe cut-off grade (the high-grade iron domains), as shown in Figures 14-1 and 14-2. The wireframes were modelled using Surpac software focusing on differentiating the mineralization potentially suitable for sizing with crushing and screening and requiring no upgrading to produce a potentially saleable product. In previous Mineral Resource estimates, the wireframe domains were defined by a lower cut-off at 45% Fe, which resulted in deleterious elements, largely concentrated in lower grade areas on the margins, flooding into enriched Fe mineralization.

A total of six high-grade iron domains were modelled representing the Houston 1, 2, and 3 deposits and two high-grade iron domains were modelled for the Malcolm deposit. Table 14-3 shows the numerical coding assigned to each domain. The material outside the modelled domains, were coded 800 and 300 for Houston and Malcolm deposits respectively.

TABLE 14-3 DOMAINS USED TO CONSTRAIN GRADE INTERPOLATION
Labrador Iron Mines Holdings Limited – Houston Project

Deposit	Block Model Codes
Houston 1	400
Houston 2	100
	200
	300
Houston 3	500
	600
Low Grade Houston	800
Malcolm	100
	200
Low Grade Malcolm	300

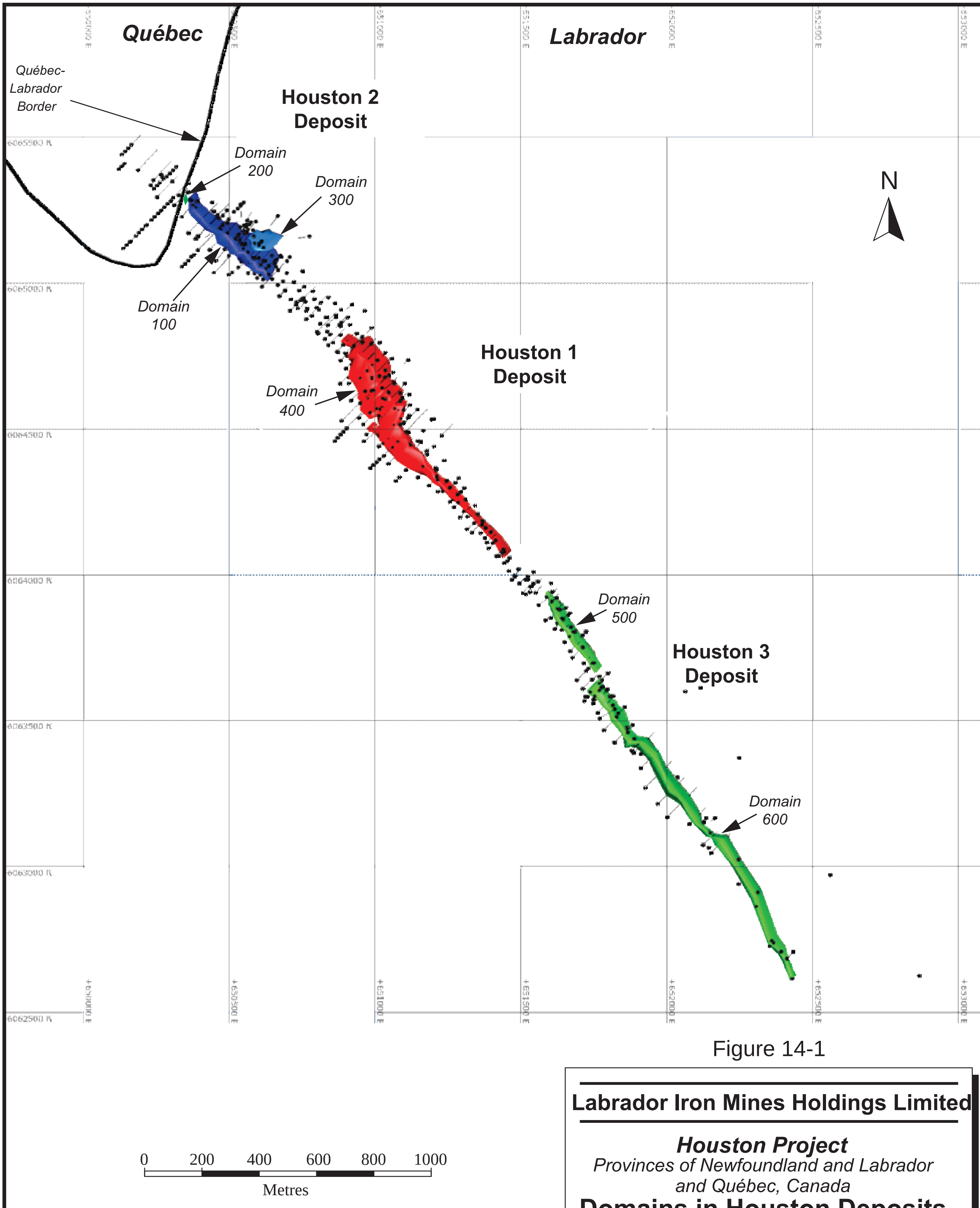


Figure 14-1

Labrador Iron Mines Holdings Limited

Houston Project

Provinces of Newfoundland and Labrador and Québec, Canada

Domains in Houston Deposits and Drill Collars

February 2021

Source: RPA, 2020.

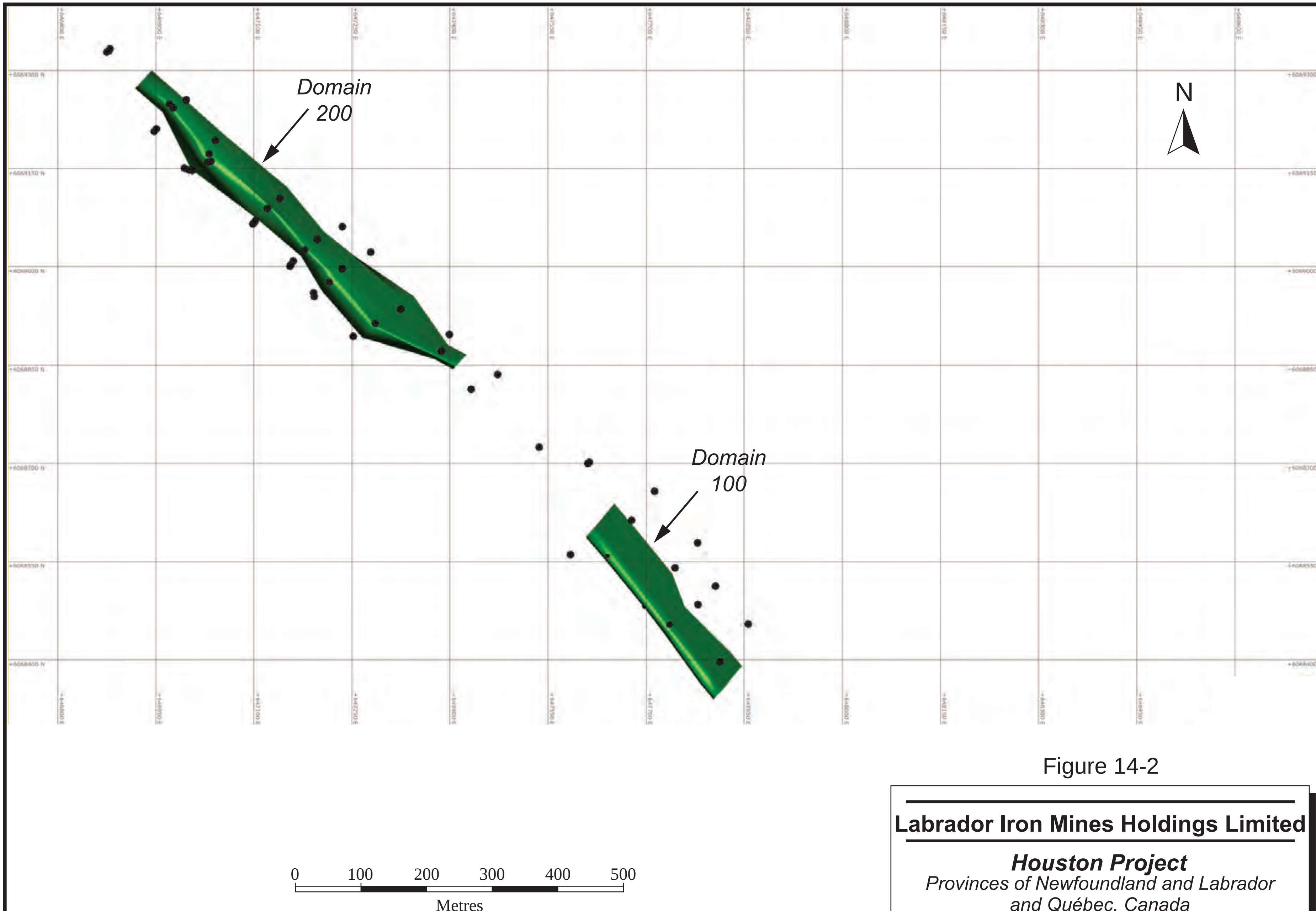


Figure 14-2

Labrador Iron Mines Holdings Limited

Houston Project
Provinces of Newfoundland and Labrador and Québec, Canada

Domains in Malcolm Deposit and Drill Collars

February 2021

Source: RPA, 2020.

www.rpacan.com

For future Mineral Resource updates, the QP recommends investigating additional wireframe domaining of lithology units and or mineralization domains, to further control estimation of not just the Fe grades, but also for the deleterious elements.

RESOURCE ASSAYS

The Fe, Mn, P, Al_2O_3, and Si_2O assays located inside the wireframe models were tagged with domain identifiers for statistical analysis. Results were used to help verify the modelling process. Descriptive statistics by domain are summarized in Table 14-4 for the Houston deposits and in Table 14-5 for the Malcolm deposit.

TABLE 14-4 ASSAY STATISTICS FOR HOUSTON DEPOSITS
Labrador Iron Mines Holdings Limited – Houston Project

Variable/Domain	Count	Min	Max	Mean	Variance	StDev	CV
			Resource Definition Drilling Assays				
Al_2O_3 %							
100	687	0.01	8.90	0.72	0.72	0.85	1.19
200	8	0.10	8.90	1.29	9.46	3.08	2.39
300	73	0.15	9.90	1.53	2.81	1.68	1.10
400	1,127	0.01	9.80	0.67	0.81	0.90	1.34
500	212	0.01	7.80	1.08	1.00	1.00	0.93
600	695	0.01	19.40	0.70	1.54	1.24	1.76
800	5,892	0.01	44.00	1.95	14.35	3.79	1.94
Fe %							
100	735	13.30	69.40	62.59	29.71	5.45	0.09
200	11	14.00	68.00	59.48	236.60	15.38	0.26
300	80	10.20	66.93	59.48	84.26	9.18	0.15
400	1,162	10.60	69.60	61.59	45.50	6.74	0.11
500	212	20.30	68.40	61.16	40.23	6.34	0.10
600	695	2.92	69.65	61.91	46.59	6.83	0.11
800	6,042	0.30	68.30	41.04	179.90	13.41	0.33
Mn %							
100	735	0.00	7.08	0.38	0.53	0.73	1.89
200	11	0.10	1.70	0.50	0.25	0.50	1.02
300	80	0.05	3.76	0.55	0.61	0.78	1.43
400	1,149	0.00	15.74	0.69	2.77	1.66	2.43
500	212	0.01	12.32	0.93	2.59	1.61	1.74
600	695	0.00	14.40	0.51	1.22	1.11	2.16
800	6,039	0.00	27.27	1.06	5.00	2.24	2.11
P %							
100	734	0.01	0.67	0.05	0.00	0.03	0.64
200	11	0.03	0.08	0.05	0.00	0.02	0.35
300	80	0.01	0.32	0.06	0.00	0.04	0.64
400	1,162	0.01	0.35	0.08	0.00	0.03	0.42

Variable/Domain	Count	Min	Max	Mean	Variance	StDev	CV
500	212	0.02	0.22	0.07	0.00	0.03	0.42
600	695	0.01	0.30	0.06	0.00	0.03	0.49
800	6,041	0.01	0.56	0.06	0.00	0.05	0.77
SiO_2 %							
100	735	0.28	63.30	7.61	47.62	6.90	0.91
200	11	0.70	62.20	11.47	298.40	17.28	1.51
300	80	1.07	64.90	9.77	108.70	10.42	1.07
400	1,162	0.10	62.90	7.77	74.02	8.60	1.11
500	212	0.70	55.90	7.07	63.25	7.95	1.12
600	695	0.29	65.06	8.28	68.92	8.30	1.00
800	6,042	0.05	94.66	34.27	275.5	16.60	0.48

TABLE 14-5 ASSAY STATISTICS FOR MALCOLM DEPOSIT
Labrador Iron Mines Holdings Limited – Houston Project

Variable/Domain	Count	Min	Max	Mean	Variance	StDev	CV
			Resource Definition Drilling Assays				
Al_2O_3 %							
100	13	0.00	0.93	0.30	0.05	0.23	0.76
200	165	0.02	3.70	0.52	0.26	0.51	0.99
300	828	0.01	20.83	0.98	6.42	2.53	2.58
Fe %							
100	13	58.15	66.23	61.89	6.92	2.63	0.04
200	165	37.20	69.20	62.32	17.29	4.16	0.07
300	828	9.51	62.30	40.73	89.74	9.47	0.23
Mn %							
100	13	0.16	2.74	0.95	0.82	0.91	0.96
200	165	0.01	6.68	0.51	0.92	0.96	1.88
300	828	0.00	17.70	0.99	4.15	2.04	2.05
P %							
100	13	0.03	0.11	0.06	0.00	0.03	0.42
200	165	0.02	0.14	0.05	0.00	0.02	0.42
300	828	0.01	0.40	0.07	0.00	0.05	0.71
SiO_2 %							
100	13	1.29	10.78	3.66	7.23	2.69	0.73
200	165	0.60	33.00	6.71	28.01	5.29	0.79
300	828	0.89	75.72	34.54	173.5	13.17	0.37

COMPOSITING

For the Houston deposits the sample lengths within the domains range from 0.5 m to 12.2 m and average approximately 2.5 m (Figure 14-3); whereas the sample lengths for the Malcolm deposit range from 2.0 m to 3.0 with an average of approximately 3.0 m (Figure 14-4). Samples were composited to 2.5 m lengths for statistics and grade interpolation. The composite length of 2.5 m was determined by selecting half the block height. Composites were manually flagged to the database and selected on a section by section basis to reflect intercepts that fell within the domains. Where holes were twinned by old IOC holes, the historic holes were excluded from the composite dataset. A separate composite coding was assigned to all drill hole intervals located outside of the domains.

FIGURE 14-3 LENGTH HISTOGRAM – HOUSTON DEPOSITS

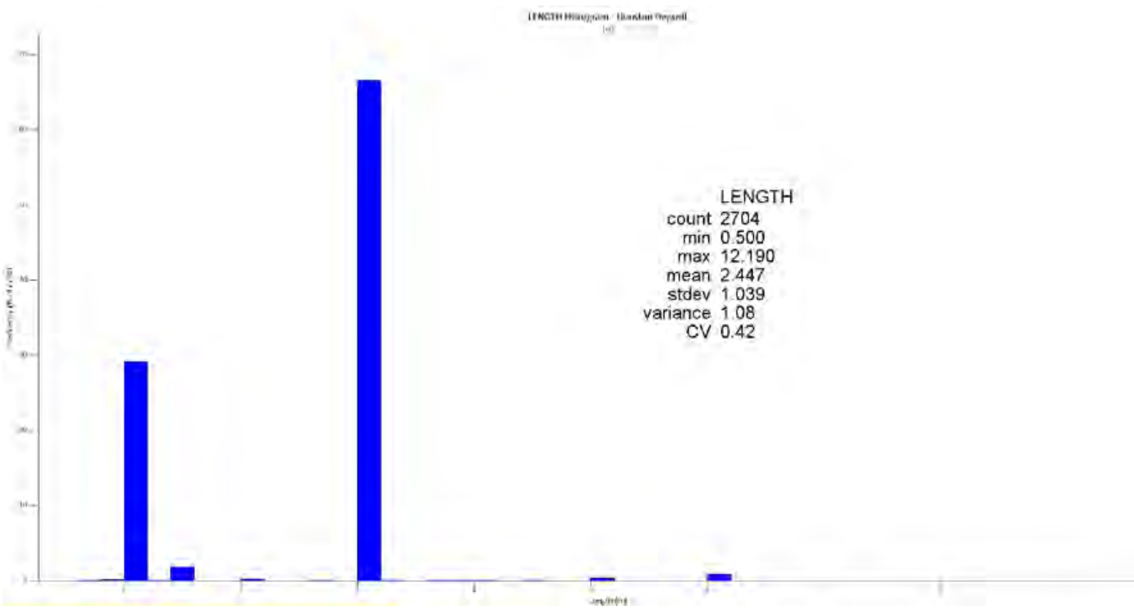
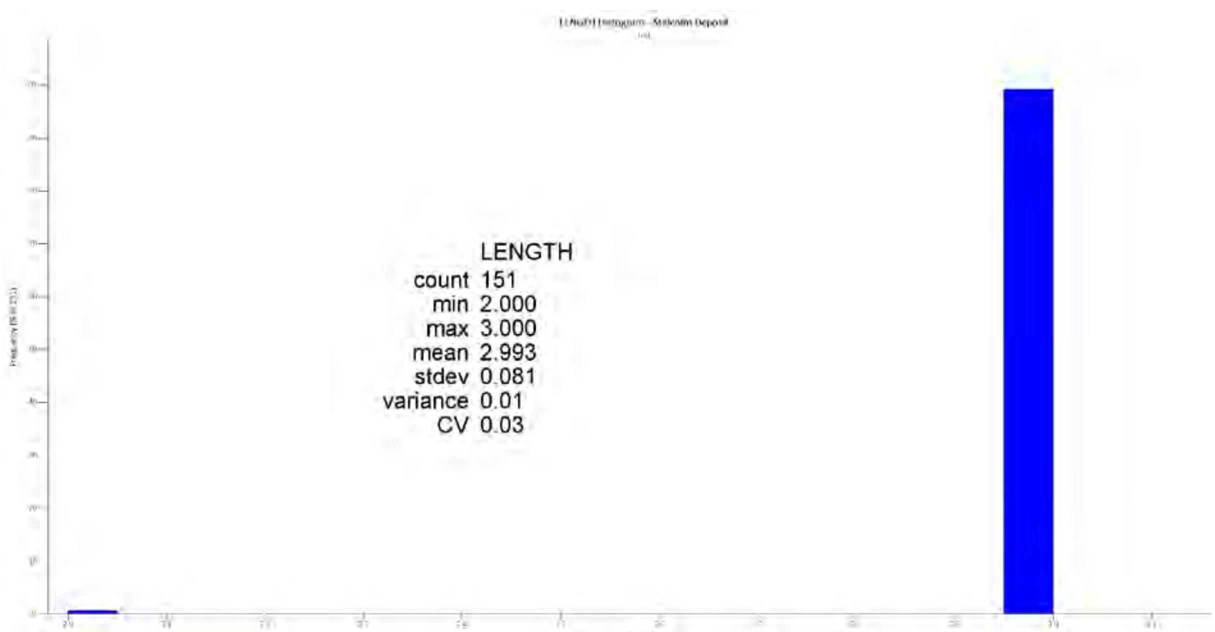


FIGURE 14-4 LENGTH HISTOGRAM – MALCOLM DEPOSIT



the QP recommends that a three metre composites length should be used in future Mineral Resource updates as the majority of sampling was carried out at three metre intervals.

Summary statistics for the 2.5 m composites are summarized in Tables 14-6 and 14-7 for the Houston and Malcolm deposits respectively.

TABLE 14-6 COMPOSITE STATISTICS FOR HOUSTON DEPOSITS
Labrador Iron Mines Holdings Limited – Houston Project

Variable/Domain	Count	Min	Max	Mean	Variance	StDev	CV
			Resource Definition Drilling Assays				
Al_2O_3 %							
100	589	0.00	5.33	0.71	0.44	0.66	0.93
200	11	0.13	8.90	1.17	6.91	2.63	2.25
300	78	0.36	3.39	1.19	0.53	0.73	0.61
400	1,089	0.00	7.25	0.68	0.54	0.73	1.08
500	147	0.20	3.71	0.90	0.35	0.59	0.66
600	479	0.00	8.00	0.60	0.39	0.62	1.03
800	3,402	0.00	28.20	2.09	14.30	3.78	1.81
Fe %							
100	589	38.29	68.93	62.84	18.72	4.33	0.07
200	11	14.00	67.87	59.27	240.30	15.50	0.26
300	78	49.73	66.33	61.50	7.71	2.78	0.05
400	1,089	20.25	69.58	62.22	29.77	5.46	0.09
500	147	35.60	68.17	62.22	15.96	3.99	0.06
600	479	40.75	69.48	62.10	16.63	4.08	0.07
800	3,402	1.15	68.01	41.36	176.77	13.30	0.32
Mn %							
100	589	0.01	6.50	0.38	0.43	0.66	1.73
200	11	0.05	0.96	0.39	0.11	0.33	0.83
300	78	0.05	3.76	0.52	0.48	0.69	1.33
400	1,089	0.01	14.22	0.64	2.08	1.44	2.27
500	147	0.09	4.88	0.74	0.70	0.83	1.12
600	479	0.00	5.86	0.48	0.57	0.76	1.58
800	3,402	0.00	21.59	1.11	5.06	2.25	1.84
P %							
100	589	0.01	0.55	0.05	0.00	0.03	0.60
200	11	0.03	0.08	0.04	0.00	0.02	0.41
300	78	0.01	0.18	0.06	0.00	0.03	0.44
400	1,089	0.01	0.26	0.08	0.00	0.03	0.39
500	147	0.02	0.14	0.07	0.00	0.02	0.33
600	479	0.02	0.24	0.06	0.00	0.02	0.38
800	3,402	0.00	0.52	0.06	0.00	0.05	0.73
SiO_2 %							
100	589	0.57	42.72	7.20	31.26	5.59	0.78
200	11	1.11	62.20	11.79	301.20	17.35	1.47
300	78	2.82	21.90	7.77	11.62	3.41	0.44

Variable/Domain	Count	Min	Max	Mean	Variance	StDev	CV
400	1,089	0.11	57.40	6.98	46.40	6.81	0.98
500	147	1.37	41.90	6.50	31.69	5.63	0.87
600	479	0.49	38.10	8.25	31.71	5.63	0.68
800	3,402	1.00	90.20	33.29	271.20	16.47	0.49

TABLE 14-7 COMPOSITE STATISTICS FOR MALCOLM DEPOSIT
Labrador Iron Mines Holdings Limited – Houston Project

Variable/Domain	Count	Min	Max	Mean	Variance	StDev	CV
Resource Definition Drilling Composites							
Al_2O_3 %							
100	15	0.00	0.81	0.28	0.04	0.19	0.67
200	163	0.03	2.77	0.52	0.18	0.43	0.82
300	753	0.01	20.83	0.90	4.59	2.14	2.39
Fe %							
100	15	58.15	66.03	62.00	5.29	2.30	0.04
200	163	52.01	67.69	62.56	6.89	2.63	0.04
300	753	12.10	62.11	41.63	66.02	8.13	0.20
Mn %							
100	15	0.16	2.73	0.94	0.61	0.78	0.83
200	163	0.01	4.97	0.49	0.66	0.81	1.66
300	753	0.00	17.7	1.14	4.30	2.07	1.81
P %							
100	15	0.04	0.11	0.06	0.00	0.02	0.37
200	163	0.02	0.13	0.05	0.00	0.02	0.38
300	753	0.01	0.37	0.07	0.00	0.05	0.64
SiO_2 %							
100	15	1.29	10.78	3.73	6.49	2.55	0.68
200	163	1.01	21.95	6.36	14.97	3.87	0.61
300	753	0.89	62.76	32.97	146.87	12.12	0.37

SEARCH STRATEGY AND GRADE INTERPOLATION PARAMETERS

All domain boundaries were treated as hard during the interpolation. Interpolations within domains were carried out in a single pass using inverse distance squared (ID^2) methodology with a 75 m isotropic search ellipse. The grades of Fe, Al_2O_3, Mn, P, and Si_2O in both deposits were estimated using a minimum of four and maximum of 24 composites, with a maximum of four composites per hole.

In the waste material, the search ellipse was anisotropic with the major, semi-major, and minor axes having a 1:1:4 ratio based on the strike and dip orientation of the adjacent mineralized domain.

BULK DENSITY

Density data provided to RPA contained 181 entries. Density testing was carried out on core using the conventional water immersion method. The density was obtained by measuring a quantity of core in air and then pouring the core into a graduated cylinder containing a measured amount of water to determine the volume of water displacement. The core was first coated with wax to prevent water from filling any voids in the core. A volume of water equal to the observed displacement is then weighed and the density of the sample is calculated using the equation below.

$$Density = \frac{A}{Ww}$$

Where:

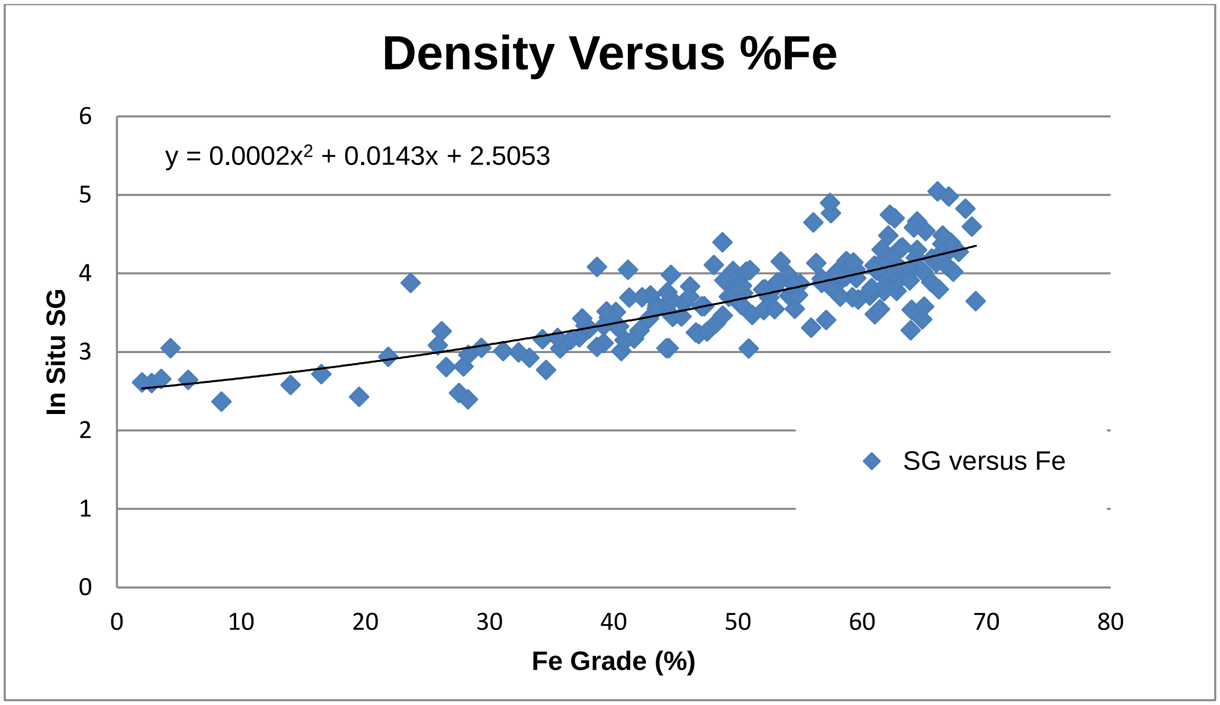
A - Weight of Sample in air (dry)

Ww - Weight of Water displaced

A density assignment in the block models was based on the estimated %Fe values. For blocks with a Fe grade greater than or equal to 23%, the density was calculated using the formula below. The expression was derived by the regression curve presented in Figure 14-5. Due to possible bias towards testing only competent core for wax immersion, a 10% factor was applied to account for increasing porosity in less competent material. A density of 2.63 was assigned for the mineralization blocks with a Fe grade less than 23% and for all the blocks marked as waste.

$$Density = 0.9 * (0.0002 * \%Fe^2 + 0.0143\%Fe + 2.5053)$$

FIGURE 14-5 REGRESSION CURVE OF DENSITY VERSUS %FE VALUES



Since the calculated density is based on %Fe grade and factored for potential porosity, there is potential for local differences in tonnes due to expected variability in porosity.

The QP recommends that additional density measurement samples be collected in both mineralization and waste, in order to interpolate the density values and adjust them for the iron content as appropriate.

BLOCK MODELS

A block model was constructed to include all three of the Houston deposits. Block model size, origin, and extents for Houston block model is listed in Table 14-8.

A second block model was constructed to cover the entire area of the Malcolm deposit. The block model size, origin, and extents are listed in Table 14-9.

TABLE 14-8 BLOCK MODEL DESCRIPTION HOUSTON DEPOSITS
Labrador Iron Mines Holdings Limited – Houston Project

Type	Northing	Easting	Elevation
Minimum Coordinates (m)	6,062,546	652,400	405
Maximum Coordinates (m)	6,066,271	653,400	630
Block Size (m)	5	5	5
Rotation (deg)	-45.6	0	0

TABLE 14-9 BLOCK MODEL DESCRIPTION MALCOLM DEPOSIT
Labrador Iron Mines Holdings Limited – Houston Project

Type	Northing	Easting	Elevation
Minimum Coordinates (m)	6,067,900	647,750	402.5
Maximum Coordinates (m)	6,070,400	648,750	632.5
Block Size (m)	5	5	5
Rotation (deg)	-47	0	0

The block grade attributes for interpolation consisted of Fe%, SiO_2%, Al_2O_3%, P%, and Mn%. Additional block attributes included resource code for domains, classification, bulk density, distance to the nearest sample, and the number of holes used for the block estimate.

CUT-OFF GRADE AND WHITTLE PARAMETERS

In order to fulfill the CIM (2014) requirement that Mineral Resources have reasonable prospects for eventual economic extraction, RPA has developed a conceptual open pit shell to constrain the Houston and Malcolm deposits using all categories of Mineral Resources in the block models.

A benchmark iron price used for Mineral Resource estimation was set at US$100/dmt for 62% Fe fines Cost and Freight (CFR) China, based on long-term independent forecasts from banks and financial institutions. Considerations were made for premiums, penalties, royalties, and transportation and logistics costs to estimate a blended FOB rail price for train loading near the existing TSH rail line to the west of the Houston deposits (the Houston Project's proposed rail siding).

Operating parameters used in the conceptual open pit shell optimization are presented in Table 14-10. Pit slope angles are based on geotechnical recommendations and costs were benchmarked to current operating mine actuals in similar climatic and logistical locations.

TABLE 14-10 PIT OPTIMIZATION INPUT PARAMETERS - RESOURCES
Labrador Iron Mines Holdings Limited – Houston Project

Input Parameter	Unit	Houston	Malcolm
Revenue Factors			
Benchmark Fe Price 62% Fe fines CFR China	US$/dmt	100.00	100.00
Exchange Rate	US$/C$	0.75	0.75
Blended FOB Price Houston	C$/dmt	72.00	73.30
Pit Slopes			
Maximum Overall Slope Angle	degrees	35 to 43	36 to 42
Mining Parameters			
Mining Extraction	%	100	100
Mining Dilution	%	0	0
Mining Cost	C$/dmt	3.00	3.00
Incremental Cost – Process Plant (1)	C$/dmt	0.30	1.40
Incremental Cost - Vertical	C$/dmt/10m	0.10	0.10
Processing and General and Administrative (G&A) Parameters			
Process Plant Fe Recovery	%	50 to 100	50 to 100
Process Plant Operating Cost	C$/dmt	5.00 to 7.00	5.00 to 7.00
Truck and Train Loading Cost	C$/dmt	4.15	4.15
General & Administration Cost	C$/dmt	12.00	12.00
Total Process and G&A (2)	**C$/dmt**	**21.45**	**22.55**

(1) Incremental Cost – Process Plant provides for hauling mineralized material from the deposit to the process plant.
(2) Total Process and G&A includes Incremental Cost – Process Plant.

Process plant iron recovery and operating cost are variable dependent on the mineralization type and its associated processing path. In general, mineralization found within the high-grade iron domains only requires dry sizing, thus has higher Fe recovery and lower costs. Whereas mineralization found outside the high-grade iron domains may require additional processing via wet beneficiation methods, which results in lower Fe recovery and higher costs.

Mineral Resources have been reported at an Fe grade cut-off of 50%. This cut-off grade is based on the minimum Fe grade considered reasonable to produce marketable products and has been used historically by the IOC for reporting resources in the Schefferville region (Table 7-1).

CLASSIFICATION

Definitions for resource categories used in this report are consistent with those defined by CIM (2014) and adopted by NI 43-101. In the CIM classification, a Mineral Resource is defined as "a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction". Mineral Resources are classified into Measured, Indicated, and Inferred categories. A Mineral Reserve is defined as the "economically mineable part of a Measured and/or Indicated Mineral Resource" demonstrated by studies at Pre-Feasibility or Feasibility level as appropriate. Mineral Reserves are classified into Proven and Probable categories.

Mineral Resources were classified using the following criteria:

- Measured Mineral Resources: within an interpreted mineralized domain and within 50 m of the nearest informing sample.
- Indicated Mineral Resources: within an interpreted mineralized domain and greater than 50 m and less than 100 m of the nearest informing sample.
- Inferred Mineral Resources: within an interpreted mineralized domain and greater than 100 m of the nearest informing sample.

RPA modified the resource classification by smoothing the outlines of the Measured and Indicated blocks into more continuous and coherent shapes and reclassifying isolated blocks within areas dominated by other resource categories. This was done by developing solids to define volumes designated as Measured and Indicated Mineral Resources, with the remaining blocks designated as Inferred Mineral Resources.

Figures 14-6 and 14-7 present histograms of the classified blocks compared to the distance to the nearest sample for Houston and Malcolm respectively.

FIGURE 14-6 HISTOGRAM OF THE CLASSIFIED BLOCKS VERSUS DISTANCE TO THE COMPOSITES – HOUSTON DEPOSITS

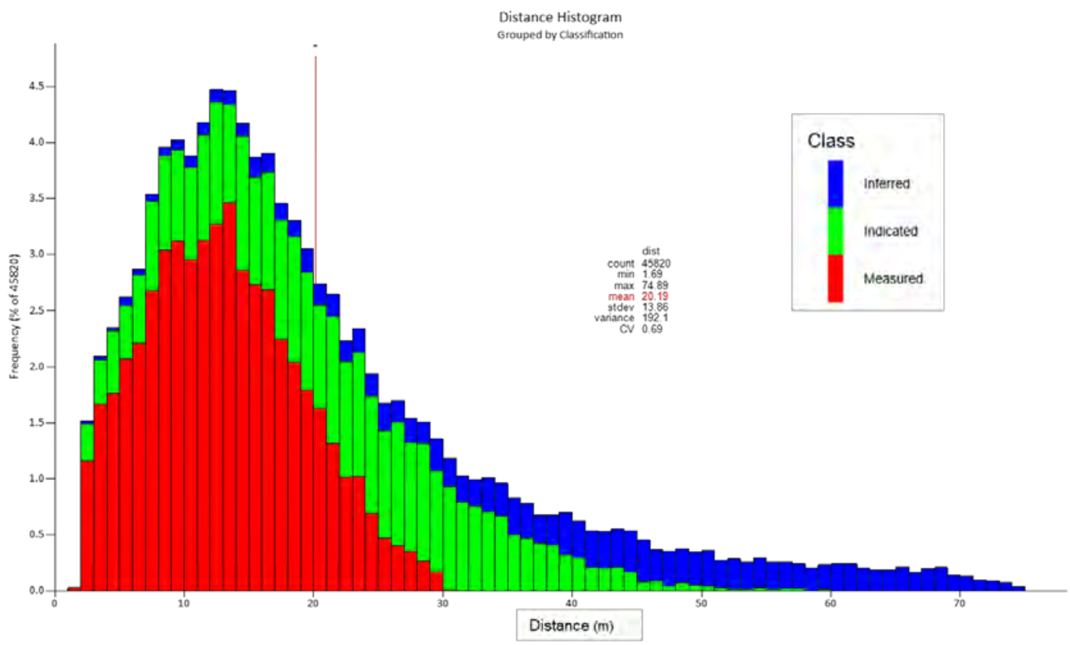
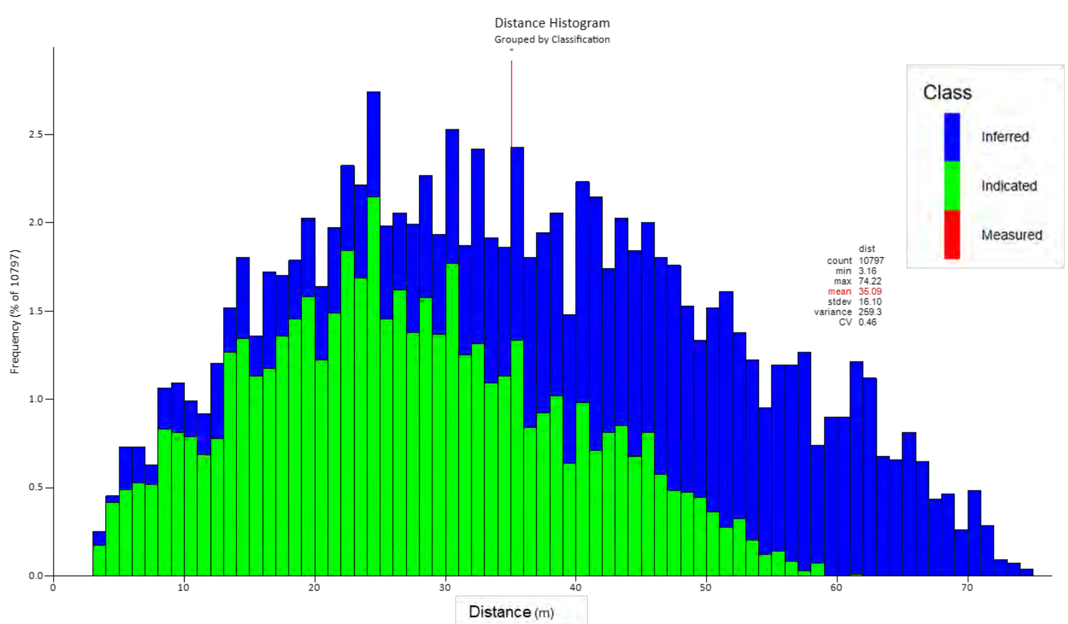


FIGURE 14-7 HISTOGRAM OF THE CLASSIFIED BLOCKS VERSUS DISTANCE TO THE COMPOSITES – MALCOLM DEPOSIT



Resource classification is based on the confidence in the estimation for iron only. Assaying for iron is more complete whereas assay data is lacking to varying degrees for the other attributes.

BLOCK MODEL VALIDATION

The block models were validated by on-screen review of block grades and drill hole composites, volumetric comparison of resource solids and resource reports, and comparison of block grades to composites' average grades on a global basis are presented in Table 14-11 (RPA notes the block grades in the low-grade domains (i.e., 800 and 300 for Houston and Malcolm respectively) are located within the open pit resource shell only).

TABLE 14-11 COMPARISON OF MEANS BLOCKS VS. COMPOSITES
Labrador Iron Mines Holdings Limited – Houston Project

Domain/	Al_2O_3%		Fe%		Mn%		P%		SiO_2%	
Attribute	Model	Comps	Model	Comps	Model	Comps	Model	Comps	Model	Comps
Houston										
100	0.67	0.71	49.54	62.84	0.39	0.38	0.06	0.05	6.88	7.20
200	0.52	1.17	44.63	59.27	0.50	0.39	0.05	0.04	8.67	11.79
300	1.13	1.19	57.24	61.50	0.71	0.52	0.06	0.06	7.64	7.77
400	0.63	0.68	50.36	62.22	0.59	0.64	0.08	0.08	6.77	6.98
500	0.87	0.90	52.25	62.22	0.76	0.74	0.07	0.07	5.90	6.50
600	0.57	0.60	53.38	62.10	0.41	0.48	0.06	0.06	7.97	8.25
800	2.91	2.09	38.68	41.36	1.04	1.11	0.06	0.06	35.89	33.29
Malcolm										
100	0.30	0.28	62.14	66.03	0.93	0.94	0.06	0.06	3.19	3.73
200	0.51	0.52	62.52	67.69	0.47	0.49	0.05	0.05	6.32	6.36
300	1.17	0.90	43.51	41.63	1.10	1.14	0.07	0.07	29.37	32.9

The visual inspection of the block grades versus the composite data on sections and level plans indicates that the interpolation performs well for all the elements (Figures 14-8 to 14-17).

Swath plots were generated for Fe grades in composites from the ID^2 and Fe NN interpolations. Swath plots for Fe in the Houston deposits by easting (X), northing (Y) and elevation (Z) are depicted in Figures 14-18 and 14-19.

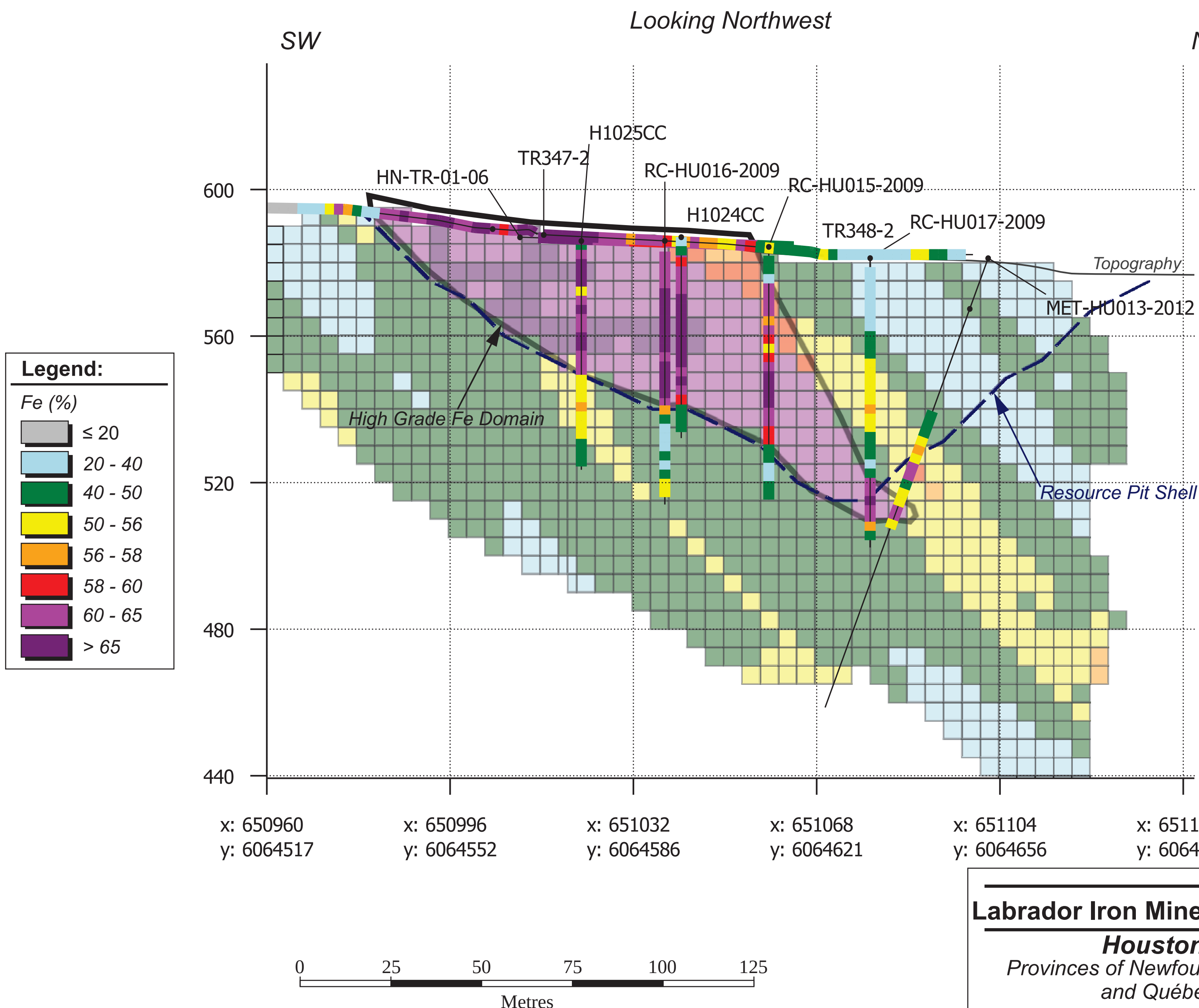


Figure 14-8

Labrador Iron Mines Holdings Limited

Houston Project

Provinces of Newfoundland and Labrador and Québec, Canada

Section Showing Estimated Block Grades Versus Composites - %Fe Houston Deposits

February 2021

Source: RPA, 2020.

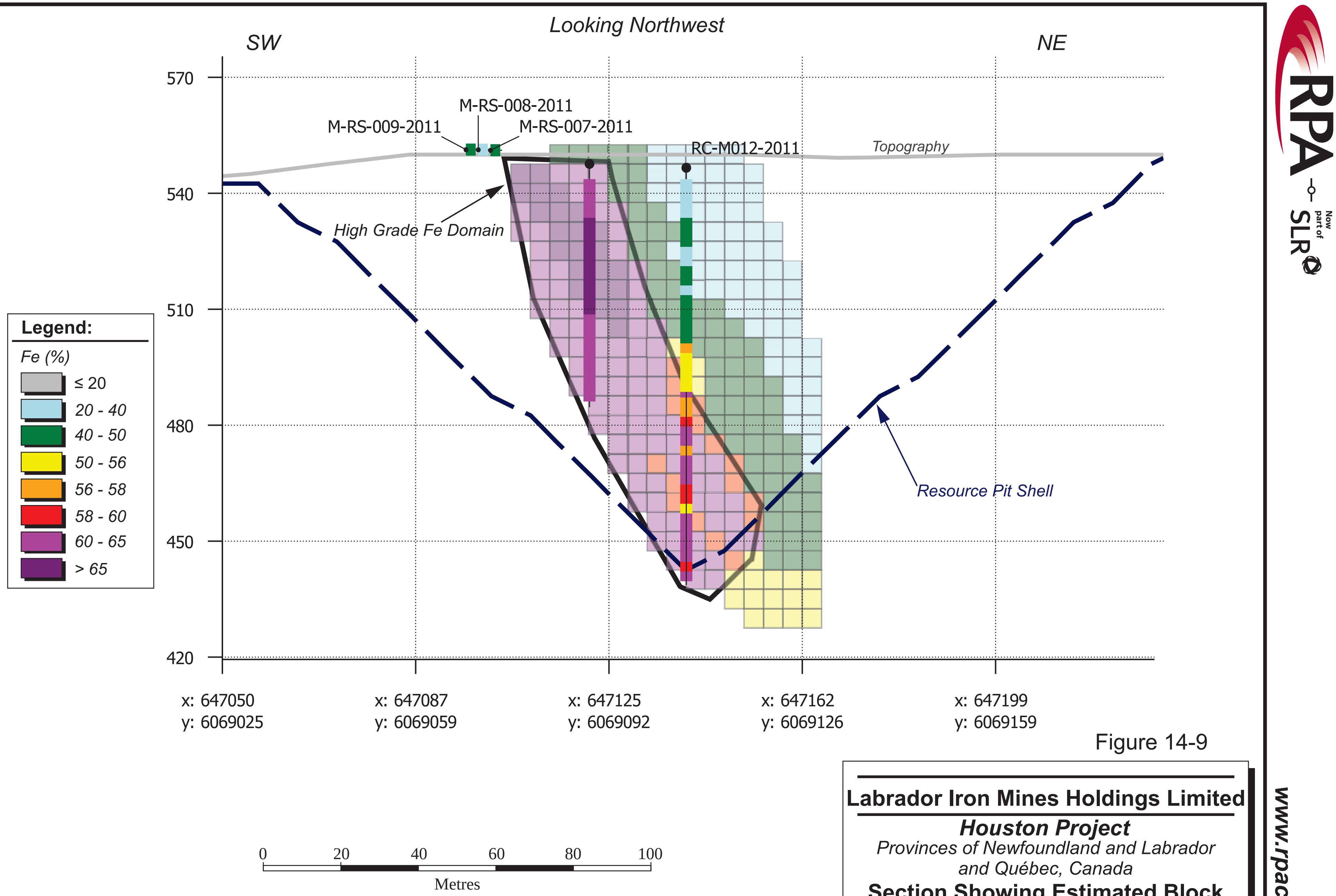


Figure 14-9

Labrador Iron Mines Holdings Limited

Houston Project

Provinces of Newfoundland and Labrador and Québec, Canada

Section Showing Estimated Block Grades Versus Composites - %Fe Malcolm Deposits

February 2021

Source: RPA, 2020.

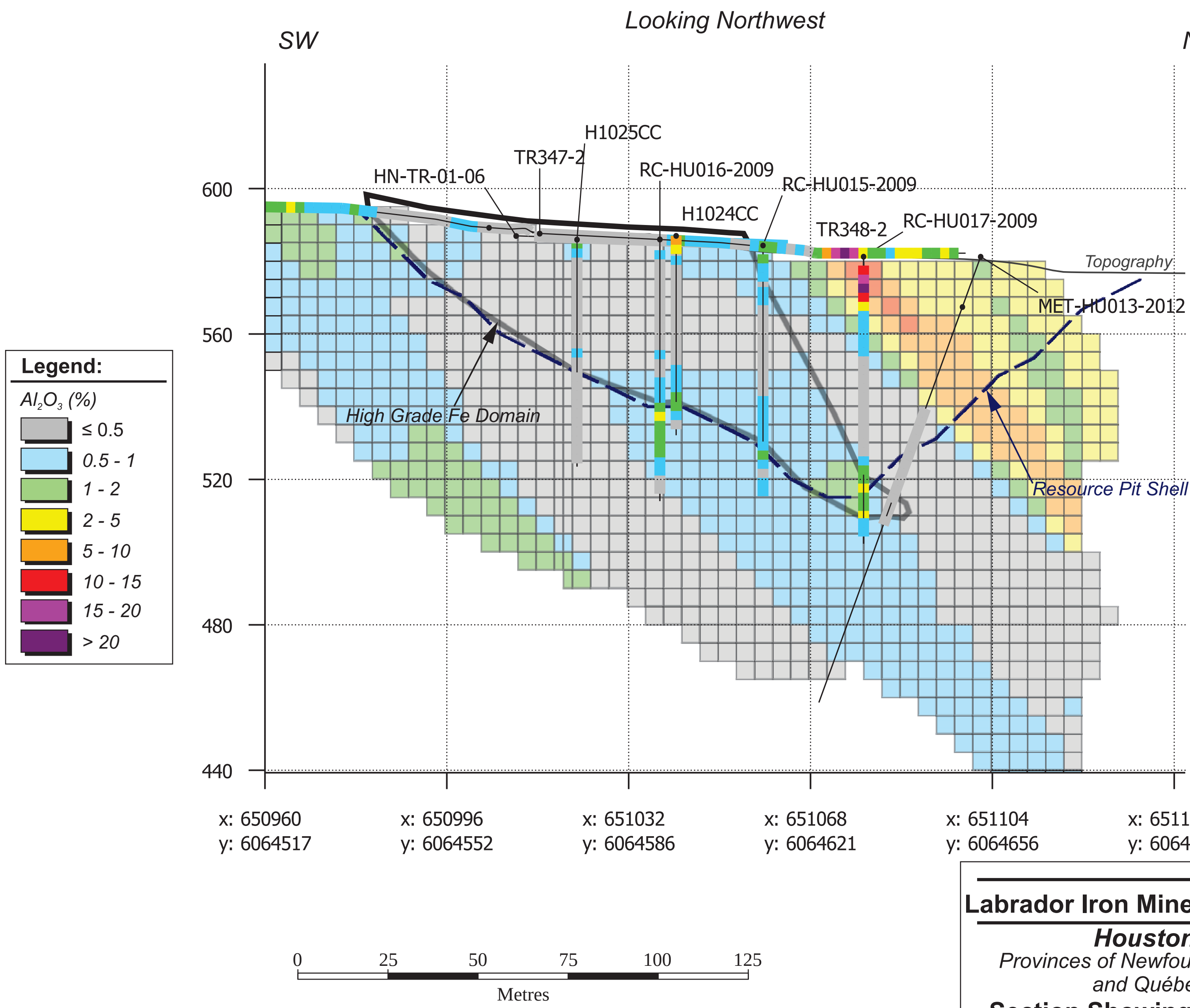


Figure 14-10

Labrador Iron Mines Holdings Limited

Houston Project

Provinces of Newfoundland and Labrador and Québec, Canada

Section Showing Estimated Block Grades Versus Composites - %Al_2O_3 Houston Deposits

February 2021

Source: RPA, 2020.

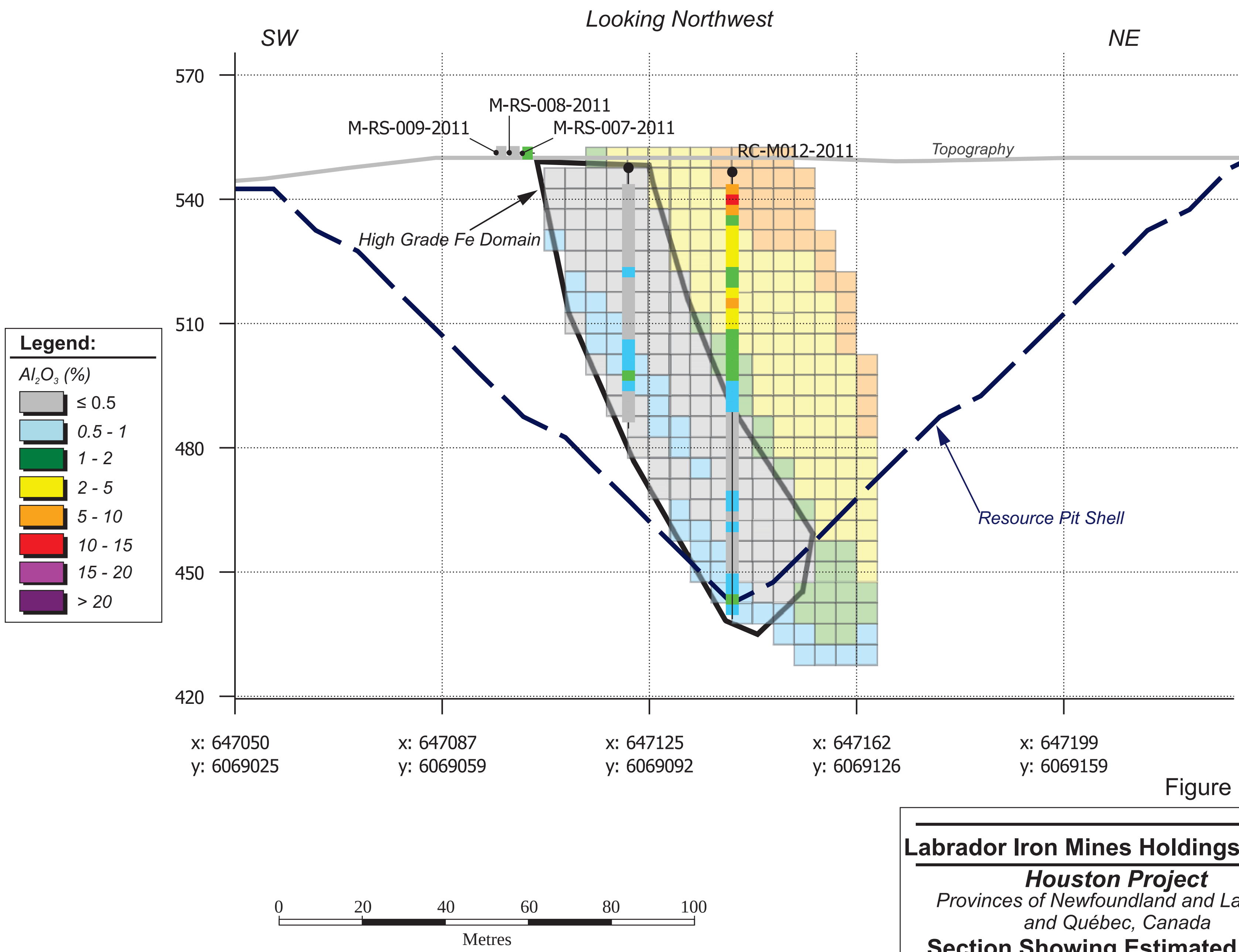


Figure 14-11

Labrador Iron Mines Holdings Limited

Houston Project

Provinces of Newfoundland and Labrador and Québec, Canada

Section Showing Estimated Block Grades Versus Composites - %Al_2O_3 Malcolm Deposits

February 2021

Source: RPA, 2020.

www.rpacan.com

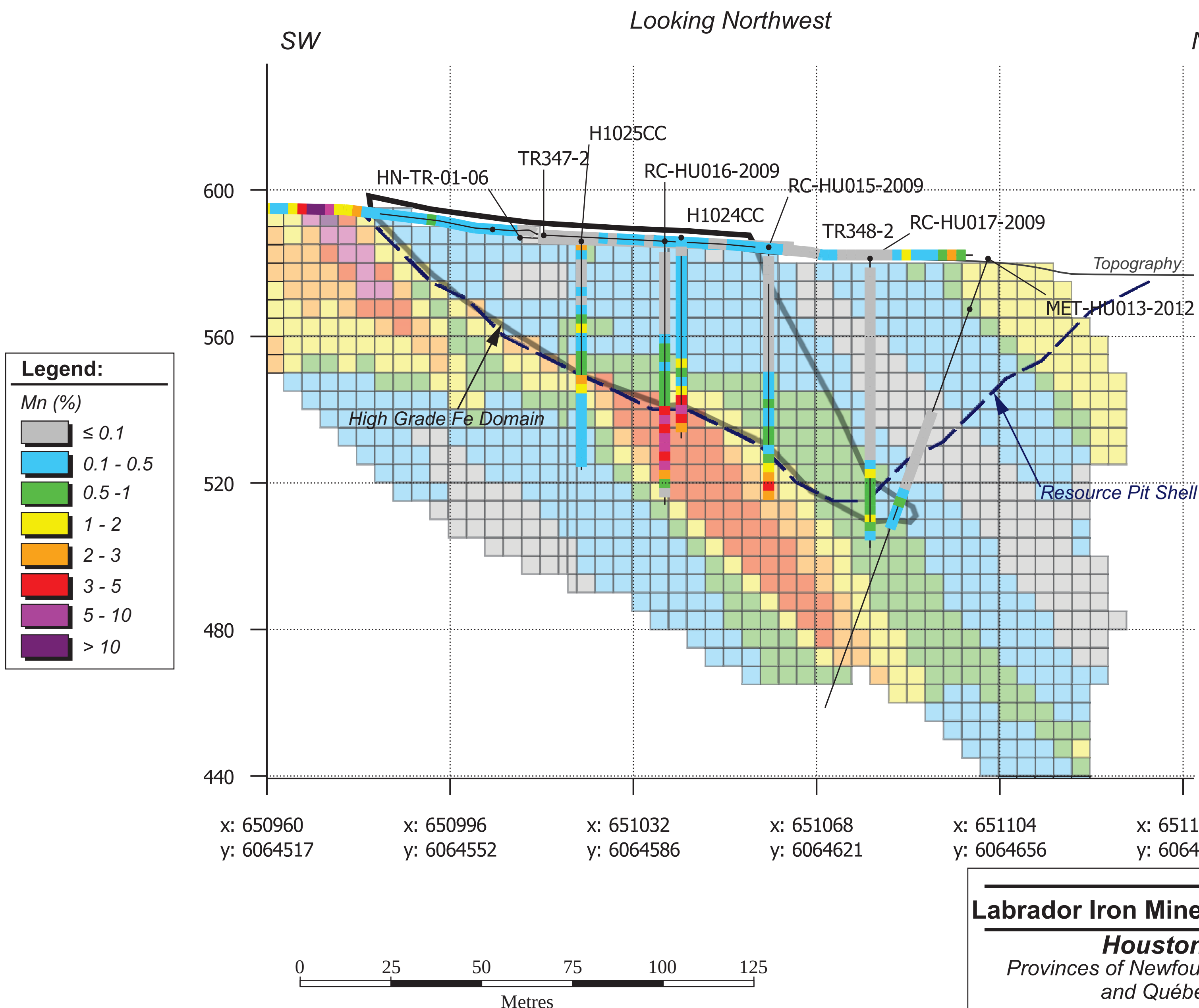


Figure 14-12

Labrador Iron Mines Holdings Limited

Houston Project

Provinces of Newfoundland and Labrador and Québec, Canada

Section Showing Estimated Block Grades Versus Composites - %Mn Houston Deposits

February 2021

Source: RPA, 2020.

www.rpacan.com

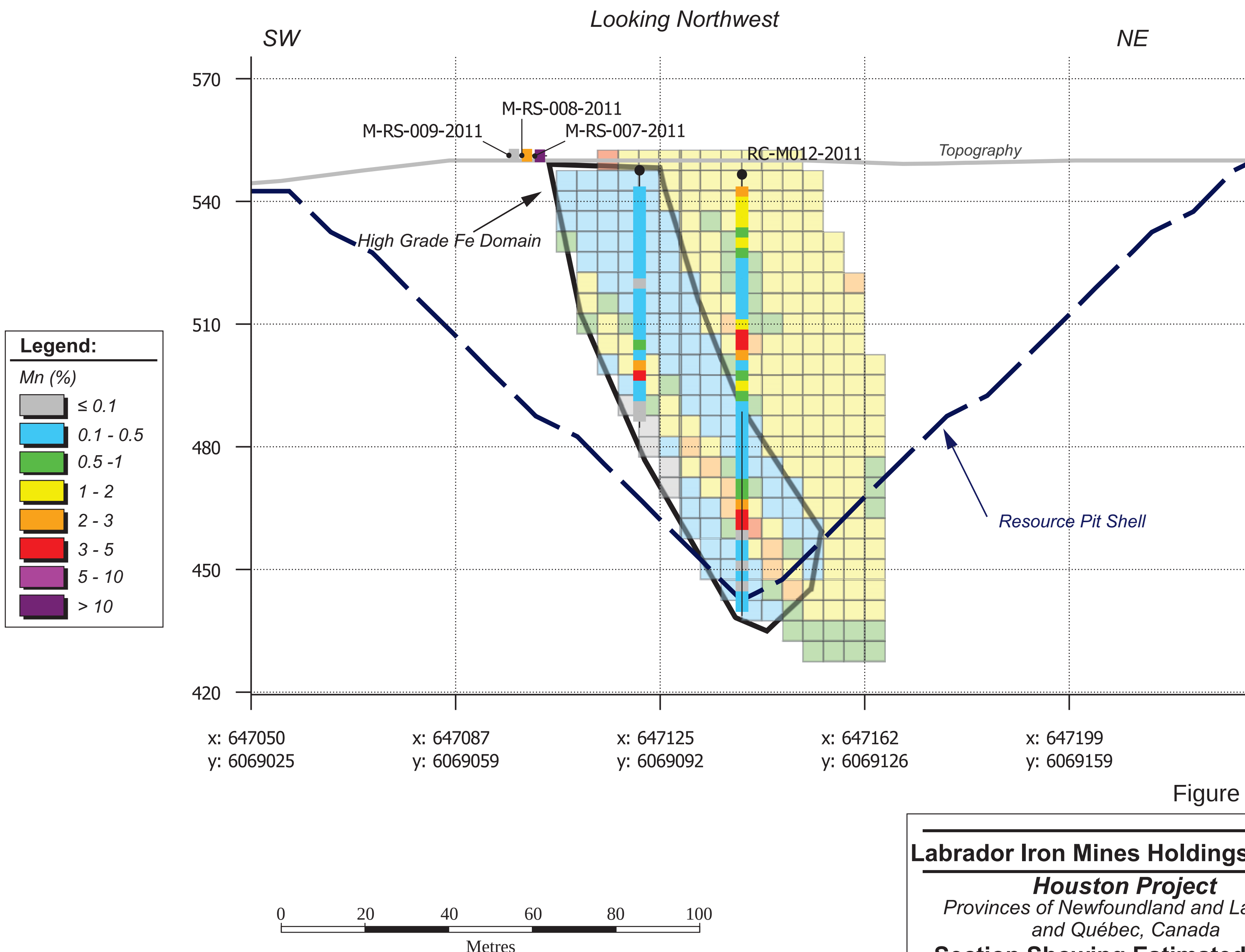


Figure 14-13

Labrador Iron Mines Holdings Limited

Houston Project

Provinces of Newfoundland and Labrador and Québec, Canada

Section Showing Estimated Block Grades Versus Composites - %Mn Malcolm Deposits

February 2021

Source: RPA, 2020.

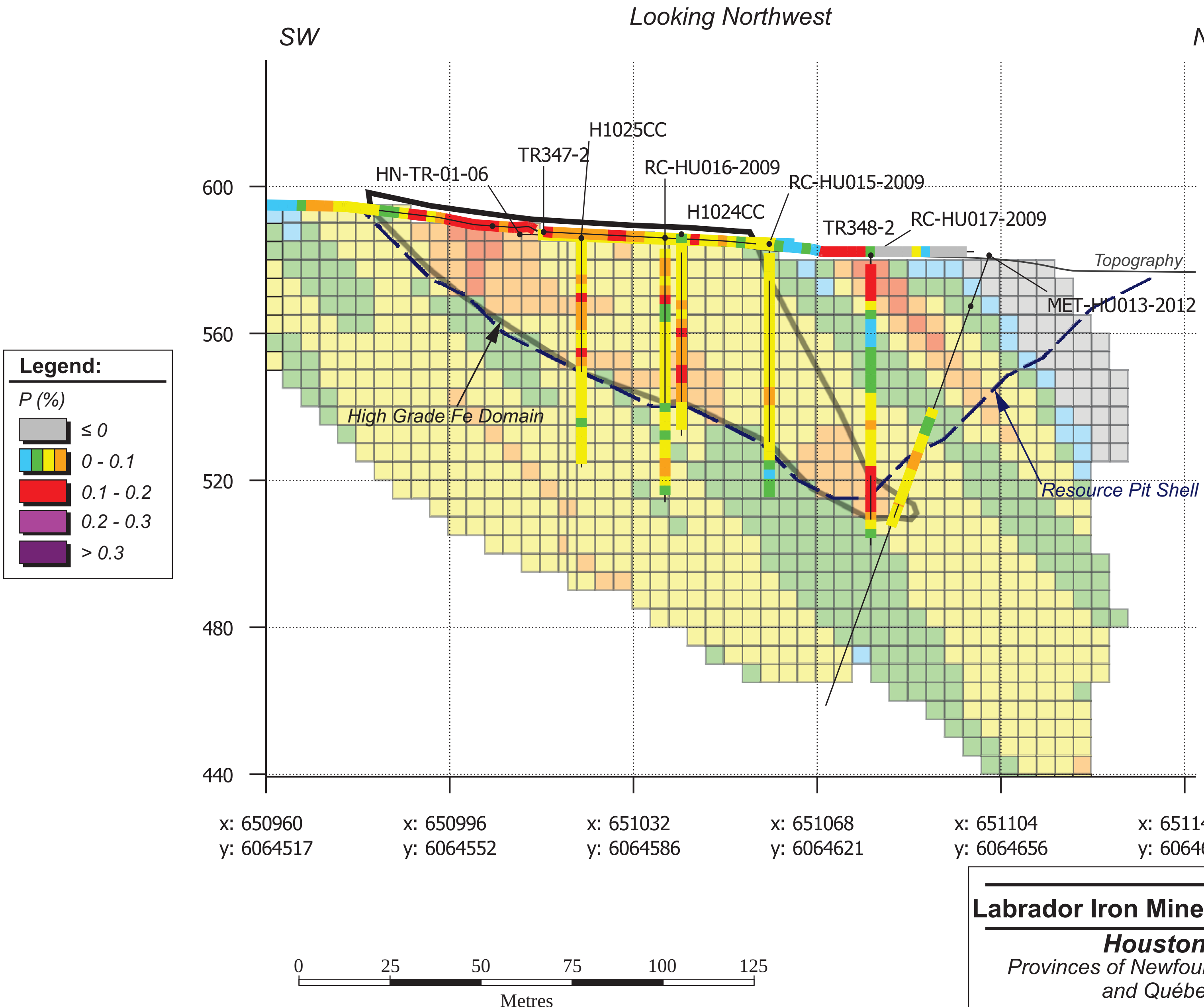


Figure 14-14

Labrador Iron Mines Holdings Limited

Houston Project

Provinces of Newfoundland and Labrador and Québec, Canada

Section Showing Estimated Block Grades Versus Composites - %P Houston Deposits

February 2021

Source: RPA, 2020.

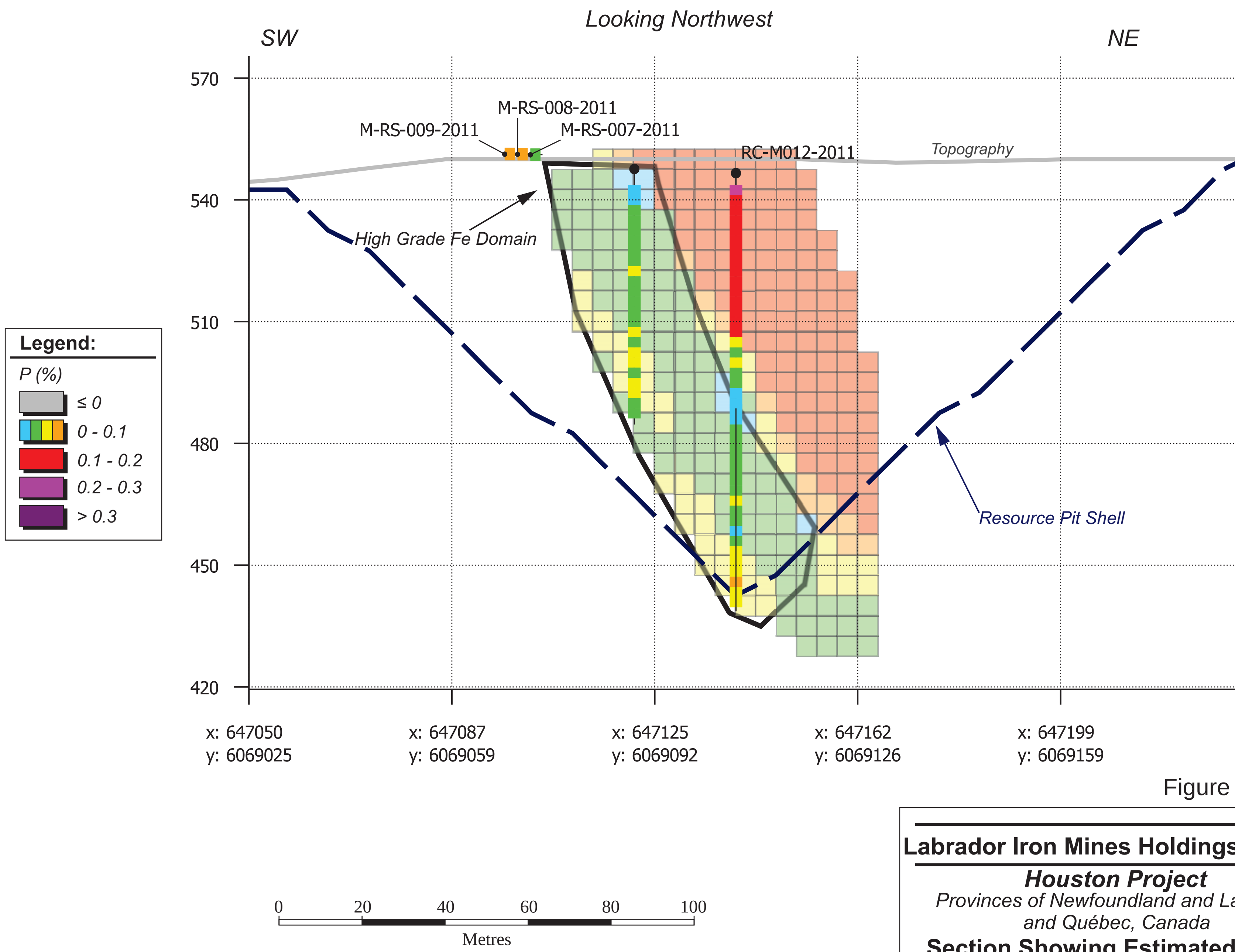


Figure 14-15

Labrador Iron Mines Holdings Limited

Houston Project

Provinces of Newfoundland and Labrador and Québec, Canada

Section Showing Estimated Block Grades Versus Composites - %P Malcolm Deposits

February 2021

Source: RPA, 2020.

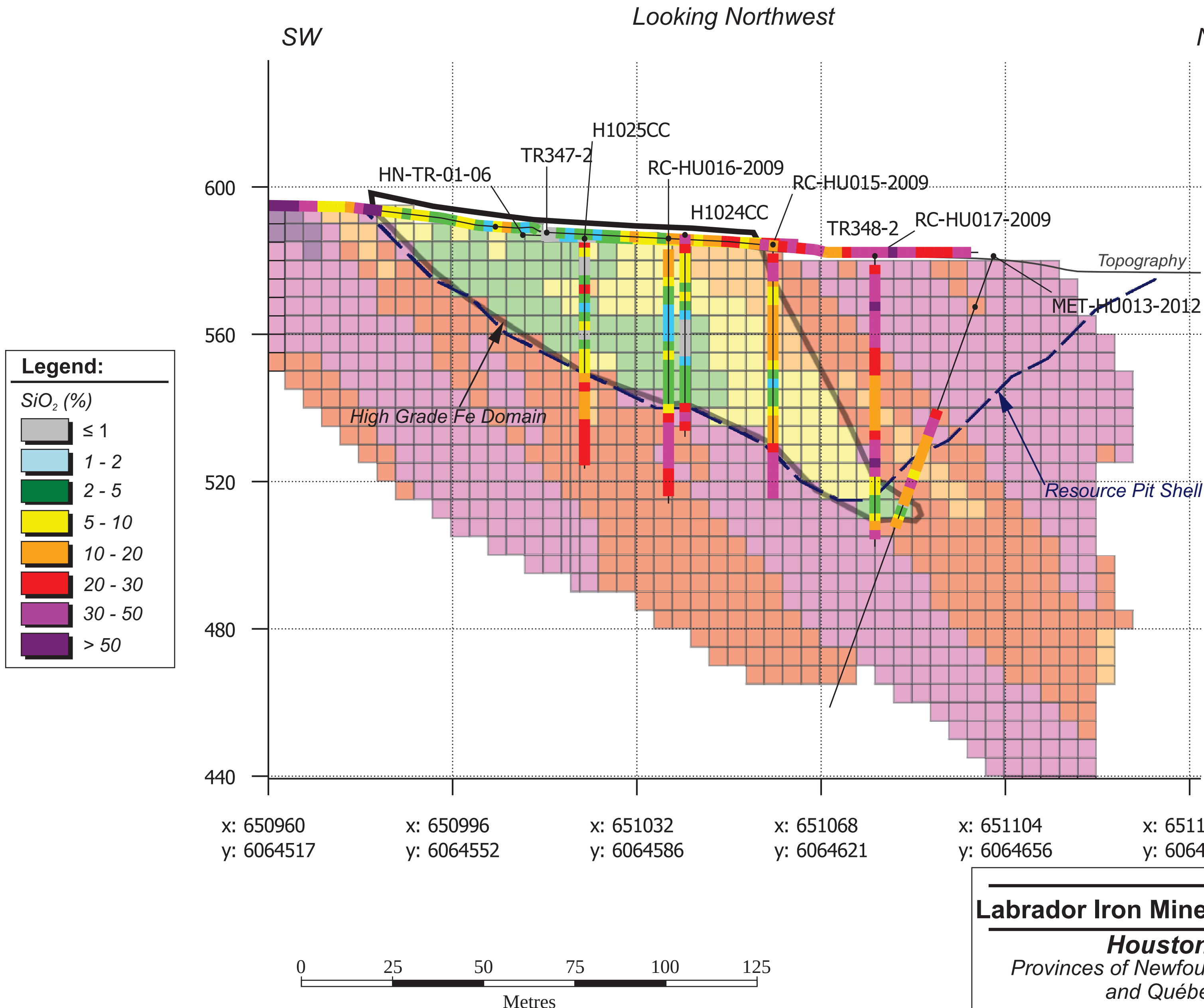


Figure 14-16

Labrador Iron Mines Holdings Limited

Houston Project

Provinces of Newfoundland and Labrador and Québec, Canada

Section Showing Estimated Block Grades Versus Composites - %SiO_2 Houston Deposits

February 2021

Source: RPA, 2020.

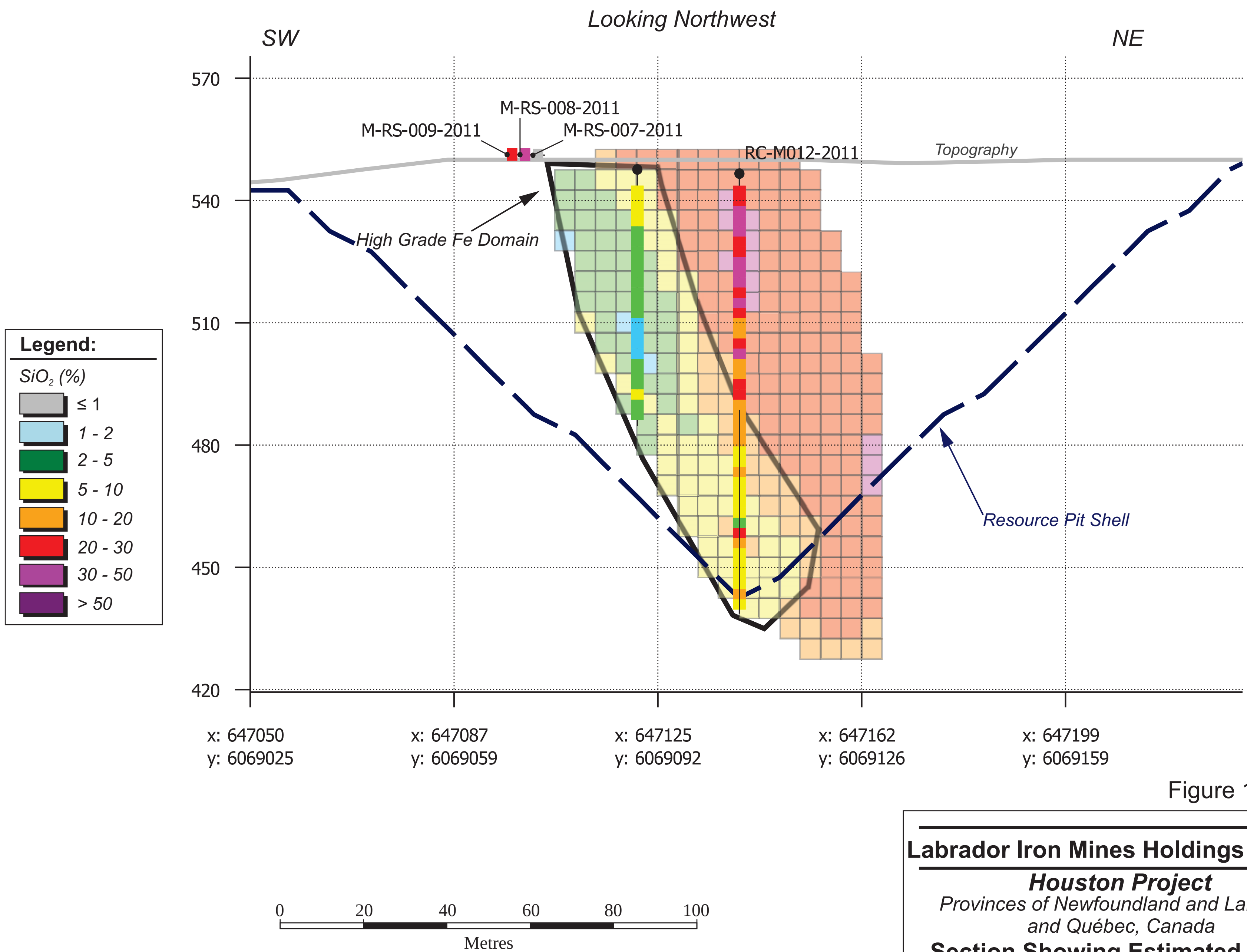


Figure 14-17

Labrador Iron Mines Holdings Limited

Houston Project

Provinces of Newfoundland and Labrador and Québec, Canada

Section Showing Estimated Block Grades Versus Composites - %SiO_2 Malcolm Deposits

February 2021

Source: RPA, 2020.

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FIGURE 14-18 SWATH PLOTS – HOUSTON DEPOSITS

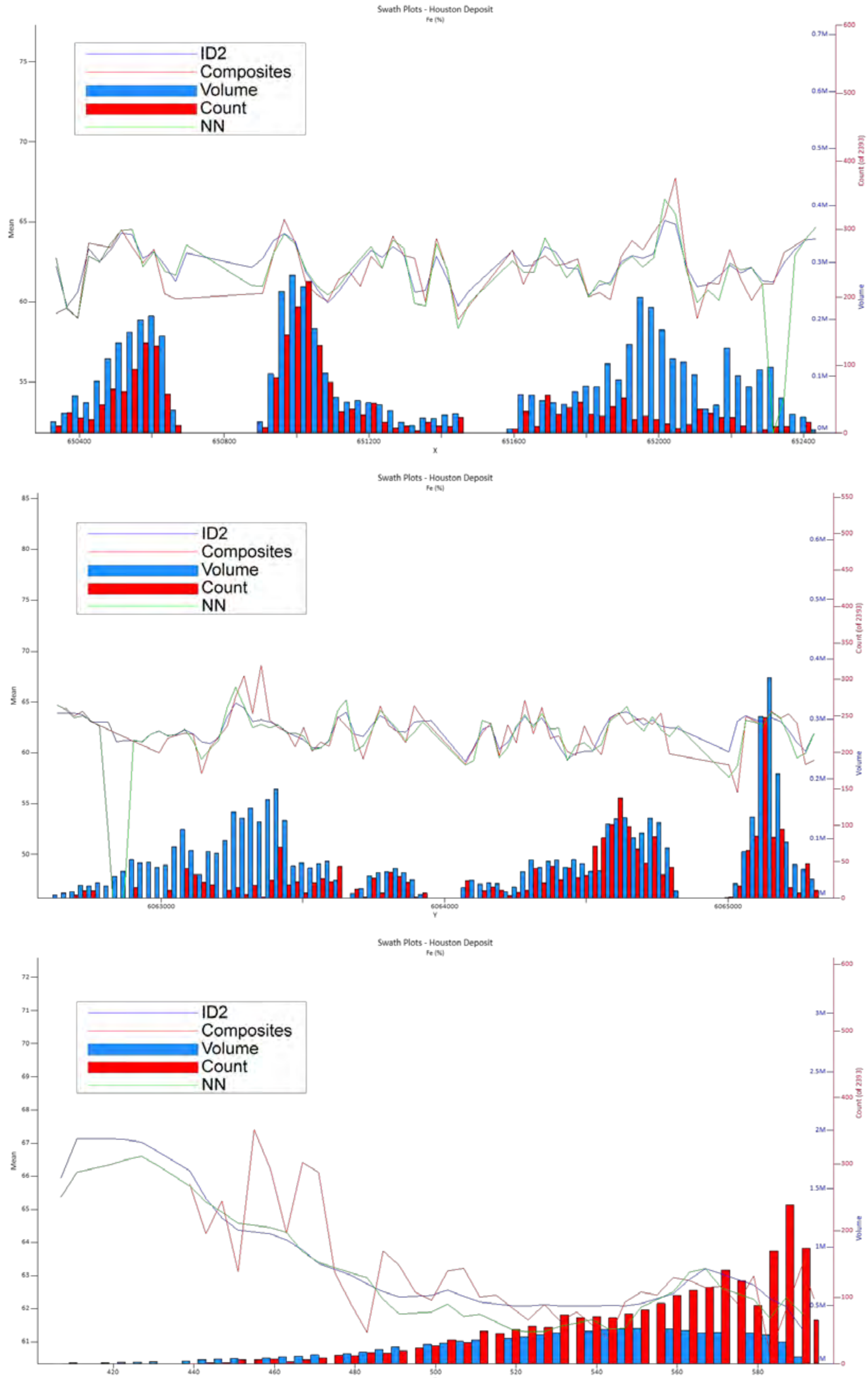
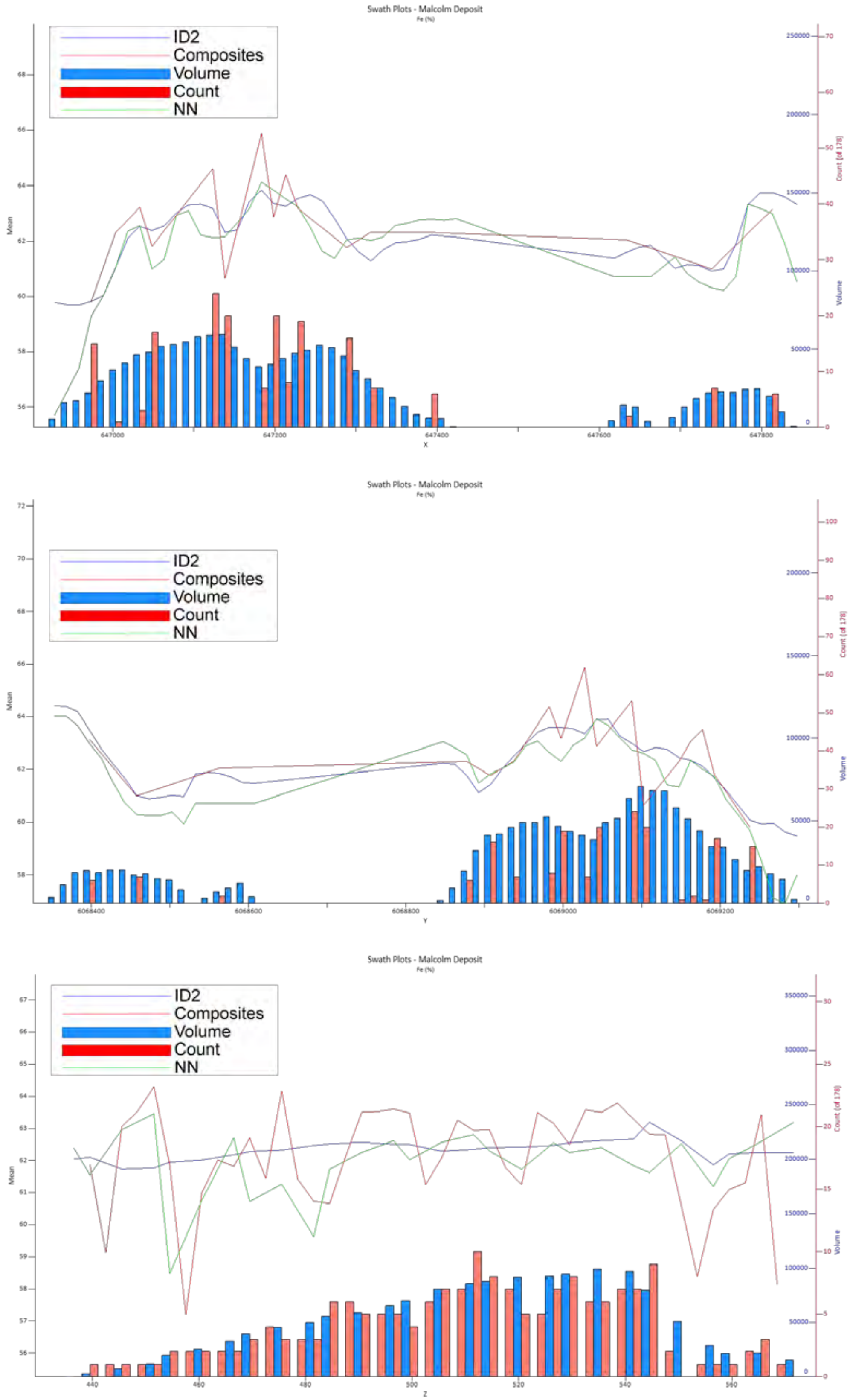


FIGURE 14-19 SWATH PLOTS – MALCOLM DEPOSIT



MINERAL RESOURCE REPORTING

The conceptual open pit shell constrained resources are reported from the block models with the effective date of December 31, 2020. Table 14-12 details Mineral Resources for the Houston deposits and Table 14-13 details Mineral Resources for the Malcolm deposit. RPA has reviewed the overall average Fe grade reported, along with other elements, and confirmed that there are reasonable prospects for producing a marketable iron product.

The QP is not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other relevant factors that could materially affect the Mineral Resource estimate.

TABLE 14-12 SUMMARY OF MINERAL RESOURCES HOUSTON DEPOSITS - DECEMBER 31, 2020
Labrador Iron Mines Holdings Limited – Houston Project

Category	Deposits	Tonnes (Mdmt)	Fe %	SiO_2 %	Mn %	P %	Al_2O_3 %
Measured	Houston 1	5.5	62.5	6.6	0.58	0.08	0.64
	Houston 2	3.5	63.4	6.3	0.36	0.06	0.76
	Houston 3	2.4	61.9	7.9	0.61	0.06	0.66
Total Measured		**11.4**	**62.7**	**6.8**	**0.52**	**0.07**	**0.68**
Indicated	Houston 1	0.7	62.4	7.3	0.52	0.08	0.52
	Houston 2	1.2	61.7	8.9	0.53	0.05	0.63
	Houston 3	4.6	62.9	7.2	0.37	0.06	0.60
Total Indicated		**6.5**	**62.7**	**7.5**	**0.42**	**0.06**	**0.60**
M + I	Houston 1	6.2	62.5	6.7	0.58	0.08	0.63
	Houston 2	4.7	63.0	7.0	0.40	0.05	0.72
	Houston 3	7.1	62.6	7.5	0.45	0.06	0.62
Total M + I		**17.9**	**62.7**	**7.1**	**0.48**	**0.07**	**0.65**
Inferred	Houston 1	1.1	52.2	21.4	1.12	0.05	0.45
	Houston 2	4.2	53.8	17.7	1.16	0.05	1.13
	Houston 3	4.4	57.9	13.0	0.85	0.06	0.70
Total Inferred		**9.7**	**55.5**	**16.0**	**1.02**	**0.06**	**0.86**

Notes:
1. CIM (2014) definitions are followed for Mineral Resources.
2. Mineral Resources are estimated based on an open pit mining scenario.
3. Mineral Resources are estimated based on a cut-off of 50% Fe.
4. Mineral Resources are estimated using a long-term benchmark iron price of US$100/dmt for 62% Fe fines CFR China and a metallurgical recovery of 50% to 100% dependent on mineralization domain.
5. Bulk density is based on a formula relating bulk density to iron content.
6. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
7. Numbers may not add due to rounding.

TABLE 14-13 SUMMARY OF MINERAL RESOURCES MALCOLM DEPOSIT - DECEMBER 31, 2020

Labrador Iron Mines Holdings Limited – Houston Project

Category	Tonnes (Mdmt)	Fe %	SiO_2 %	Mn %	P %	Al_2O_3 %
Indicated	2.6	62.6	6.9	0.38	0.05	0.39
Inferred	4.6	57.9	9.0	1.01	0.08	0.77

Notes:

1. CIM (2014) definitions are followed for Mineral Resources.
2. Mineral Resources are estimated based on an open pit mining scenario.
3. Mineral Resources are estimated based on a cut-off of 50% Fe.
4. Mineral Resources are estimated using a long-term benchmark iron price of US$100/dmt for 62% Fe fines CFR China and a metallurgical recovery of 50% to 100% dependent on mineralization domain.
5. Bulk density is based on a formula relating bulk density to iron content.
6. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
7. Numbers may not add due to rounding.

15 MINERAL RESERVE ESTIMATE

There are currently no Mineral Reserves estimated for the Houston Project.

16 MINING METHODS

INTRODUCTION

Conventional open pit mining methods are proposed for the Houston Project. Proposed RoM operations would begin in the Houston 1 pit in July of Year 1, followed by Houston 2 pit in Year 2. Both Houston 1 and 2 were previously permitted, as described in Section 20. In Year 6, RoM operations move north to the Malcolm pits in Québec, and in Year 8 RoM operations return to Labrador for mining of Houston 3 to the end of RoM operations in Year 12.

Mining operations will be performed by LIM using its own equipment and workforce, with the exception of blasting services, which will be provided by an explosives contractor. LIM will provide the open pit equipment, operator training, supervision, pit technical support services, mine consumables, and the pit operations and maintenance facilities. The downstream activities following mining consist of crushing and screening at the dry sizing plant, product haul to the rail siding, and loading of trains.

RoM operations target production of approximately 2.0 Mdmtpa of high-grade iron mineralization for lump and sinter fines product sales over a 12 year period. Approximately 23.4 Mdmt of high-grade iron mineralization is mined at a diluted grade of 62.2% Fe over the Life-of-Mine (LoM), along with 52.5 Mdmt of waste material. The LoM stripping ratio is approximately 2.2 units of waste to each unit of high-grade iron mineralization (2.2:1). Of note are the very low stripping ratios in Years 1 and 2, at 0.1:1 and 1.2:1 respectively.

CUT-OFF GRADE

As described in Section 14 - Geological Interpretation, high-grade iron mineralization at both Houston and Malcolm was constrained by wireframe domains based on a 58% Fe cut-off grade (the high-grade iron domains). For the PEA production schedule, only mineralization found inside of the high-grade iron domains was considered for production and a 0.0% Fe cut-off grade was applied, effectively reporting the entire volume of the high-grade iron domains within the final pit designs for production, with a few minor exclusions. The exclusions were related to approximately 140,000 dmt in total found in discrete pods at grades below 50% Fe. The

QP recommends infill exploration drilling targeting the pods to further increase the confidence in grades in the local area.

GEOTECHNICAL PARAMETERS

A total of 24 geotechnical drill holes (2,524 m) were completed under the supervision of Piteau in 2012 and 2013, for pit slope investigation. The slope design criteria used for pit optimization and pit design were provided by Piteau in their August 28, 2014 memorandum titled, “Updated Conceptual Slope Designs for Houston Pits 1 and 2”. In summary, the slope design recommendations were as follows:

Hanging wall - east wall

- Bench heigh of 20 m (double benches).
- Berm width of 10 m.
- Bench face angle between 65º and 68º.
- Inter-ramp angle between 46º and 48º.

Footwall – west wall

- Bench heigh of 20 m (double benches).
- Berm width of 10 m.
- Bench face angle between 55º and 65º.
- Inter-ramp angle between 40º and 46º.

For the PEA, RPA used the same hanging wall and footwall pit slope recommendations for the Malcolm pits and Houston 3 pit.

It is assumed that pit ramps will be incorporated in the final pit walls. Based on previous pit design work including consideration for haulage ramp configuration, overall pit slopes for open pit optimization were estimated by pit and/or by sector, as shown in Table 16-1.

TABLE 16-1 PIT SLOPE PARAMETERS
Labrador Iron Mines Holdings Limited – Houston Project

Sector	BFA (º)	Bench Height (m)	Berm Width (m)	IRA (º)	OSA (º)
Houston 1					
East wall	65	20	10	46	41
West wall	60	20	10	43	43
Houston 2					
East wall	65	20	10	46	38
West wall	60	20	10	43	35
Houston 3					
North End					
East wall	60	20	10	48	41
West wall	55	20	10	44	38
South Portion					
East wall	65	20	10	46	38
West wall	60	20	10	43	38
Malcolm					
North Pit					
All walls	65	20	10	46	42
South Pit					
All walls	65	20	10	46	36

OPEN PIT OPTIMIZATION

The open pit optimizations were conducted in Whittle software to generate pit shells for mine planning. The benchmark iron ore price used for the mine planning optimizations was US$85/dmt for 62% Fe fines Cost and Freight (CFR) China. Considerations were made for premiums, penalties, royalties, and transportation and logistics costs to estimate a blended FOB rail price for the proposed rail siding near the existing TSH rail line to the west of the Houston deposits.

The optimizations were run considering only iron mineralization within the high-grade iron domains. (RPA notes that all mineralization within the high-grade iron domains is classified as Measured, Indicated, or Inferred.) Operating costs were benchmarked to current operating mine actuals in similar climatic and logistical locations. A summary of operating parameters used in the optimization is presented in Table 16-2.

TABLE 16-2 PIT OPTIMIZATION INPUT PARAMETERS
Labrador Iron Mines Holdings Limited – Houston Project

Input Parameter	Unit	Houston	Malcolm
Revenue Factors			
Benchmark Fe Price 62% Fe fines CFR China	US$/dmt	85.00	85.00
Selling Costs (freight/logistics/royalties)	US$/dmt	43.00	43.50
Silica Penalty (1)	US$/dmt	6.00	4.50
Lump Premium (2)	US$/dmt	3.00	3.00
Exchange Rate	US$/C$	0.75	0.75
Blended FOB Price Houston	C$/dmt	52.00	53.33
Pit Slopes			
Overall Slope Angle	degrees	35 to 43	36 to 42
Mining Parameters			
Mining Extraction (3)	%	96	96
Mining Dilution	%	4	5
Waste Mining Cost	C$/dmt	3.00	3.00
Incremental Cost – Iron Mineralization (4)	C$/dmt	0.30	1.40
Incremental Cost - Vertical	C$/dmt/10 m	0.10	0.10
Processing and G&A Parameters			
Process Recovery	%	100	100
Dry Sizing Plant Cost	C$/dmt	5.00	5.00
Product Haul Cost	C$/dmt	1.90	1.90
Train Loading Cost	C$/dmt	2.25	2.25
G&A	C$/dmt	12.00	12.00
Total Process and G&A (5)	**C$/dmt**	**21.45**	**22.55**

Notes:
1. Assumed 8% and 7% silica for Houston and Malcolm respectively at a penalty of US$1.50 per percent above 4%.
2. Assumed a credit based on 30% lump at a premium of US$10/dmt.
3. Includes mining losses at 1% and product losses during transport at 3%.
4. Haulage to Houston site is considered within incremental for Malcolm before trucking to rail site.
5. Iron mineralization incremental cost is added to the process cost for optimization purpose.

A series of nested pit shells was generated utilizing the open pit optimization input parameters and a variable revenue factor. Analysis of pit-by-pit graph results are presented in Figures 16-1 and 16-2 for Houston and Malcolm respectively.

FIGURE 16-1 HOUSTON OPEN PIT OPTIMIZATION RESULTS

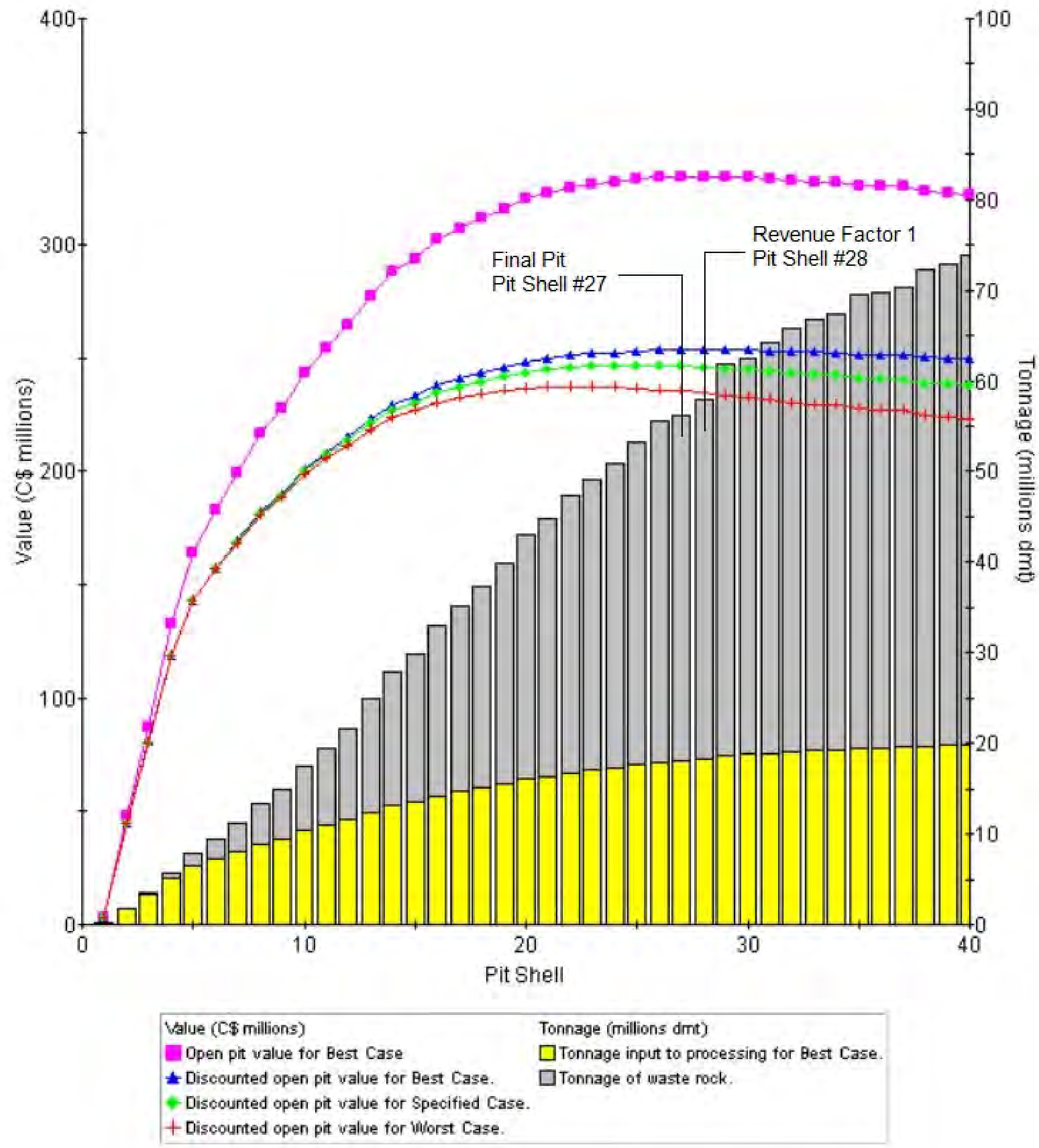
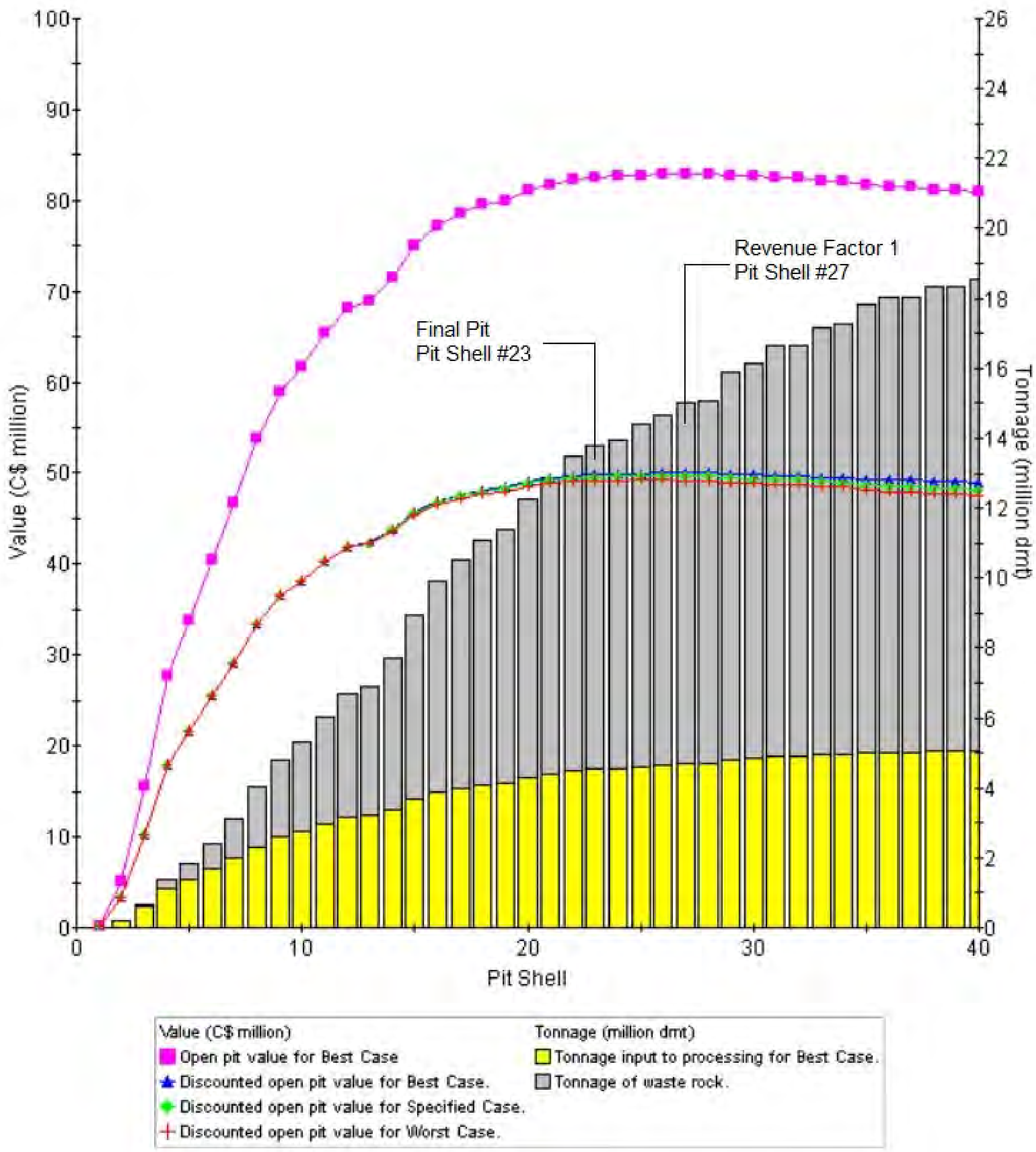


FIGURE 16-2 MALCOLM OPEN PIT OPTIMIZATION RESULTS



Pit shell 28 for Houston and pit shell 27 for Malcolm were generated utilizing the pit optimization input parameters described above (i.e., revenue factor of 1, representing the benchmark iron ore price of US$85.00/dmt). These shells generate the maximum operating cash flow on an undiscounted basis.

Whittle was also used to generate two discounted cash flow (DCF) estimates for each pit based on a "best case" mining sequence, which simulates mining the interior nested pit shells sequentially until the final pit is mined out, and the "worst case" mining sequence, which mines to the final pit outline, bench by bench. Actual results during mine operation are expected to fall between these two limits. RPA specified select pit shells to simulate phases in the mining sequence and generate the "specified case", as shown in Figures 16-1 and 16-2.

RPA notes the maximum DCF for the Houston pits "specified case" is reached at pit shell 25, which has a revenue factor of 0.94, however, as the DCF differences are negligible between Pit 23 and Pit 28, and the Fe grade and SiO_2 grade are similar, RPA selected pit shell 27 (revenue factor 0.98) as a guide for a final pit limit to maximize production tonnes.

For Malcolm, the "specified case" maximum DCF is obtained with Pit 26, at revenue factor 0.98; while Pit 23 is one before a downward step is noted going towards smaller pits. As opposed to Houston, there was no gain to select a larger nested shell, thus RPA selected pit shell 23 (revenue factor 0.92) to be used as basis for final pit design to maximize the iron grade.

The contained quantities within selected final pit shells are shown in Table 16-3.

TABLE 16-3 PIT SHELLS CONTAINED QUANTITIES
Labrador Iron Mines Holdings Limited – Houston Project

Revenue Factor	Diluted Tonnes (Mdmt)	Fe Grade (%)	SiO_2 Grade (%)	P Grade (%)	Mn Grade (%)	Al_2O_3 Grade (%)	Strip Ratio
Houston – Pit Shell 27							
0.98	18.6	59.8	7.2	0.06	0.46	0.62	2.0:1
Malcolm – Pit Shell 23							
0.92	4.7	59.4	5.9	0.05	0.46	0.48	1.9:1

PIT DESIGN

Pit designs were completed in Surpac mining software using the Piteau bench scale design recommendations and selected pit shells from the open pit optimization as a guide. A bench height of 10 m was generally utilized with berms at 20 m intervals (i.e., double benched).

Bench face angles and berm width are variable dependent on pit slope sector as presented in Table 16-1.

The haul ramps were designed for the largest hauling equipment using the road, a 40 t payload capacity truck. For two-way traffic, the industry best practice is to design a travelling surface of at least three times the width of the largest vehicle with the shoulder berm on the outside edge designed to a height equal to three quarters of the rolling radius of the largest tire, along with consideration for ditching and back break. This results in an overall ramp design width of 15 m for the specified haul truck. For access to the bottom benches of the pit, the haul road is narrowed to a width of 9 m, suitable for one-way traffic. The maximum ramp gradient is 10%.

The approximate final pit dimensions are as follows:

- Houston 1 final pit: 100 m deep with a bottom elevation of 495 MASL; pit strike length of 1,010 m.
- Houston 2 final pit: 135 m deep with a bottom elevation of 470 MASL; pit strike length of 460 m.
- Houston 3 final pit: 110 m deep with a bottom elevation of 465 MASL; pit strike length of 1,590 m.
- Malcolm North final pit: 100 m deep with a bottom elevation of 490 MASL; pit strike length of 700 m.
- Malcolm South final pit: 45 m deep with a bottom elevation of 535 MASL; pit strike length of 370 m.

Mining will be accomplished with a maximum of four pit phases in each area to achieve the final pit limits. In general, pit phasing is used to improve economics by targeting higher margin production during the earlier years. The pit phasing has also been used to provide multiple active pit faces to help with product blending at the mine face and to smooth equipment fleet sizing. A minimum mining width of 30 m was used to separate pit pushbacks and allow room for productive mining benches.

Figures 16-3 through 16-7 show the mining phases in plan view along with representative sections looking northwest for each pit area.

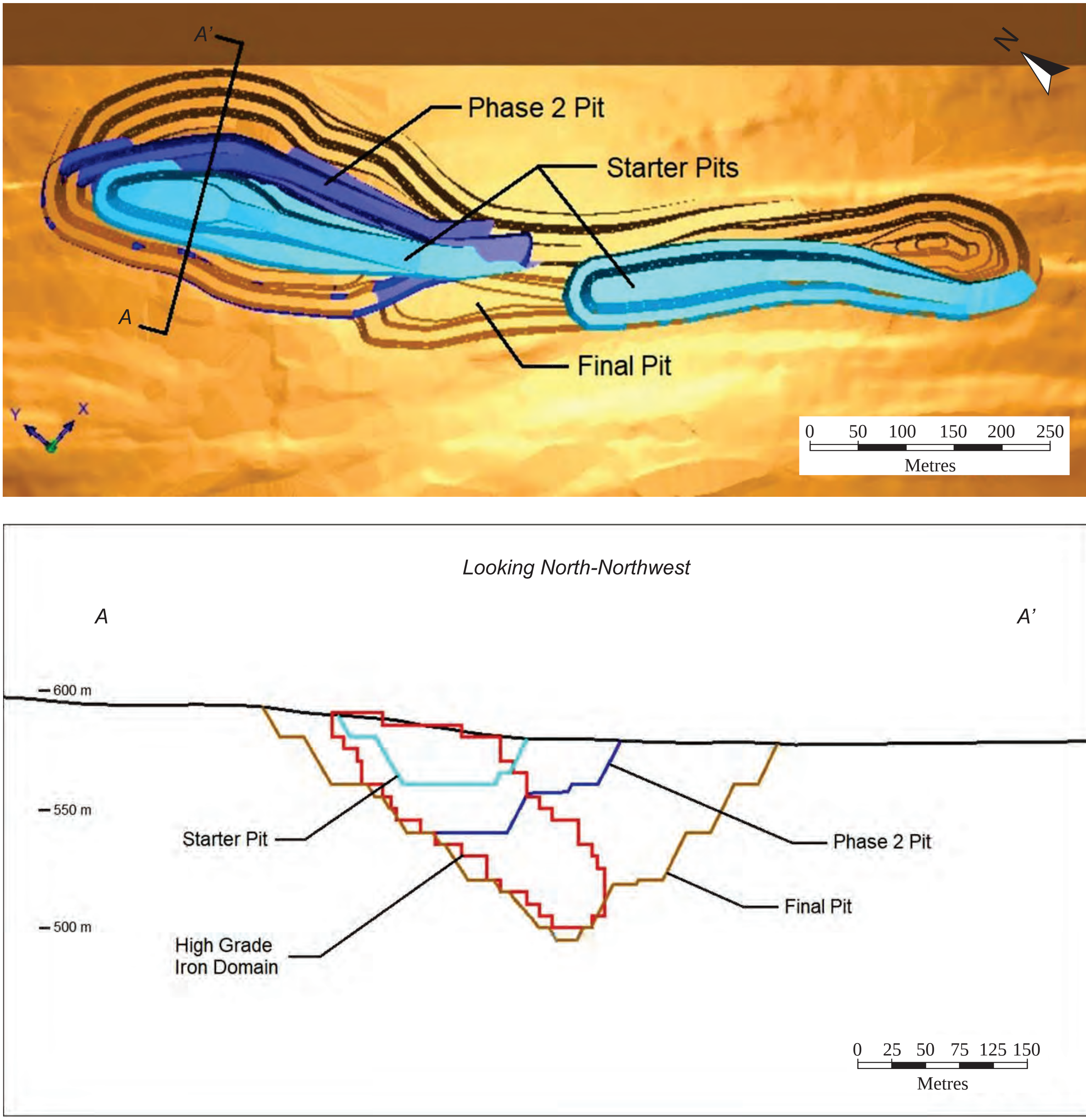


Figure 16-3

Labrador Iron Mines Holdings Limited

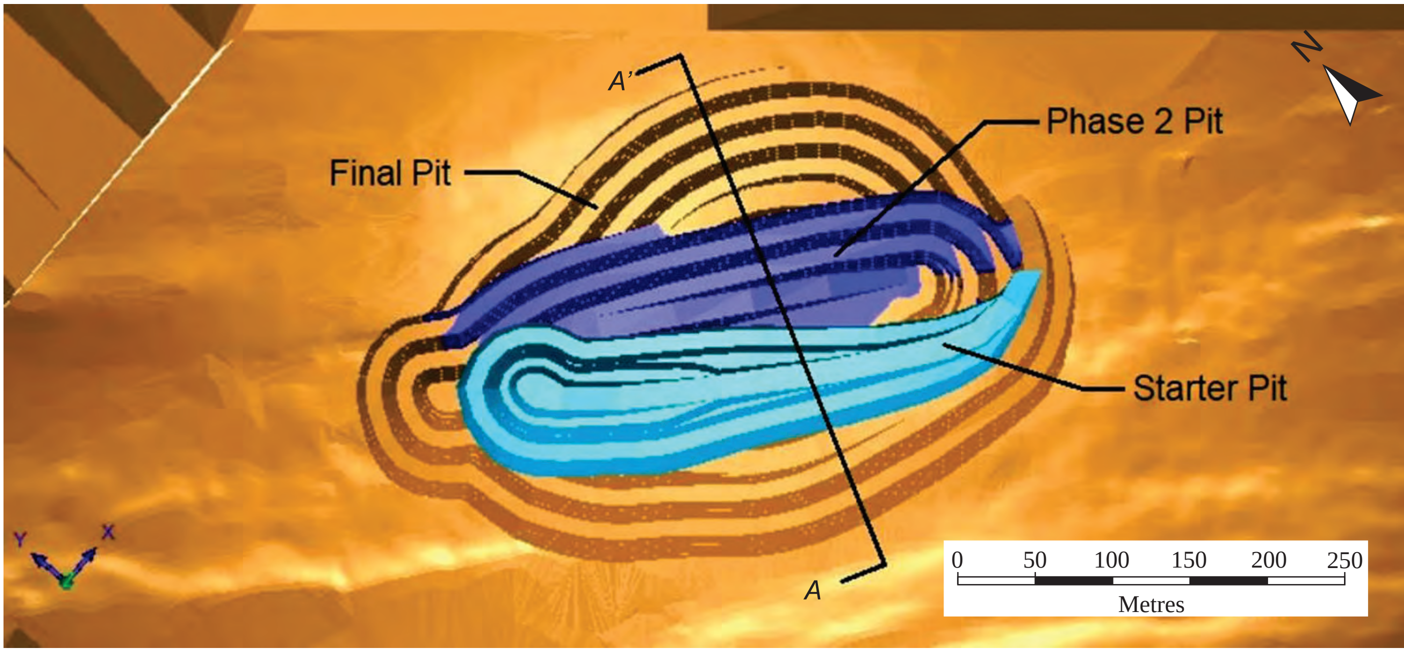
Houston Project

Provinces of Newfoundland and Labrador and Québec, Canada

Houston 1 Mining Phases

February 2021

Source: RPA, 2020.



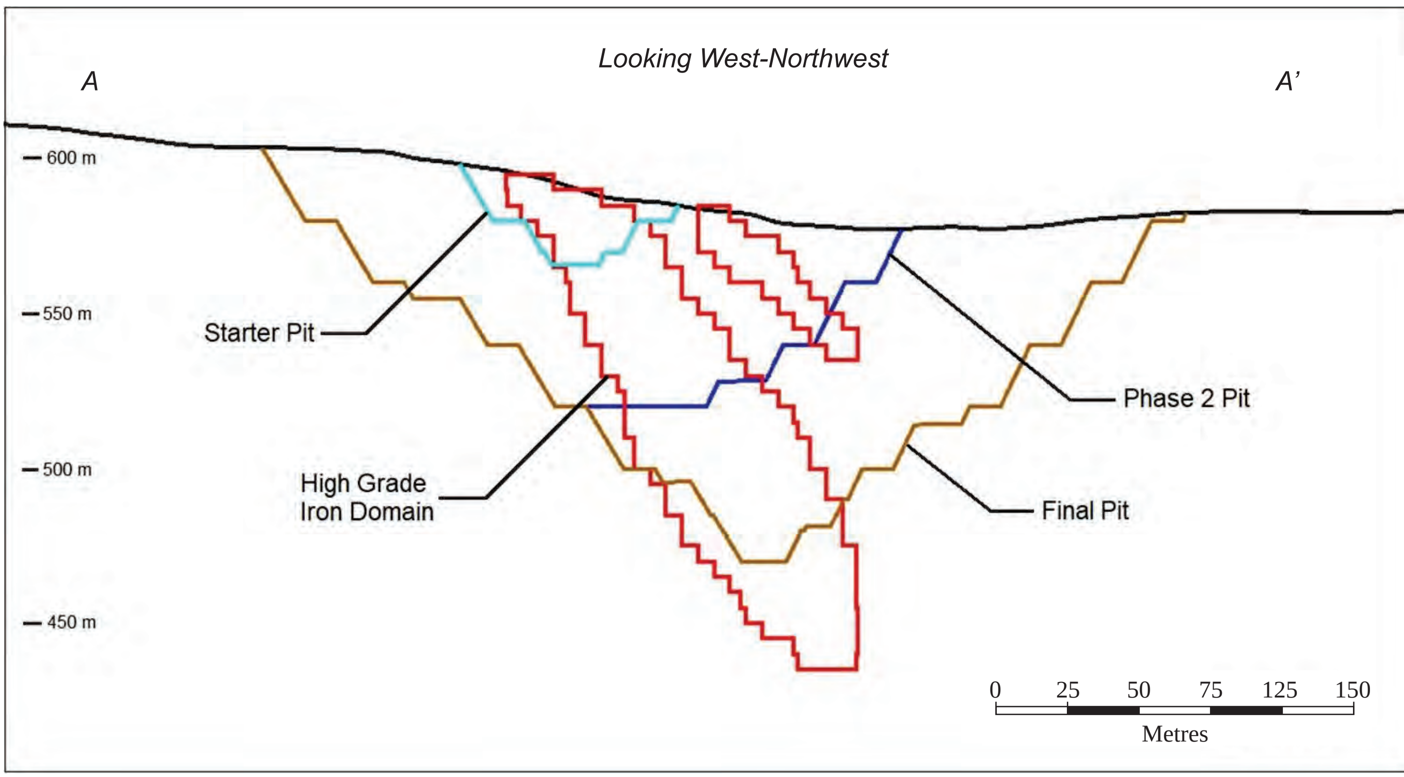


Figure 16-4

Labrador Iron Mines Holdings Limited

Houston Project

Provinces of Newfoundland and Labrador and Québec, Canada

Houston 2 Mining Phases

February 2021

Source: RPA, 2020.

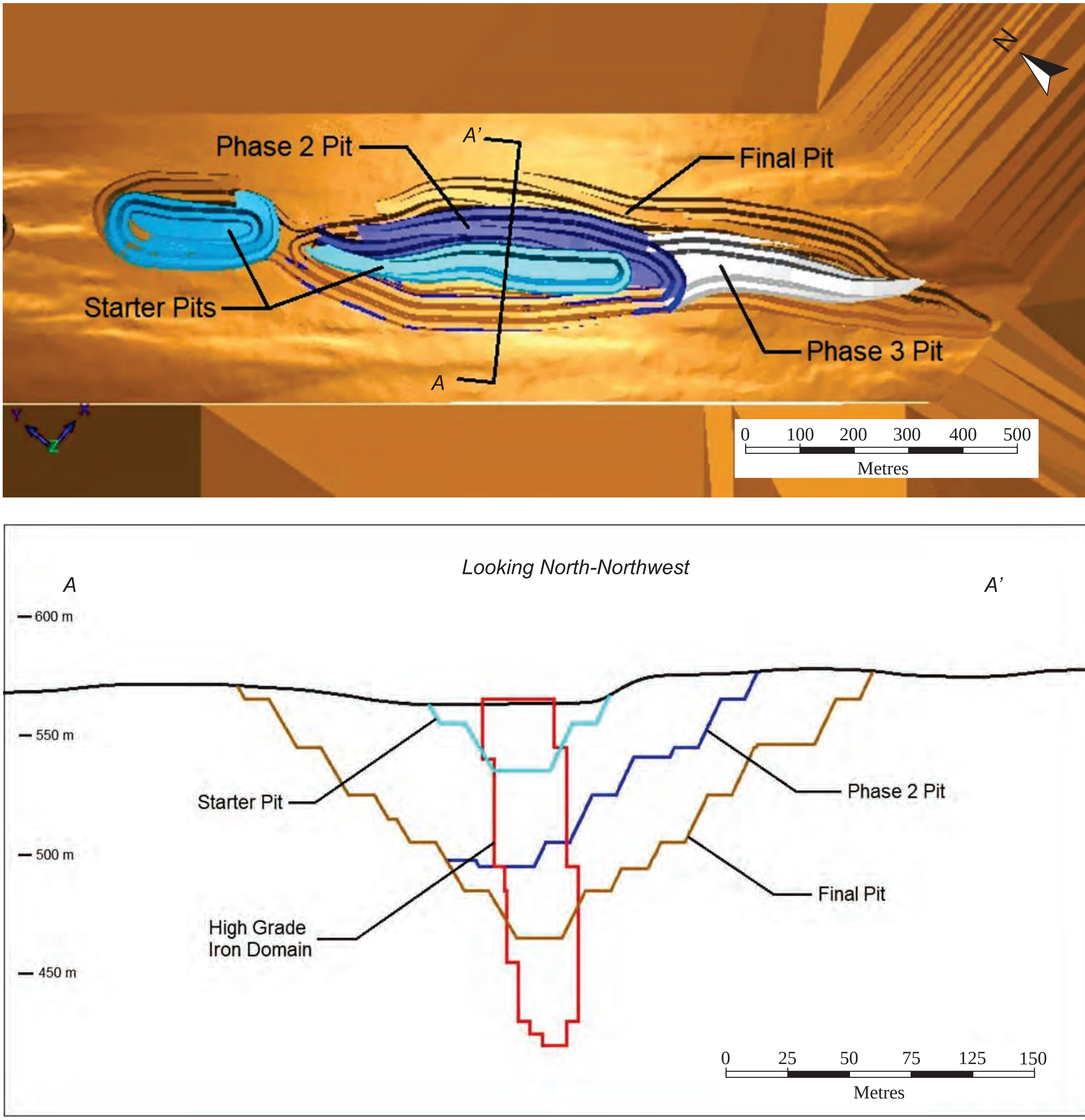


Figure 16-5

Labrador Iron Mines Holdings Limited

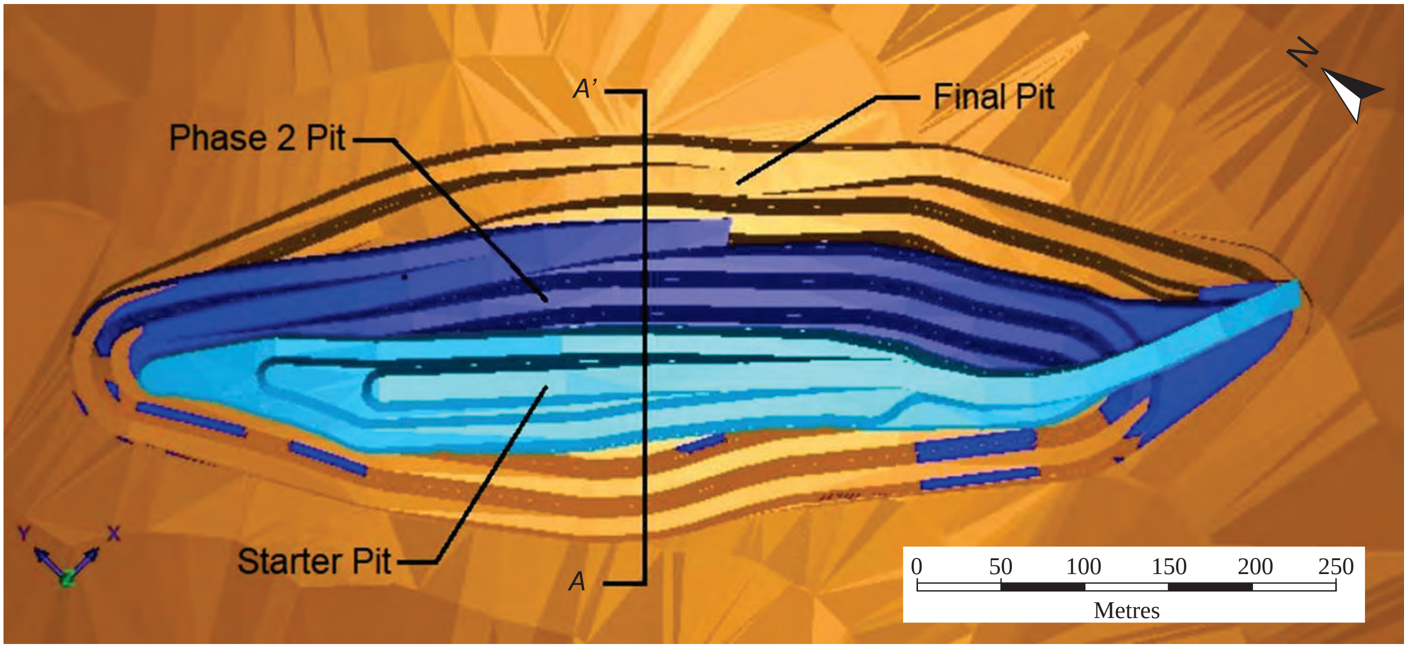
Houston Project

Provinces of Newfoundland and Labrador and Québec, Canada

Houston 3 Mining Phases

February 2021

Source: RPA, 2020.



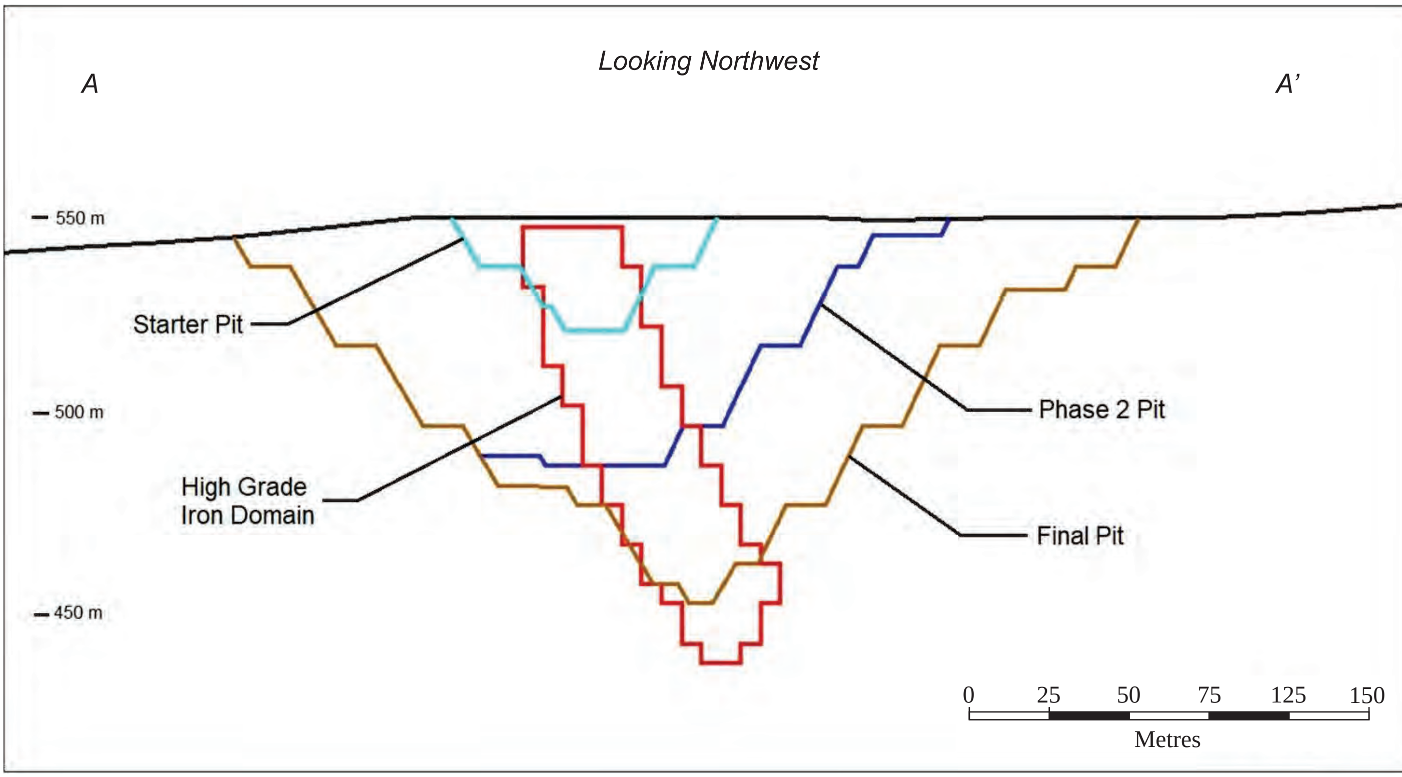


Figure 16-6

Labrador Iron Mines Holdings Limited

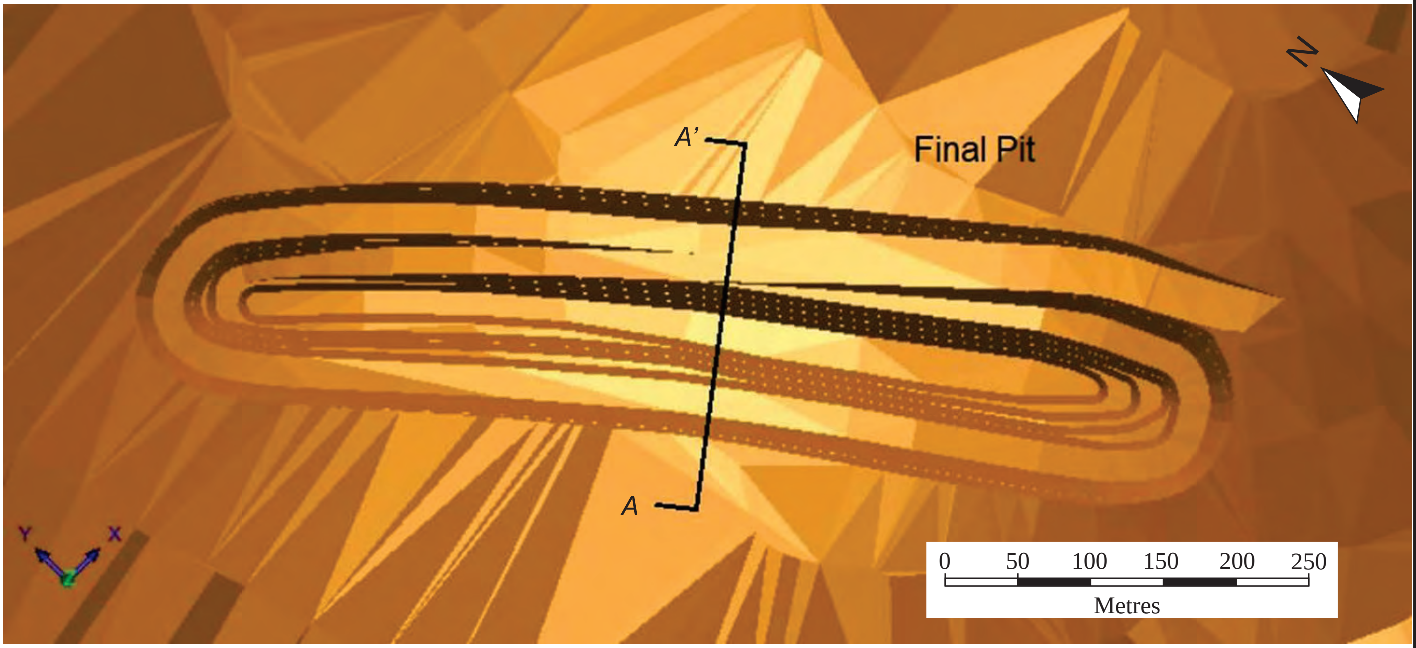
Houston Project

Provinces of Newfoundland and Labrador and Québec, Canada

Malcolm North Mining Phases

February 2021

Source: RPA, 2020.



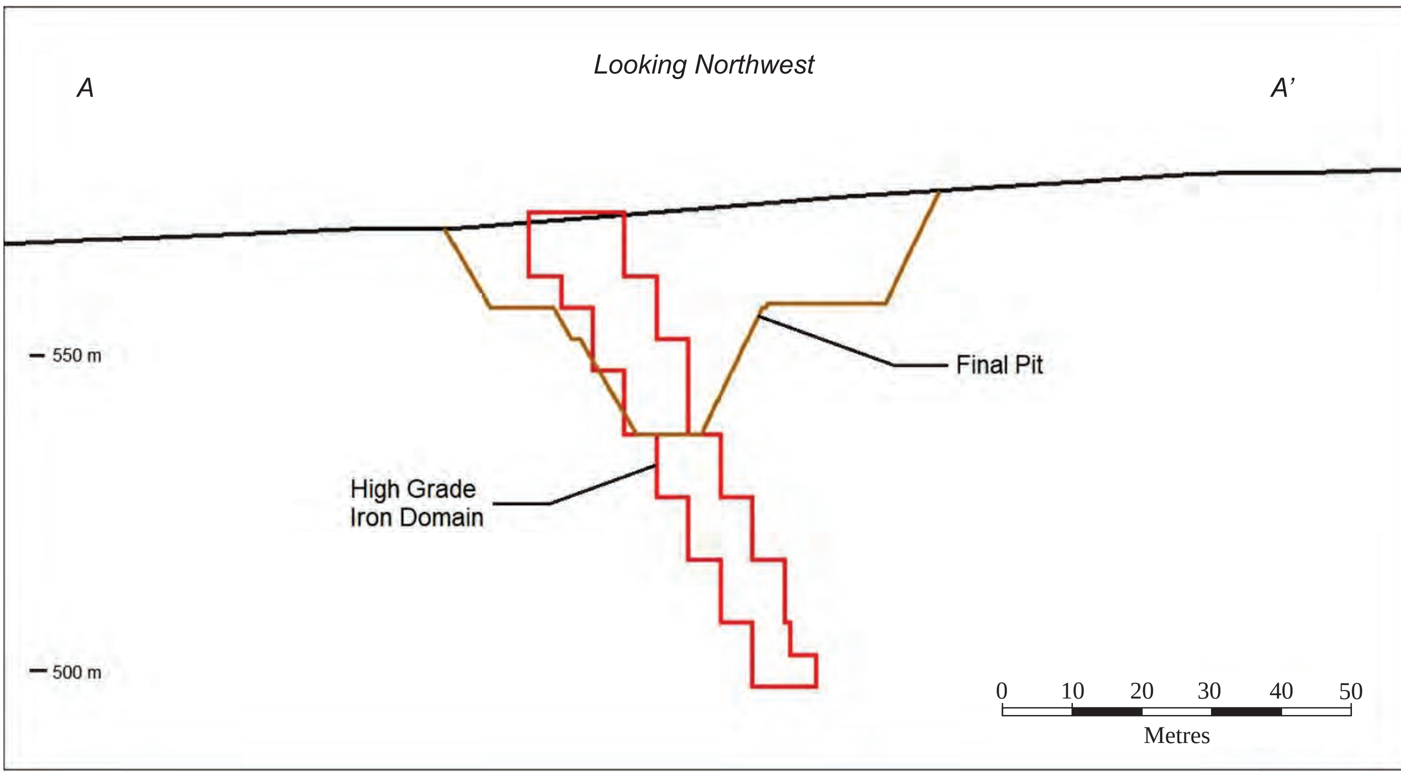


Figure 16-7

Labrador Iron Mines Holdings Limited

Houston Project

Provinces of Newfoundland and Labrador and Québec, Canada

Malcolm South Mining Phases

February 2021

Source: RPA, 2020.

DILUTION AND EXTRACTION

As described in Section 14 - Geological Interpretation, both Houston and Malcolm deposits were constrained by wireframe domains based on a 58% Fe cut-off grade. The high-grade iron domains were modelled focusing on differentiating the mineralization with higher iron grades and lower deleterious grades, potentially suitable for dry processing to lump and sinter fines iron products. Immediately adjacent to the hanging wall and footwall contacts of the high-grade iron domains is iron mineralization with similar qualities, but gradational to lower iron grades and higher deleterious grades as one moves further away from the contacts.

The specified fleet of relatively small loading excavators is assumed to have a high selectivity for mining, however, due to the gradational contact, selectivity is not considered a high risk aspect to the Houston Project. RPA reviewed the high-grade iron domains on a bench-by-bench basis and determined a global external mining dilution factor of 5% to be reasonable. In addition to the external mining dilution factor, internal dilution is included as a 0.0% Fe cut-off grade is applied when reporting from within the high-grade iron domains for production scheduling. A mining extraction factor of 99% was also applied, for consideration of operational losses due to blast movement, grade control resolution, carry-back, and mis-directed loads.

The external contact diluting grades were estimated by reviewing the grade tonnage curves at each of the deposits for the iron mineralization outside of the high-grade iron domains. Diluting grades were estimated for all elements in the model, as presented in Table 16-4. RPA notes diluting grades for the three Houston deposits were similar, thus the same values were used for all of Houston, while Fe and SiO_2 diluting grades at Malcolm were observed to be lower than at Houston.

TABLE 16-4 EXTERNAL CONTACT DILUTION GRADES
Labrador Iron Mines Holdings Limited – Houston Project

Deposit	Fe Grade (%)	SiO_2 Grade (%)	P Grade (%)	Mn Grade (%)	Al_2O_3 Grade (%)
Houston	57.0	13.4	0.06	1.46	0.79
Malcolm	54.0	12.2	0.11	1.65	0.90

PIT MINING QUANTITIES

The PEA production schedule is inclusive of Measured, Indicated, and Inferred Mineral Resources. Iron mineralization outside the high-grade iron domains was considered as waste or waste dilution. In-pit diluted and extracted production tonnes total 23.4 Mdmt at 62.2% Fe, as summarized by pit in Table 16-5.

TABLE 16-5 SUMMARY OF PEA PRODUCTION BY PIT
Labrador Iron Mines Holdings Limited – Houston Project

Pit	High-grade Iron Domain (Mdmt)	Fe Grade (%)	SiO_2 Grade (%)	P Grade (%)	Mn Grade (%)	Al_2O_3 Grade (%)	Strip Ratio	Total Mined (Mdmt)
Houston 1	6.1	62.3	7.1	0.08	0.60	0.64	1.4:1	14.6
Houston 2	4.5	62.7	7.2	0.05	0.44	0.72	2.2:1	14.3
Houston 3	8.1	61.8	8.5	0.06	0.50	0.61	2.9:1	31.3
Malcolm	4.7	62.2	6.3	0.06	0.53	0.51	2.4:1	15.7
Total	**23.4**	**62.2**	**7.4**	**0.06**	**0.52**	**0.62**	**2.2:1**	**76.0**

Note: values may not sum due to rounding.

Table 16-6 presents a detailed breakdown of in-pit diluted and extracted production by Mineral Resource classification. Overall, Measured and Indicated Mineral Resources represent approximately 80% of the production total, while the Houston 1 and Houston 2 pits consist of primarily Measured and Indicated Mineral Resources.

TABLE 16-6 PEA PRODUCTION BY CLASSIFICATION BY PIT
Labrador Iron Mines Holdings Limited – Houston Project

Category	Deposits	High-grade Iron Domain (Mdmt)	Fe (%)	SiO_2 (%)	P (%)	Mn (%)	Al_2O_3 (%)
Measured	Houston 1	5.6	62.3	7.0	0.08	0.61	0.65
	Houston 2	3.5	63.1	6.6	0.06	0.40	0.75
	Houston 3	2.3	61.6	8.4	0.06	0.65	0.66
	Malcolm	-	-	-	-	-	-
Total Measured		**11.4**	**62.4**	**7.2**	**0.07**	**0.56**	**0.68**
Indicated	Houston 1	0.5	62.0	8.0	0.08	0.48	0.52
	Houston 2	1.0	61.4	9.3	0.04	0.55	0.61
	Houston 3	3.3	62.1	8.2	0.06	0.41	0.64
	Malcolm	2.6	62.3	7.1	0.05	0.42	0.41
Total Indicated		**7.4**	**62.1**	**7.9**	**0.06**	**0.44**	**0.55**

Category	Deposits	High-grade Iron Domain (Mdmt)	Fe (%)	SiO_2 (%)	P (%)	Mn (%)	Al_2O_3 (%)
M + I	Houston 1	6.1	62.3	7.1	0.08	0.60	0.64
	Houston 2	4.5	62.7	7.2	0.06	0.43	0.72
	Houston 3	5.6	61.9	8.2	0.06	0.51	0.65
	Malcolm	2.6	62.3	7.1	0.05	0.42	0.41
Total M + I		**18.8**	**62.3**	**7.5**	**0.06**	**0.51**	**0.63**
Inferred	Houston 1	-	-	-	-	-	-
	Houston 2	0.0	62.8	6.7	0.06	0.65	0.76
	Houston 3	2.1	62.1	5.3	0.06	0.67	0.63
	Malcolm	2.5	61.5	9.2	0.06	0.50	0.56
Total Inferred		**4.6**	**61.8**	**7.4**	**0.06**	**0.58**	**0.59**
Total PEA Production		**23.4**	**62.2**	**7.4**	**0.06**	**0.52**	**0.62**

Note: values may not sum due to rounding.

Total RoM material by pit phase is presented in Table 16-7.

TABLE 16-7 BREAKDOWN OF PIT MINING QUANTITIES BY PHASE
Labrador Iron Mines Holdings Limited – Houston Project

Pit	High-grade Iron Domain (Mdmt)	Fe Grade (%)	SiO_2 Grade (%)	P Grade (%)	Mn Grade (%)	Al_2O_3 Grade (%)	Strip Ratio	Total Mined (Mdmt)
Houston 1								
Starter Pit North	1.0	63.2	7.1	0.07	0.42	0.46	0.1:1	1.0
Starter Pit South	0.6	62.5	5.3	0.10	0.33	1.10	1.6:1	1.5
Phase 2 Pit	1.9	63.3	6.7	0.07	0.50	0.43	0.8:1	3.5
Phase 3 Final Pit	2.7	61.2	7.7	0.09	0.79	0.76	2.2:1	8.6
Subtotal	**6.1**	**62.3**	**7.1**	**0.08**	**0.60**	**0.64**	**1.4:1**	**14.6**
Houston 2								
Starter Pit	1.0	64.0	6.0	0.05	0.33	0.71	0.6:1	1.6
Phase 2 Pit	2.2	62.5	7.7	0.05	0.40	0.66	2.6:1	8.2
Phase 3 Final Pit	1.2	62.2	7.4	0.06	0.60	0.85	2.7:1	4.5
Subtotal	**4.5**	**62.7**	**7.2**	**0.05**	**0.44**	**0.72**	**2.2:1**	**14.3**
Houston 3								
Starter Pit Centre	1.0	61.5	8.9	0.06	0.48	0.65	0.6:1	1.6
Starter Pit North	0.6	62.0	7.2	0.06	0.76	0.92	3.2:1	2.4
Phase 2 Pit	2.5	61.7	8.8	0.06	0.41	0.58	3.2:1	10.5
Starter Pit South	0.9	61.2	9.6	0.06	0.48	0.62	1.2:1	2.0
Phase 3 Final Pit	3.2	62.2	8.1	0.06	0.54	0.57	3.7:1	14.9
Subtotal	**8.1**	**61.8**	**8.5**	**0.06**	**0.50**	**0.61**	**2.9:1**	**31.3**
Malcolm North								
Starter Pit	1.0	62.9	6.0	0.05	0.33	0.49	0.4:1	1.5
Phase 2 Pit	1.9	62.1	6.5	0.06	0.49	0.57	2.7:1	6.9
Phase 3 Final Pit	1.3	61.7	7.2	0.06	0.61	0.50	3.5:1	5.8
Subtotal	**4.2**	**62.2**	**6.6**	**0.06**	**0.49**	**0.53**	**2.4:1**	**14.2**
Malcolm South								
Final Pit	0.5	61.8	3.3	0.07	0.94	0.37	2.2:1	1.6
Subtotal	**0.5**	**61.8**	**3.3**	**0.07**	**0.94**	**0.37**	**2.2:1**	**1.6**
Total	**23.4**	**62.2**	**7.4**	**0.06**	**0.52**	**0.62**	**2.2:1**	**76.0**

Note: values may not sum due to rounding.

PRODUCTION SCHEDULE

The mine production schedule was prepared targeting a steady state 2.0 Mdmtpa of high-grade iron domain production. Additional open pit production scheduling objectives include the smoothing or normalizing of the overall open pit mining rate and truck fleet size in order to minimize fluctuations in the workforce and equipment fleet.

Open pit mining is scheduled for 365 calendar days per year, including an allowance for 15 lost days per year due to weather. The production schedule operations are assumed to start on July 1 of Year 1, corresponding with the construction completion of the product haul road and rail siding, and mobilization and commissioning of the dry sizing plant and associated site infrastructure.

Operations during Year 1 ramp up to full production starting in Year 2. Due to the low stripping ratio of the starter pit at 0.1:1, no pre-production waste rock stripping is required. Pre-production mining activity consists primarily of tree removal and overburden salvage of the starter pit and initial waste dump area, improved road access, and preparation for the initial production blast benches.

The general mine sequence starts with mining of Houston 1, followed by Houston 2 in Year 2, both in Labrador. Mining of both these pit areas is complete in Year 6, at which point operations are moved north for mining of the Malcolm pits located in Québec. In Year 8, Malcolm mining is complete and operations move south to Houston 3 in Labrador. Permits for mining Houston 1 and 2 are already in place. Malcolm is scheduled for mining prior to Houston 3 as the grades are higher and stripping ratio is lower. The QP recommends maintaining the flexibility to mine Houston 3 prior to Malcolm, as this will reduce the number of times the operation will need to be relocated.

The LoM mining rate averages approximately 17,500 tpd with a peak mining rate of 25,000 tpd in Year 9. In general, mining of the individual pit phases will be at a maximum sinking rate of six benches per year (60 m vertical).

Waste material has been subdivided into three types:

- the Menihek shale, which is potentially acid generating and has a special handling plan, as detailed in Section 20.
- Waste rock with Fe ≥ 45%.
- Waste rock with Fe < 45%.

Highlights of the production schedule are as follows:

- A 6-month production mining period in Year 1, with mine operations ramping up monthly from 50% to 95% of the rated dry sizing plant capacity.
- Waste mining averages 4.4 Mdmt per year with a peak at approximately 7.0 Mdmtpa in Year 9.

- Total rock mining peaks between Year 8 and Year 11 at approximately 9 Mdmtpa as the operations are concentrated in Houston 3, which has a higher-than-average stripping ratio.
- Reduction of annual production equivalent by two weeks in Years 6 and 8 when the dry sizing plant is moved to Malcolm (Québec) and then back to Houston (Labrador) respectively (assumes zero production during the relocation followed by a ramp-up during the re-start).

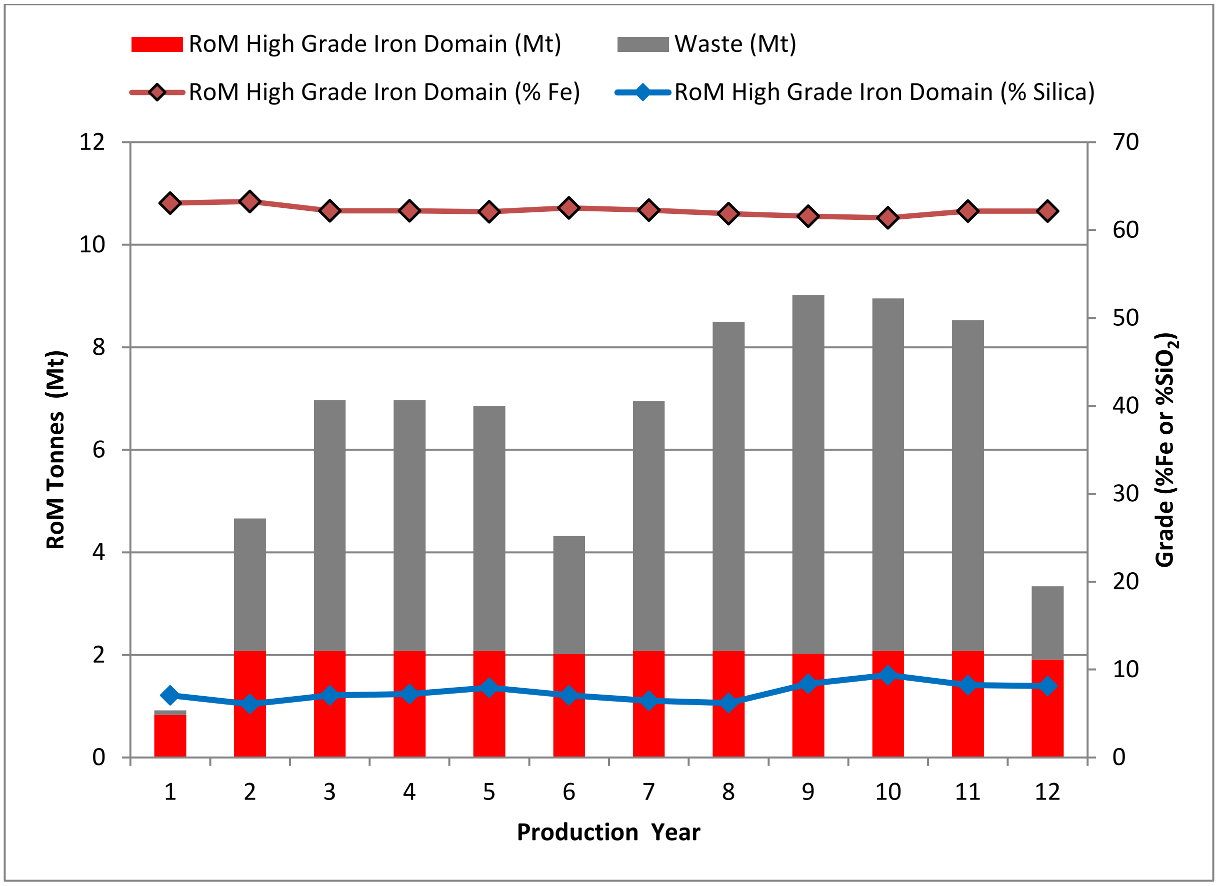
The production schedule is summarized in Table 16-8. Overall pit mining rate, by year, can be visualized in Figure 16-8.

TABLE 16-8 SUMMARY OF THE LOM PRODUCTION SCHEDULE
Labrador Iron Mines Holdings Limited – Houston Project

	Pit	High-grade Iron Domain (Mdmt)	Fe (%)	SiO_2 (%)	Menihek Shale (Mdmt)	Waste < 45% Fe (Mdmt)	Waste ≥ 45% Fe (Mdmt)	Total Waste (Mdmt)	Strip Ratio	Total Mined (Mdmt)
Year 1	H1	0.8	63.1	7.1	0.0	0.1	0.0	0.1	0.1:1	0.9
Year 2	H1,H2	2.1	63.3	6.1	0.0	2.0	0.5	2.6	1.2:1	4.7
Year 3	H1,H2	2.1	62.2	7.1	0.0	3.9	1.0	4.9	2.3:1	7.0
Year 4	H1,H2	2.1	62.2	7.2	0.0	3.2	1.7	4.9	2.3:1	7.0
Year 5	H1,H2	2.1	62.1	7.9	0.1	2.9	1.8	4.8	2.3:1	6.9
Year 6	H1,H2,M	2.0	62.5	7.1	0.1	1.1	1.1	2.3	1.1:1	4.3
Year 7	M	2.1	62.3	6.4	0.6	3.4	0.8	4.9	2.3:1	7.0
Year 8	M,H3	2.1	61.9	6.2	1.1	4.2	1.1	6.4	3.1:1	8.5
Year 9	H3	2.0	61.6	8.4	1.3	5.0	0.7	7.0	3.5:1	9.0
Year 10	H3	2.1	61.4	9.4	0.9	5.5	0.5	6.9	3.3:1	9.0
Year 11	H3	2.1	62.2	8.2	0.2	5.7	0.6	6.4	3.1:1	8.5
Year 12	H3	1.9	62.1	8.1	0.0	1.2	0.2	1.4	0.7:1	3.3
Total		**23.4**	**62.2**	**7.4**	**4.4**	**38.1**	**10.0**	**52.5**	**2.2:1**	**76.0**

Notes: H1=Houston 1, H2=Houston 2, H3=Houston 3, M=Malcolm
Values may not sum due to rounding.

FIGURE 16-8 PEA ANNUAL ROM PRODUCTION SCHEDULE



WASTE ROCK DUMPS AND STOCKPILES

During the mining of high-grade iron ore domains, approximately 52.5 Mdmt of waste material will be generated. Included in the total is the Menihek shale at approximately 4.4 Mdmt, and waste rock with variable levels of iron concentration. A material handling plan has been developed to manage the Menihek shale, which requires special handling as described in Section 20. The QP recommends exploration drilling and additional surface investigations to refine the Menihek shale dimensions in the vicinity of the proposed open pits.

Waste rock with higher concentrations of iron mineralization will be stored separately from the remaining waste rock to allow for potential future processing if an alternate processing facility were to be available capable of upgrading the material to a marketable product. Overburden material suitable for reclamation will be salvaged and stockpiled in the overburden stockpiles. Sufficient capacity exists for all mined materials.

For the PEA production plan, it is assumed that all waste material from the pits will be stockpiled in the indicated surface dump locations. RPA notes that opportunities may exist to backfill exhausted pits in the future, once the full extent and development of the resources are known. The proposed waste dump and stockpile locations are presented in Figure 18-1. The facilities located adjacent to the Houston 1 and Houston 2 pits were previously permitted for use for mine production from the Houston 1 and Houston 2 pits.

Currently there are no geotechnical investigations completed for waste rock dump design criteria for the Houston Project, however, designs have been based on LIM's previous operating experience at the James Mine. The dump design assumptions for the Houston Project include a 20 m catch berm for each 10 m lift. The resulting overall slope is approximately 3.3 Horizontal: 1.0 Vertical. At this overall slope angle, dump re-sloping will be easier and can proceed periodically during dump construction over the LoM. The QP recommends completing geotechnical investigations for confirmation of the waste dump designs.

MINE EQUIPMENT FLEET

Conventional open pit mining is proposed with an owner owned and operated equipment fleet from the start of production. The specified fleet sizing significantly reduces dependence on an individual unit and allows for a high level of operational flexibility in deployment. In addition, many of the production units are common with the product truck haul and rail siding operations.

Mining operations are scheduled 365 days per year with an allowance for 15 lost days per year. Personnel will typically work on a two-weeks-on, two-weeks-off rotation, working 12 hour day and night shifts. Drill and blast operations are scheduled for day shift only, along with some maintenance and service positions.

The mine equipment fleet was estimated using first principles. The primary loading units specified are backhoe excavators loading a fleet of 40 t capacity rigid frame haul trucks. Based on the estimate of equipment hours, the only major equipment requiring replacement over the LoM are the haul trucks, which have an operating life of approximately 25,000 hrs and are replaced in Years 5 through 7, the approximate mid point of the LOM. Table 16-9 presents the equipment first purchase list for the major mine equipment and mine support and ancillary equipment.

TABLE 16-9 EQUIPMENT PURCHASE LIST
Labrador Iron Mines Holdings Limited – Houston Project

Mine Service	Equipment Description	Maximum Fleet Size
Drill and Blast	540 hp Track Drill	2
Drill and Blast	Skid Steer Stemming Loader	1
Loading	500 hp Backhoe Excavator	3
Hauling	560 hp Haul Truck at 40 t Payload	9*
Mine Support	300 hp Track Dozer	3*
Mine Support	260 hp Motor Grader	1*
Mine Support	Water Truck	1*
Mine Support	500 Hp Backhoe Excavator	1
Ancillary Equipment	Fuel/Lube Truck	2
Ancillary Equipment	Mechanics Truck	2
Ancillary Equipment	Mobile Crane	1
Ancillary Equipment	Loader/Tire Manipulator	1
Ancillary Equipment	Equipment Float	1
Ancillary Equipment	Multi-Purpose Vehicle	1
Ancillary Equipment	Portable Light Plant	10
Ancillary Equipment	Service Crew Truck	3
Ancillary Equipment	12 Passenger Crew Van	2
Ancillary Equipment	Light Vehicle Trucks	6

Note (*) – additional equivalent size units specified for product truck haul and rail siding operations.

DRILLING

A 540 hp class down-the-hole track drill with boom is specified. The drill rig is capable of drilling 110 mm to 203 mm diameter drill holes up to approximately 50 m in length. For the Houston Project, 10 m high drilled benches are specified with a 171 mm blasthole diameter in both iron mineralization and waste rock for regular production blastholes. Trim and pre-split drilling is performed with the same drill.

A total of two drills are specified from the start of operations in Year 1 to regularly operate on day shift only. RPA notes that only one drill is required to meet the production demand in Years 1 and 2, however, two units are purchased in Year 1 to ensure a drill is available at all times.

Grade control will be accomplished by sampling the blasthole cuttings. All holes in the main mineralization zone will be sampled, while in the waste material one in four holes is assumed to be sampled.

Table 16-10 summarizes the production blasthole drilling assumptions.

TABLE 16-10 BLASTHOLE DRILLING ASSUMPTIONS
Labrador Iron Mines Holdings Limited – Houston Project

Description	Units	High-grade Iron Domain	Waste Material
Material Density, dry	dmt/m^3	3.76	2.85
Hole Diameter	mm	171	171
Bench Height	m	10	10
Subgrade	m	1.3	1.4
Re-drill	%	7	7
Fallback	%	1	1
Mass Shot per Hole	dmt	758	752
Penetration Rate	m/hr	40	40
Drill Time Utilization	%	65	65
Drill Maximum Productivity	dmt/hr	1,615	1,589

Drill time utilization allows for time spent for tramming, spotting new holes, and bit changes. Operating on only day shift and drilling just production blastholes, each drill has the capacity to drill off approximately five million dry tonnes per annum of material.

BLASTING

Explosives supply to the hole, including initiation devices, will be performed by contractor. The explosive supply contractor is responsible for all equipment, buildings (other than camp facilities for staff), and permits required to perform the duties of the contract. A magazine site and explosive site will be located on the Houston Project site. The design, scheduling, and implementation of the blast patterns will be performed by the owner’s technical services department.

Table 16-11 presents assumptions for a typical blast design. Blasting will occur only on day shift, with one to two blasting times per week scheduled.

TABLE 16-11 BLASTING PARAMETERS
Labrador Iron Mines Holdings Limited – Houston Project

Description	Units	High-grade Iron Domain	Waste Material
Material Density, dry	t/m^3	3.76	2.85
Hole Diameter	mm	171	171
Bench Height	m	10	10
Subgrade	m	1.3	1.4
Stemming	m	2.9	3.4
Burden	m	4.2	4.8
Spacing	m	4.8	5.5
Explosive Density	g/cc	1.15	1.15
Powder Factor	kg/t	0.29	0.28

Waterproof emulsion has been specified along with non-electric initiation systems. Blasthole stemming material will be sourced from suitable in-pit material. A small skid steer loader is specified for handling of stemming material and help with blast pattern site preparation.

LOADING

The primary excavation fleet for loading haul trucks consists of up to three 500 hp class backhoe excavators with a 3.5 m^3 bucket for mining in the high-grade iron domain and 4.8 m^3 bucket for mining in waste material. All RoM material in the production schedule is scheduled to be loaded by the primary excavation fleet. An additional excavator is specified for the ancillary fleet for road construction and general site maintenance, which is available for pit support. In addition, a spare front-end loader is available at the dry sizing plant stockpile rehandle area.

The backhoe excavators are to be equipped with a mass excavation arm and boom combination for increased power at the bucket. Blasted benches will be mined in two passes. Ideally, the excavator will be sitting on top of the bench lift and excavating to the pit floor elevation. The mass excavation setup allows for a digging depth of over seven metres, which is sufficient for the five-metre split bench height with consideration of blasting swell, as well as cleaning out trenches at up to 7.5 m depth.

Loading operations are scheduled for both day and night shift. The target haul truck load is 40 t. The buckets for high-grade iron domain and waste material are sized to four-pass load the haul trucks with a total load time per truck of approximately 2.8 minutes. Operating on day and night shift, each excavator has the capacity to load approximately four million dry tonnes per annum of material.

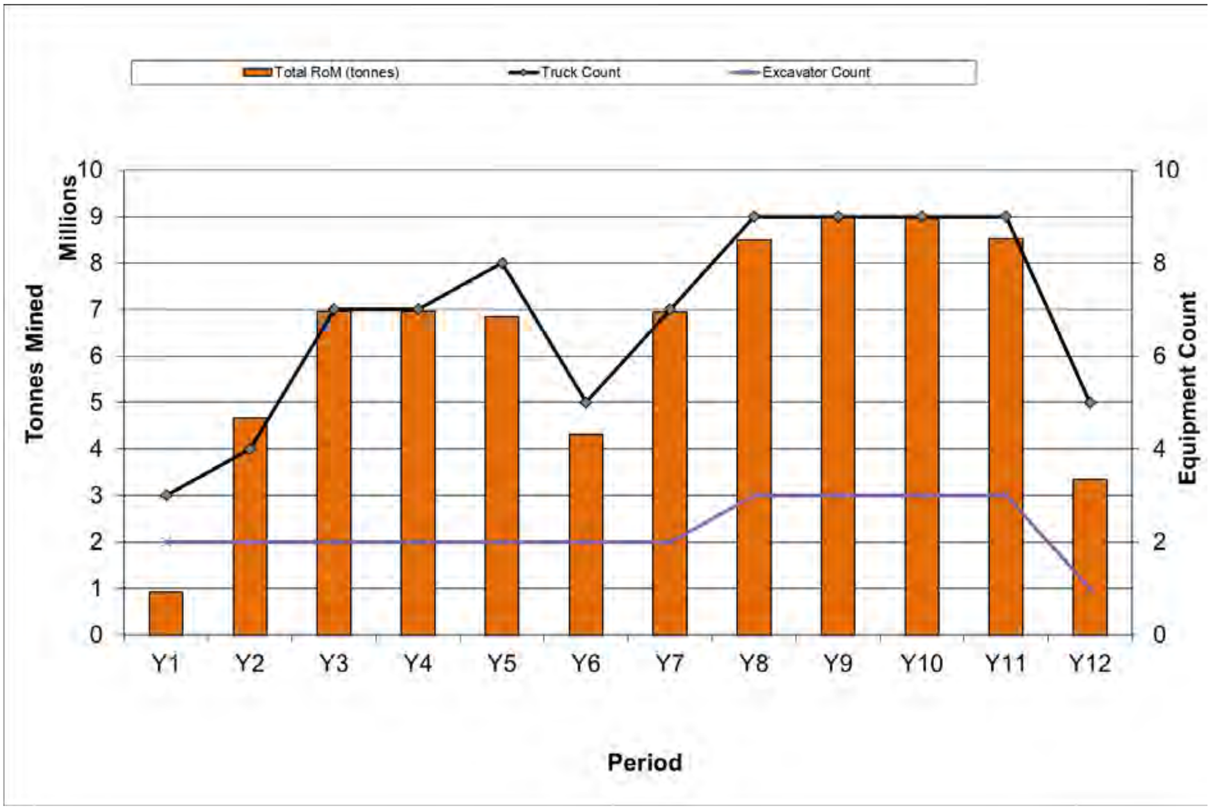
HAULING

The RoM production haulage fleet consists of up to nine rigid frame haul trucks rated at 40 t payload capacity. The diesel-powered haul trucks are rated at 560 hp with an approximate 20 m^3 capacity dump body. The RoM fleet size, along with consideration of the same truck specified for the product haul to the rail siding, significantly reduces dependence on individual units and allows for a high level of operational flexibility in deployment. In addition, the water trucks utilize the same platform.

Average haulage profiles were identified for each material type and mining phase. A maximum speed limit in the mine of 50 km/hr was considered, along with additional speed restrictions at 30 km/hr for downhill travel and loading and dumping areas. As such, the haul truck productivities are variable over the LoM, dependent on the haulage profiles, and range from approximately 0.8 Mdmt to 1.2 Mdmt per truck per year.

Figure 16-9 presents the excavator and haul truck fleet requirements over the LoM relative to the production schedule total material movement.

FIGURE 16-9 HAUL TRUCK AND EXCAVATOR FLEET SUMMARY



MINE SUPPORT EQUIPMENT

The mine support equipment consists of track dozers, motor graders, and water trucks:

- Track Dozers - Up to three, 300 hp class, track dozers are specified. Track dozer duties include waste rock dump and stockpile spreading, overburden stripping, and road construction and maintenance. An equivalent make and model track dozer is also specified for stockpile management at the rail siding.
- Motor Graders - One 260 hp class motor grader with four-metre moldboard is specified primarily for road and in pit floor maintenance. An equivalent make and model motor grader is also specified for the product haul road maintenance from the dry sizing plant to the rail siding.
- Water Trucks - One water truck is scheduled for use during production with an additional unit operating along the product haul road and rail siding. The water trucks use the same platform as the production haul trucks, equipped with a water cell and spray bar. The water trucks are primarily for dust suppression on haulage and service roads.

The QP recommends consideration for a portion of the Houston Project haul road construction to be completed by LIM, as the mine equipment fleet utilizes similar equipment to that proposed for the haul road construction. This would potentially lower construction costs as well as get greater utilization of the capital investment of the mining fleet, and further advance operational readiness for the start of mining operations.

PERSONNEL

The mine department will employ a peak of 159 personnel on various work schedules over the LoM. Mine department personnel are divided into four main areas: mine management and technical services, mine production, mine maintenance, and mine contractors. Personnel counts within mine management and technical services are relatively stable during the course of RoM operations at 20, whereas mine production and maintenance personnel counts fluctuate with production levels from a low of 52 in Year 1 to a high of 139 in Year 11. Mine contractors include personnel for the explosive delivery contract.

ROSTER

The majority of mine personnel are scheduled to work 12 hour shifts on a 14 days-on 14 days-off rotation. Roles requiring both a day shift and night shift require four work crews, with crews alternating day and night shift rotations.

17 RECOVERY METHODS

Processing at the Houston Project will comprise dry sizing of high-grade iron mineralization (>58% Fe), represented by DRO samples in metallurgical test work (as described in Section 13), to produce two products, lump (-31.5 mm +6.3 mm), and sinter fines (-6.3 mm).

Processing will be performed via a dry sizing plant, which will consist of crushing and screening, resulting in two stockpiles, one for each product. The product stockpiles will be recovered by front end loader and loaded into mine trucks for hauling to the rail siding for stockpiling prior to being loaded into rail gondolas. The loaded rail gondolas are defined as the point of sale for the Houston Project PEA.

Processing is currently planned to take place throughout the year, with train loading taking place from May to November. Facilities at the Houston Project will consist of a mobile crushing and screening plant sized to process approximately 6,000 tpd of high grade iron ore mineralization, a railway siding, and utilities.

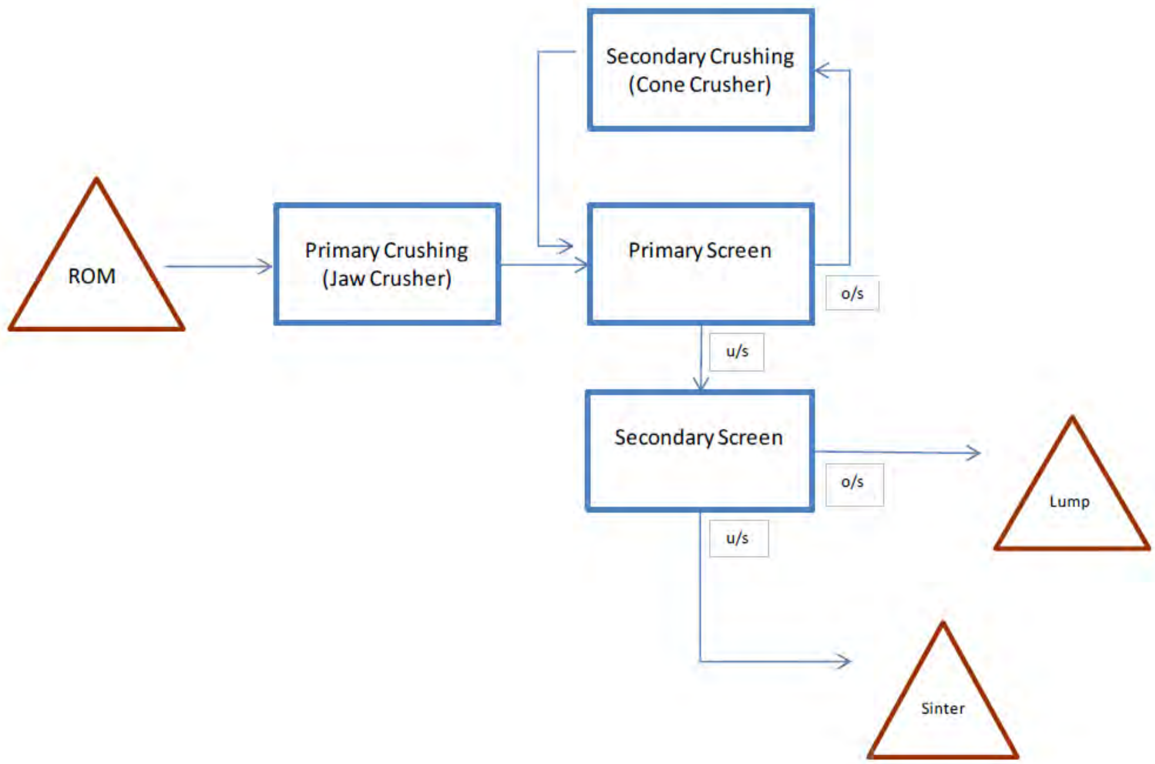
PROCESS DESCRIPTION

SUMMARY

A plant feed stockpile will be located close to the primary jaw crusher to ensure there is a constant feed into the plant. A front-end loader will recover high grade iron ore mineralization from the feed stockpile and deposit it into the feed hopper that will feed a vibrating grizzly screen. Oversize from the grizzly screen will feed the primary jaw crusher where the material will be crushed to -100 mm. The grizzly screen undersize and crushed material will be combined on the crusher conveyor and then onto the primary screen feed conveyor for further sizing. The primary screen will split the material at 31.5 mm with the oversize reporting to the secondary crusher and the undersize reporting to the secondary screen. The oversize from the secondary screen (-31.5 mm +6.3 mm) will be directed to a mobile stacker as the final lump product. The undersize from the secondary screen (-6.3 mm) will be directed to a separate mobile stacker as the final sinter fines product. The secondary cone crusher will crush oversize material from the primary screen, and the product from the secondary crusher will return to the primary screen ensuring that all plant feed is sized and classified correctly.

The processing plant for treating the Houston Project high-grade iron ore mineralization will be a fully mobile plant, each section of which will be on a trailer and will not require any permanent foundations for the plant floor, other than a suitably prepared and graded gravel area. The plant can be moved to different locations so that material mined in Labrador is processed in Labrador (i.e., the Houston property), and material mined in Québec is processed in Québec (i.e., the Malcolm property). It is estimated that three days will be required to relocate the plant, followed by a start-up period of reduced production. Figure 18-1 presents the location of the dry sizing plant facilities while in Labrador and for Québec. Figure 17-1 presents the dry sizing plant flowsheet.

FIGURE 17-1 DRY SIZING PLANT FLOWSHEET



PRIMARY CRUSHING

High-grade iron ore mineralization will be reclaimed from stockpile and delivered to the feed bin by a front-end loader with a load capacity of approximately 13 t. The front-end loader will discharge into the feed bin of the crusher trailer. The bin is fitted with a vibrating grizzly screen with 50 mm openings. Oversize from the screen is directed via a chute to the primary jaw crusher with a closed side opening set to 100 mm. The primary jaw crusher discharges onto a short conveyor belt where the material combines with the grizzly screen undersize via a transfer chute.

The product from the mobile crushing unit is discharged into a mobile surge bin with live capacity of 30 t that feeds the primary screen feed conveyor, which lifts the material to the primary screen. The primary screen oversize (+31.5 mm) discharges onto a conveyor belt that conveys it to the secondary crusher, while the undersize (-31.5 mm) is directed to the secondary screen. The secondary screen oversize (-31.5 mm +6.3 mm) reports to a mobile stacker conveyor as a final lump product, and the undersize (-6.3 mm) reports to a mobile stacker conveyor as a final sinter fines product.

SECONDARY CRUSHING

The primary screen oversize (+31.5 mm) discharges onto the secondary cone crusher feed conveyor. The crusher will have a closed sized setting of approximately 50 mm and discharges through a chute onto a conveyor belt which carries the material back to the primary screen where any remaining +31.5 mm material will be recycled to the secondary crusher.

UTILITIES

The utilities required for the plant will include:

- A van trailer for the motor control centre (MCC) and plant controls.
- Fuel tanks for the power plant fuel (10,000 L capacity).
- Power required for the dry sizing plant and local facilities (e.g., mine maintenance facilities, site administration buildings, pumping, and other local infrastructure) is estimated at 1,500 kW. This will be achieved through a central power plant with 3+1 configuration of 500 kW skid-mounted diesel generators. A transformer will increase voltage to 13.8 kV for site distribution.
  - A second equivalent set of generators is specified for installation in Year 2 as a backup; during operations, both units will be utilized with alternating service, with replacement at 25,000 hrs (approximately mid-life of the mine and in conjunction with the dry sizing plant relocations).
  - Stand-alone portable generators will be utilized at the rail siding and for remote pit locations (primarily for providing power to dewatering pumps).

18 PROJECT INFRASTRUCTURE

LIM's Schefferville Projects benefit from established and extensive infrastructure including railway service, roads, airstrip, hydro power, multiple work camp facilities, laboratory facilities, and the nearby town of Schefferville.

The Houston Project's Malcolm property, in Québec, and Houston property, in Labrador, are located approximately 12 km and 15 km southeast of Schefferville respectively. Both properties are accessible from an existing public gravel road. Approximately five kilometres west of the Houston property and in Labrador, is the Houston Project's proposed and previously permitted rail siding, adjacent to the existing TSH main line. The rail siding is accessed via an approximately 6.5 km proposed and previously permitted haul road. Further to the west is the historic Redmond pit, which is proposed and permitted for use as a water collection (discharge) facility and involves construction of an additional 1.5 km of road for access.

There is currently no existing infrastructure at the Houston Project site, other than the below noted dry materials landfill site. Right-of-way clearing of trees was previously completed for the haul road and rail siding.

The following is a summary list of the proposed infrastructure for the Houston Project:

- Houston and Malcolm pits and associated access roads.
- Explosives and magazine facilities (provided by explosives contractor).
- Waste, overburden, and low-grade stockpile material storage areas and associated access roads.
- Dry sizing plant facilities (mobile / modular facility to be located in Labrador for sizing of Houston property iron mineralization and located in Québec for sizing of Malcolm property iron mineralization). The dry sizing plant details are presented in Section 17.
- Sample preparation trailer (prepared samples will be shipped offsite for contract assaying).
- Site power primary diesel generator, backup generator, and site distribution (details presented in in section 17).
- Site haul roads.
- Rail siding.
- Water management infrastructure including dewatering wells, as required, for open pit water management, in-pit sumps, surface water collection and diversion ditches,

and sedimentation ponds. In addition, the option exists to construct an overland discharge pipeline to the Redmond open pit site, for storage of water in the historic Redmond pit.

- Fuel storage (day tanks only – fuel will be despatched by a contracted truck service from Schefferville) and distribution facilities.
- Maintenance shop (portable soft-sided building) including warehouse facilities.
- Hazardous waste storage area (for waste oil, filters, batteries, etc.).
- Mobile trailer type offices and lunchroom, including mine rescue and first-aid station.
- Mobile trailer type mine dry facility.
- Wastewater leach field for sewage management.
- Parking areas.
- Security signage and gates.
- Storage and laydown areas.
- Communications system including internet and radio system.
- Existing dry materials landfill site (LIM owns a dry materials landfill site approximately two kilometres south of the intersection of the proposed Houston Project product haul road and the public road to the Menihek dam site).
- Proposed use of the existing camp facility at Bean Lake at 144-person capacity (contracted service).

Figure 18-1 presents a general site layout at the end of the mine life and prior to rehabilitation and closure activity.

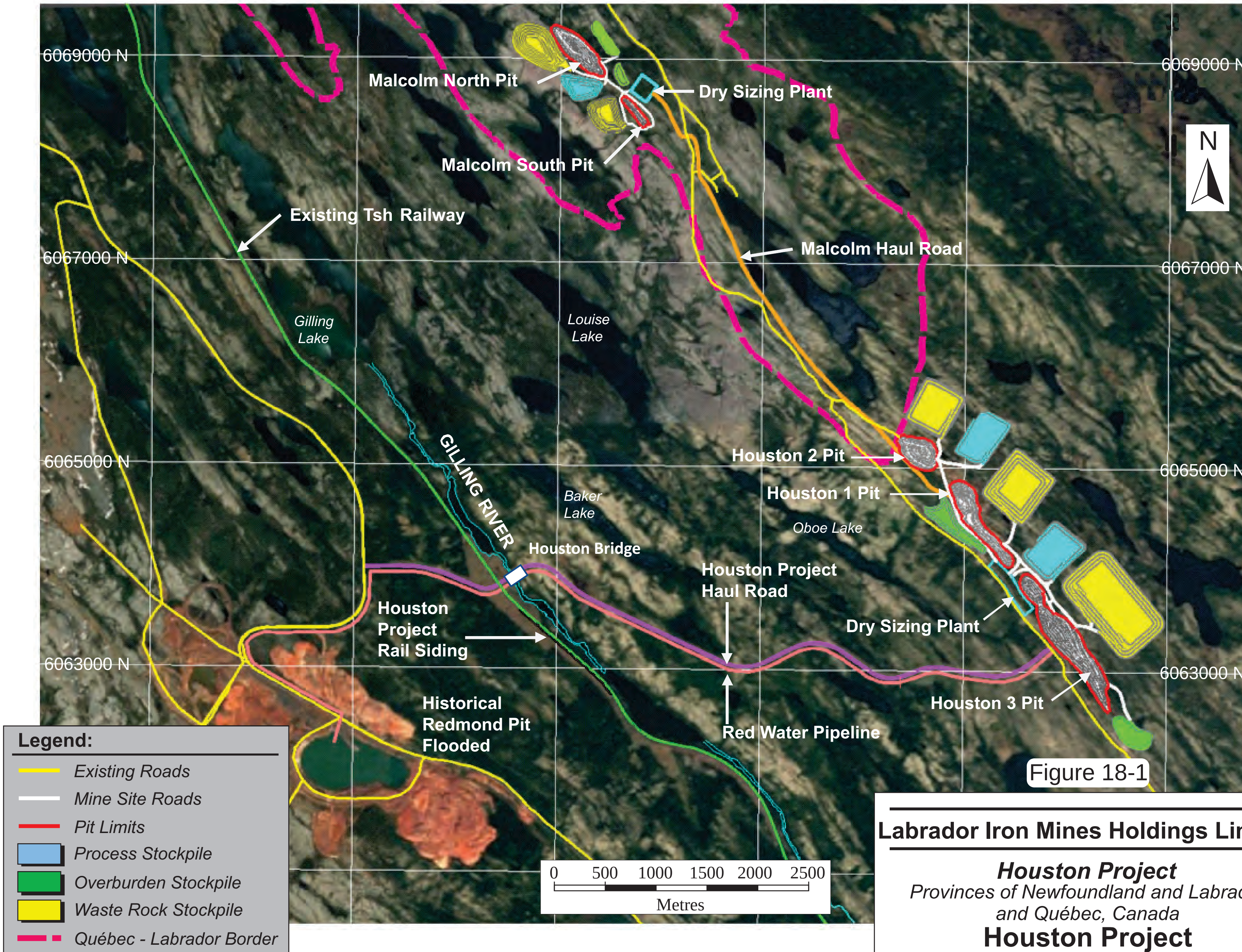


Figure 18-1

Labrador Iron Mines Holdings Limited

Houston Project

Provinces of Newfoundland and Labrador and Québec, Canada

Houston Project General Site Layout

February 2021

Source: RPA, 2020.

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HAUL ROADS

The Houston and Malcolm properties are connected via an existing public gravel road, which traverses through the properties. From northwest to southeast along a linear trend, the proposed mining areas are the Malcolm north pit and Malcolm south pit in Québec, followed by the Houston 2, Houston 1, and Houston 3 pits in Labrador.

Distances between the various proposed pits from north to south are as follows:

- The Malcolm north pit and Malcolm south pit are separated by approximately 280 m.
- The Malcolm south pit to Houston 2 pit is approximately 3.9 km.
- The Houston 2 pit to Houston 1 pit is approximately 220 m.
- The Houston 1 pit to Houston 3 pit is approximately 130 m.
- In total, from the north end of the Malcolm north pit to the south end of the Houston 3 pit, it is approximately 8.7 km.

MINE SITE HAUL ROADS

A mine haul road approximately 7.0 km long is proposed to connect the Malcolm property dry sizing plant area to the Houston property dry sizing plant area (the Malcolm haul road), which will parallel the existing public road. The existing public road will remain open for public use during operation of the mine, however, access will be controlled as the mine site haul roads cross the public road in multiple locations and to restrict access during blasting activity.

The Malcolm haul road will be constructed to support two-way traffic for the proposed haul truck, with an operating width at approximately 10 m. As access to the starter pit areas already exists, the Malcolm haul road will be built from suitable non potential acid generating (PAG) waste rock from RoM open pit operations. Prior to placement of the roadbed material, the right-of-way will be cleared of vegetation and any overburden materials will be salvaged and stockpiled for reclamation use.

Construction of the Malcolm haul road would begin in Year 5, in time to relocate the dry sizing plant to the Québec site and begin mining operations in Year 6 on the Malcolm deposits.

Additional mine site haul roads accessing material stockpile facilities and the dry sizing plant will be built in a similar fashion.

Other than the proposed realignment of Houston Creek for the development of the Houston 3 pit, there are no crossings of major drainages required for any of the mine site roads development.

HOUSTON PROJECT PRODUCT HAUL ROAD

The proposed Houston Project product haul road will be approximately eight kilometres in total length; all components of the proposed haul road were previously permitted, as described in Section 20.

The product haul road will be used to transport the dry sizing plant production from the mine site to the proposed rail siding adjacent to the existing TSH railway mainline. The right-of-way would also support the water pipeline from the mine site to the Redmond water storage pit if required (RPA notes for the currently proposed dry sizing plant, the water pipeline will not be required). In addition, once built, it will become the primary access route for the Houston Project.

The product haul road starts at the approximate mid point of the proposed Houston 3 pit, traversing west northwest, below the southeast end of Oboe Lake towards the Gilling River. A major crossing over the Gilling River is proposed, with a timber decked steel bridge spanning approximately 40 m. After the Gilling River bridge, there will be a controlled crossing of the TSH railway main line and entrance to the proposed Houston Project rail siding and loadout facilities.

The portion of the Houston Project product haul road from the mine site to the rail siding is approximately 6.5 km and will be full width at approximately 10 m to support two-way traffic for the proposed haul truck, except for the Gilling River bridge, which will be single lane. The maximum design gradient is at 8% uphill and downhill and the maximum allowed speed limit along the dedicated haulage road is 60 km/hr.

From the rail siding to the historic Redmond pit is an additional approximately 1.5 km of new and existing road, which will be constructed for light vehicle traffic at approximately six metres wide (also suitable for one-way traffic for the proposed haul truck). Along this segment the road aligns with the existing Schefferville to Menihek Hydro Dam power station access road and Schefferville is approximately 15 km by road to the north.

The Houston Project product haul road has been designed to minimize earthworks requirements and overall it is a balanced cut and fill with all excavated rock for road cuts used as road backfill and surfacing. The product haul road has a maximum gradient of 8%. Access to the product haul road will be controlled through security checkpoints to be installed as trailers at each end of the road. Signs will be established every kilometre along the road and all vehicles using the road will be radio equipped.

Tree clearing for the Houston Project product haul road was completed in 2014. Construction of the product haul road is proposed to take approximately four months, with completion in July, corresponding to the start-up of process operations. Development can proceed on multiple fronts as there is existing access from both ends.

HAULAGE OPERATIONS

Haulage of the lump and sinter fines products from the dry sizing plant to the rail siding will be performed with a fleet of 40 t payload capacity diesel-powered heavy-duty haul trucks, which are readily available and have a well supported dealer network. The proposed haul trucks are the same as proposed for use in the RoM mining operations, thus increasing flexibility in operations dependent on operating conditions and or short-term production requirements. In addition, the same truck platform is proposed for numerous service vehicles, such as the water truck.

Haulage of lump and sinter fines products will be performed year round on the same shift schedule as the mining and plant operations (two 12 hour shifts per day). Reduced monthly haulage quantities have been assumed for an approximate one-month period each year to allow for road stabilization during freshet. From approximately December to May when heavy freight is not being transported by rail, the lump and sinter fines products will be stockpiled at the rail siding.

A fleet of six trucks has been estimated for the haulage operations when the dry sizing plant is located in Labrador, increasing to eight trucks when the dry sizing plant is located in Québec. In addition to the haul trucks, road maintenance vehicles are required including a motor grader, water truck (same platform as the haul truck), a small excavator, and compactor. The estimate of maintenance vehicles is dedicated to the haul road and rail siding, however, can be used to provide backup service in the mine on a part time basis if required. Maintenance of the fleet will be performed by the mine maintenance department.

Haulage cycle time, including waiting times, loading, hauling, scaling, dumping, and return, is estimated at approximately 30 minutes when the dry sizing plant is located in Labrador and 45 minutes when the dry sizing plant is located in Québec.

Loading of the haul truck at the dry plant site will be by front end loader. A 540 hp class front end loader is proposed, which can three-pass load the haul trucks at approximately 13 wmt per pass. The same loader will also feed the primary crusher feed hopper from the ROM stockpiles. A second equivalent loader will be available on standby, to ensure plant and haulage operations can continue uninterrupted. Of note, the same front-end loader make and model will be utilized at the rail loadout.

Total personnel for the haulage operations, including truck loading, maintenance, and shift foremen, who cover both the truck haulage and train loading operations, ranges from approximately 55 persons when hauling from Labrador, up to 71 persons when hauling from Québec.

If electric power from the Menihek Hydro dam power grid is available, the QP recommends consideration for use of a battery electric version of the recommended haul truck. RPA notes battery electric modification packages currently exist for the proposed truck, and initial deployment of a single unit could be completed, prior to committing to a larger fleet.

The QP also recommends consideration for use of an aerial tramway for transporting product from the dry sizing plant in Labrador to the rail siding. This would eliminate the need for a full-size haulage road, while tramways are proven to operate in winter climatic conditions. In addition, power could be supplied by either diesel generator or from the Menihek Hydro dam power grid.

Part of the consideration for incorporating power supply from the Menihek Hydro dam power grid is historically this grid power has typically been available in the summer months only, as all capacity is required in Schefferville during the winter due to the additional electric heating requirements.

MATERIAL STORAGE AREAS

Numerous mine waste material and process stockpiles are located adjacent to the proposed pits, as described in further detail in Sections 16 and 17. Sufficient capacity exists for all mined materials, including storage of the PAG Menihek shale waste rock, which requires special handling as described in Section 20. Overburden material suitable for reclamation will be salvaged and stockpiled in separate facilities.

MINE SITE SUPPORTING INFRASTRUCTURE

No permanent structures will be required for the Houston Project, although a temporary maintenance shop and warehouse will be established, fuel storage tanks at the dry sizing plant and the rail siding, as well as a portable office, lunchroom, security, and first aid facilities. Initially, potable water will be tanked to site, however, longer term potable water may be obtained from a well. Wastewater will be disposed of in a leach field to be constructed in the construction year.

As all buildings will be portable and modular, there will be no concrete foundations required, with standard wooden cribbing utilized instead on a suitably prepared gravel pad. All of the buildings, including cribbing, will be removed upon completion of operations.

MAINTENANCE SHOP

A maintenance workshop, and yard facilities, will be established adjacent to the dry sizing plant. This facility will be used to conduct major repairs and minor routine and preventative maintenance on the mobile equipment. A suitable portable dome structure will be used for this facility, with a mobile crane utilized for heavy lifts.

On-site storage of small retail size quantities of hydraulic oils and other materials will be required for mine vehicle and equipment maintenance. Petroleum/oil/lubricant (POL) transport, storage, use, and disposal will be conducted in accordance with applicable legislation and all workers will be trained in LIM's environmental, health and safety policies and procedures for working with these materials. Spill kits will be available at key locations on site and workers will be trained in their use and other emergency response procedures. Secondary containment or double walled tanks will be provided as appropriate. Used oils and hazardous wastes, such as batteries, will be transported to Labrador City by train for disposal.

FUEL STORAGE

Primarily diesel fuel will be consumed during operations. Based on the operation's road access and close proximity to Schefferville, primary fuel storage will be performed by a local supplier in Schefferville, with scheduled fuel deliveries to various site facilities on a daily basis when in operation. Diesel fuel will be delivered to Schefferville by the regular TSH Railway freight service, as arranged by the local supplier.

Fuel storage tanks on site will be sized to hold approximately three days of fuel consumption, with "day storage" areas as follows:

- Dry sizing plant site power generators – 10,000 L capacity.
- Mine operations and truck haul (located at dry sizing plant) – 40,000 L capacity.
- Rail siding rail loadout operations – 5,000 L capacity.

Diesel fuel consumption during full years of production is estimated to range from 4.5 ML per annum to 6.5 ML per annum, with the fluctuation due primarily to differences in waste stripping ratio during mining operations.

As an alternate to diesel power site generators for powering the dry sizing plant and site facilities, the QP recommends consideration for electric power supply from the Menihek dam power station, via LIM's existing substation/transformer (or relocated facility).

WAREHOUSE AND LAYDOWN YARD

A small warehouse/storage facility and laydown yard is designated for storage of critical spares, tires, wear parts, and lubricants/oils for mining, plant, and support equipment.

COMMUNICATIONS

All operating equipment and vehicles will be equipped with two-way radio systems. This radio system will be available within the maintenance shop and offices. A transmitter/receiver station including antenna tower and housing for radio communication equipment will be required. The location of the tower will be selected to optimize communication transmissions over the entire Houston Project area. Telephone and internet connections will be provided through satellite service.

MINE SITE WATER MANAGEMENT

Mine pit dewatering will be completed through a combination of in-pit dewatering wells and in-pit sumps. The anticipated flow rates during initial operations can range from 185 USgpm when the bench elevation of the pit is 580 MASL to 3,600 USgpm when the bench elevation is at 450 MASL. LIM owns used high-density polyethylene (HDPE) pipeline of various diameters stored at its Silver Yards site. The pipeline is from LIM's previous operations and is suitable for use on the Houston Project, offsetting a portion of pipeline costs.

PIT DEWATERING WELLS

It is anticipated that one to five deep wells will be required per pit area. For initial operations at Houston 1 and Houston 2, the deep wells will be tied into a single header pipeline running around the perimeter of the pits. The dewatering well water will be routed downstream from the pit along Houston Creek and discharged into the creek via an energy dissipation pad. Houston Creek flows south from the proposed Houston 1 and Houston 2 pit areas and makes its way to Astray Lake. The location of discharge into the creek has been selected to ensure that flooding does not occur. The non-contact water is expected to meet Total Suspended Solids (TSS) requirements and not require treatment.

Detailed plans are not yet in place for the Malcolm and Houston 3 pits, however, a similar strategy is proposed for the dewatering wells.

CONTACT SURFACE WATER

Contact surface waters from the roads, stockpiles, or other disturbed areas around the pit, and the in-pit sump water will be collected in ditches and routed to a main sump area. The contact surface waters may exceed TSS requirements for discharge; thus they are collected and stored prior to discharge to allow time for settling of suspended solids to meet water discharge requirements. Once mining has advanced sufficiently in the Houston 1 and Houston 2 pits, the pit bottoms will become available for additional water storage capacity. The QP recommends an update to the surface water management plan based on the proposed localized handling and treatment of surface contact water.

HOUSTON CREEK

Prior to commencing mining operations at Houston 3 in Year 8 of operations, Houston Creek will require realignment. For the PEA, it is proposed that the creek will be diverted by open ditch and pipeline where required and routed around the Houston 3 mine infrastructure back to its downstream channel to continue to Astray Lake. Real time monitoring of creek flows will be performed to ensure minimum natural flow levels are maintained. The QP recommends advancing planning and discussions with the Federal and Provincial authorities and local First Nations on the proposed development as soon as possible so as not to risk development delay of Houston 3.

RAIL SIDING

The Houston Project proposes building a new rail siding approximately two kilometres northeast of the historic Redmond pit, adjacent and parallel to the TSH mainline track. The rail siding will include gates for controlled access, a truck scale, fuel storage, storage shed for light maintenance, surface water management, a train loading area, and stockpile areas for lump and sinter fines products.

The Houston Project rail siding will connect to the existing TSH mainline track by switches located at the north and south end of the siding. The siding will consist of two parallel tracks for loading and rail car movement, as well as a southern end stub track for switching. The total amount of track to be built is approximately 3.3 km, including five switches. The loading area is approximately 1.2 km long and is designed to accommodate 82 iron ore gondola cars with the parallel track holding the remaining cars.

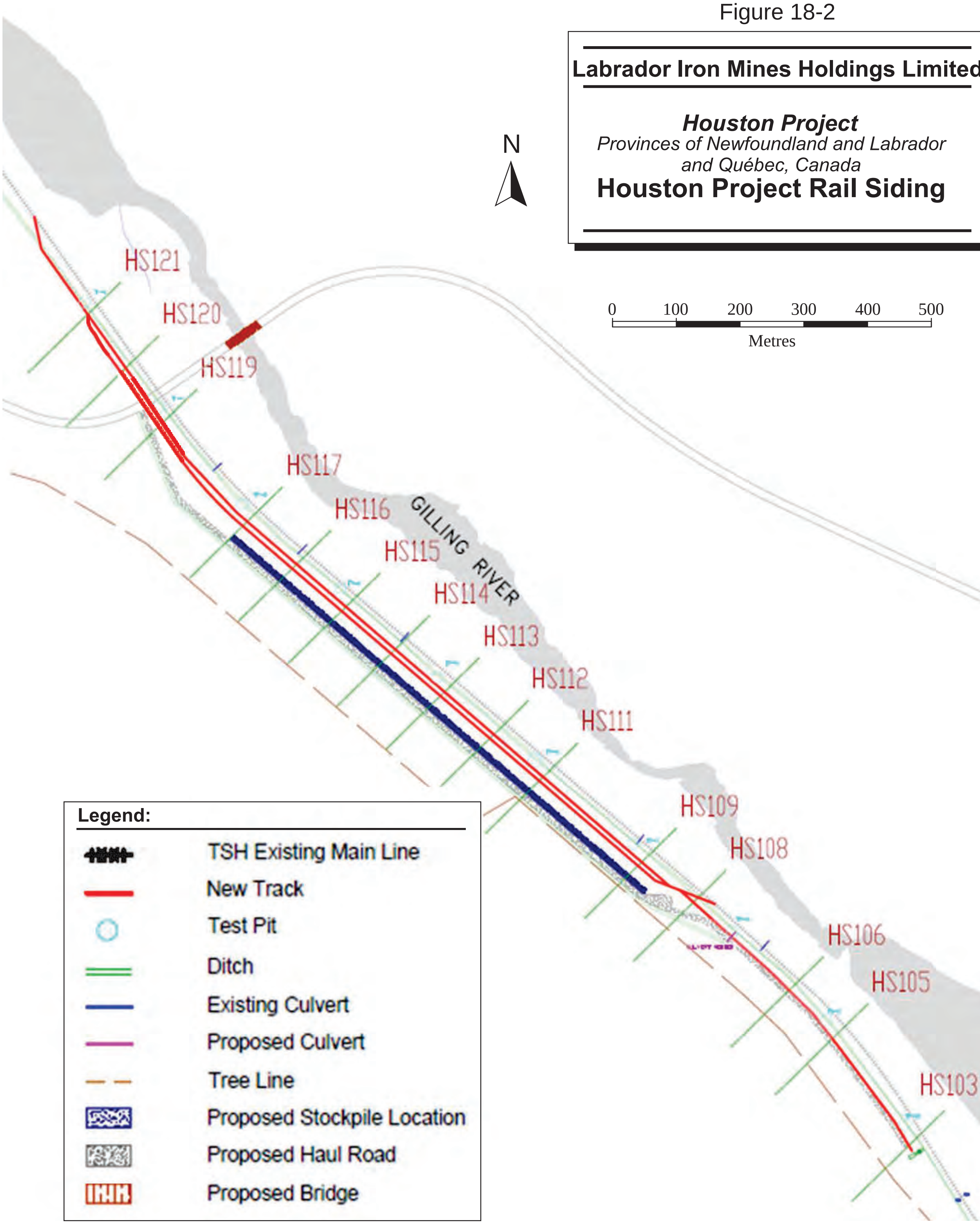
The lump and sinter fines product stockpiles will be constructed parallel to the loading track, offset by approximately 20 m to allow space for the loading units to operate. From December through April when iron trains are not operating, the stockpile will be built up in a single lift up to 10 m high. Capacity for over 350,000 cubic metres (over one million dry tonnes of product) is available. A 360 Hp class track dozer is specified for stockpile management, operating on the same shift schedule as the haul trucks. Figure 18-2 shows a plan view of the Houston rail siding area.

Figure 18-2

Labrador Iron Mines Holdings Limited

Houston Project
Provinces of Newfoundland and Labrador and Québec, Canada

Houston Project Rail Siding



February 2021

Source: LIMH, 2020.

Train sets of standard “North Shore” iron ore gondola cars will consist of 164 cars with a payload capacity of up to 106 wmt each. In a typical year, rail transport of iron ore products will be conducted over 200 days between May and December. Trains transporting iron ore products are not run from December to April, as the payload can freeze during transport negatively impacting unloading operations and heavy freight during this period increases the risk of track and rail bed damage and increased maintenance from extreme colds and soft conditions during freshet. At the proposed production rate of 2.0 Mdmtpa, approximately 126 full trains will be loaded per annum, or, one full train is required to depart each 1.6 days on average.

The Houston Project products will be loaded on the gondolas using two 540 hp class front end loaders equipped with weightometers. Lump and sinter fines products will be loaded separately. Train loading will be performed by LIM staff. The front-end loaders will seven pass each gondola, loading approximately 14 wmt per pass for 101 wmt per gondola and 16,600 wmt per typical train. Loading of a full train set, including shunting, is expected to take 12 hrs (one full shift) to complete. A third equivalent front-end loader will be available on stand-by at the rail siding during train loading operations to ensure two units are available during the shift at all times. RPA notes the rail loadout front end loader fleet will use an equivalent make and model as at the plant site, however, the fleet is dedicated to the rail load out during loading operations.

From the dry sizing plant RoM stockpile through processing, product haul, and stockpiling at the rail siding, to loaded onto the gondolas, RPA has assumed a total product loss of 1.5%.

Total LIM personnel for the rail siding and train loading operations on average is estimated at seven persons. In addition to LIM personnel, four train operators will be required (two per shift) to operate the trains while on the LIM rail line, which will be contracted through LIM’s train operator. Shift supervision of the rail siding operations will be performed by the truck haul shift foreman and maintenance will be overseen by the mine maintenance department.

Tree clearing for the Houston Project rail siding was completed in 2014. Construction of the rail siding and associated infrastructure is proposed to take approximately four months with completion in July of Year 1. Overall, the siding area earthworks has been designed as a balanced cut and fill.

The QP recommends consideration for using the Redmond property rail right-of-way for the Houston Project's rail loading operations. Although a longer product haul is required (approximately 1.5 km greater), the Redmond property rail right-of-way was formerly used for loading iron ore trains and includes a rail loop at the end to turnaround, versus the current proposed operation, which requires the train to be split multiple times. The improved efficiencies in loading operations, along with potentially lower capital cost building off an existing rail bed, would potentially offset the additional cost of the incremental truck haul.

SITE DRAINAGE

An existing ditch running next to the TSH mainline track will be maintained and continue to be used for water drainage. Additionally, a diversion ditch will be constructed to the west of the yard to catch all surface water from entering the site minimizing surface run-off with suspended solids. All surface water in contact with the product stockpiles will drain with topography south to an excavated basin and rock dam, acting as a filter, before re-entering the existing ditch. If collected surface water is not in compliance with TSS discharge limits, the collected water can be pumped to the Redmond water storage pit.

OFFSITE CONTRACT SUPPORT

EXPLOSIVES SUPPLY

It has been assumed that all ROM production will require blasting prior to excavation. Explosives supply will be provided by an explosives contractor. The explosives contractor will be responsible for supplying the initiation devices and delivering the explosive down-the-hole, along with obtaining and complying with the required permit(s) and/or approval(s) under the Natural Resources Canada Explosive Regulatory Division. The explosives contractor will ensure that blasting follows all provincial regulations while operating in Labrador and in Québec. It is anticipated that existing explosive storage and magazine facilities near Schefferville would be utilized, alternatively the explosive contractor could mobilize temporary facilities on site.

CAMP FACILITIES

There is an existing modular trailer camp facility, the Bean Lake camp, along the Menihek Hydro Dam power station access road, between Schefferville and the proposed rail siding. The camp was formerly owned by LIM and used during LIM's historic operations. For the Houston Project construction and operations, it is proposed to utilize the camp on a contract basis.

The Bean Lake camp has 144 rooms and is capable of accommodating up to 288 persons operating on a four-crew cycle on a single person per room occupancy basis. Additional accommodation is available in Schefferville. Camp occupancy is estimated to range from a low of 82 LIM operations personnel in Year 1 to 127 in Year 8, averaging approximately 115 over the LoM, thus sufficient capacity exists at the Bean Lake camp for LIM operations personnel as well as camp operating staff and any additional LIM personnel not directly related to operations (e.g., Schefferville Projects exploration and development).

LABORATORY

Sample preparation will be performed by LIM personnel on site in a sample preparation trailer. Analytical services for assaying of primarily blasthole samples and iron ore product samples will be provided on a contract basis. It is envisioned that either a mobile trailer type facility will be set up adjacent to the Houston property dry sizing plant or prepared samples will be dispatched to an accredited facility.

19 MARKET STUDIES AND CONTRACTS

For the past two years the benchmark iron ore price (62% Fe fines CFR China, dry metric tonne basis) has often exceeded US$100/dmt. This has been a function of both supply disruptions and steady and increasing demand from China, which shows no signs of declining.

In January 2020, the price temporarily declined to approximately US$80/dmt, due to the initial impact of the COVID-19 pandemic, which caused a short-term curb in China's steel production due to public health measures. By mid-February 2020, China's steel production began to increase again, based on significant government stimulus programs and an improving domestic public health situation. By July and for the remainder of 2020, China's industrial output surpassed all expectations, with daily run-rates for steel production hitting all-time highs as state spending accelerated and the nation's producers fed rising demand in such sectors as construction and automobiles.

On the supply side in 2020, Brazil was particularly hard hit by the COVID-19 pandemic, which exacerbated by earlier dam failures, interrupted the country's iron ore production resulting in a tight supply in the global iron ore market.

The cumulative impact of robust demand in China and tight supply has led to a significant increase in the benchmark price of iron ore over the past year. In February 2021, the price reached US$170/dmt, representing the highest price in more than six years, while the three year trailing average is at US$90/dmt.

Market commentators are generally confident that continuing strong demand from China will support a robust iron ore market. Going forward, a significant global economic recovery driven by COVID-19 recovery stimulus programs expected worldwide in 2021 should create strong demand for steel production and a supportive price floor for benchmark iron ore at approximately US$100/dmt.

The Houston Project is proposed to produce direct shipping iron ore mineralization for both lump and sinter fines products, which can be marketed globally. An attractive attribute of the Houston Project is the extremely low sulphur levels in the iron ore mineralization. The QP recommends further testing of potential iron ore products to improve knowledge of the chemical and physical characteristics to support potential for further premium pricing options if available.

MARKETS

Global iron ore supply and demand in 2019 was approximately 2,500 Mt, of which 1,650 Mt was seaborne trade. Annual production forecasts for the Houston Project at approximately 2.0 Mdmtpa represent significantly less than 1% of global production and the Houston Project production is not expected to impact market pricing.

The largest iron ore producing countries in the world continue to be Australia, Brazil, and China. While Chinese production is largely captive to the local steel industry, Australian and Brazilian producers participate primarily in the global seaborne trade. The Indian seaborne trade has nearly been eliminated due to domestic demand and government intervention. European iron ore producers typically supply the European market only, while iron ore producers in the United States typically sell domestically as well.

Iron ore production in the Schefferville area was traditionally sold to steel producers in the United States (1950's to 1980's) with transportation by rail to Sept-Iles and seaborne shipments through the St. Lawrence seaway. The steel market around the Great Lakes remains a potential target market for products from the Houston Project. The rail transportation season for the Houston Project aligns with the seaway's seasonal operations.

The four largest producers in the world (Vale, Rio Tinto, BHP Billiton, and Fortescue) account for more than 70% of the seaborne trade and have been responsible for almost the entire new seaborne iron ore capacity that has come into the market in the past decade. Currently, there are a limited number of sizable supply additions coming into the market, and those that are expected to enter have been fully anticipated for some years and are expected to replace lost production from aging mines with declining quality, implying a broadly balanced market in the medium term.

CRUDE STEEL MARKET

All the iron ore produced in the world today is primarily used to manufacture crude steel for use in construction, infrastructure development, automotive production, and the manufacturing and energy industries. World steel production has historically grown in line with world GDP. The trend in steel production is forecast to continue growing, and by 2022, global steel production is forecast to be 5.7% higher than the 1.7 billion tonnes produced in 2018. Over the last decade, China has accounted for the greatest increase in crude steel demand and currently represents approximately 50% of global steel production. Chinese steel production grew at 2.3% in 2018; this added the equivalent demand for 40 Mdmt of iron ore.

IRON PRICE BASIS

The Houston Project Mineral Resources have been estimated using a benchmark iron ore price of US$100/dmt, based on long-term independent forecasts from banks and financial institutions.

The Houston Project PEA cash flow uses a benchmark iron ore price of US$90/dmt. The benchmark price was adjusted to account for the following:

- Lump premium: US$10/dmt.
- Penalties for deleterious elements: US$1.50 per 1.0% silica above grade threshold of 4.0%.

CONTRACTS

Iron ore was traditionally sold via long term contracts that specified certain volumes that the steel producer must take, and the producer must supply. Historically (pre-2004) spot iron ore sales were minor, and the majority of iron ore was sold on through the benchmark system. This changed in 2010 with volumes still on contracts but shorter duration. Pricing is based upon the IODEX, based upon 62% iron fines delivered CFR China. China has been the primary driver behind demand growth.

The Houston Project assumes the sale of its iron products at the proposed rail siding south of Schefferville on an FOB basis. The offtake buyer would assume title to the products at this point and be responsible for transporting the products by rail to the port of Sept-Îles, with all port charges, and ocean freight charges to the offtake buyer. The offtake buyer would assume all risk associated with changes in commercial terms related to transporting the products to a final customer. A fixed price including consideration for potential premiums and penalties would be paid to LIM at the rail siding to ensure a minimum return to LIM on its invested capital.

Adjustments due to an increase in the benchmark pricing above the base case price would be reconciled with a 50%-50% price participation arrangement.

In addition to iron ore mineralization sales contracts, the Houston Project will require operations contracts for various services on site, including:

- Explosive supply.
- Camp facilities.
- Personnel transportation.
- Assay laboratory services.
- Exploration drilling (excluded from the PEA).

20 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

TECHNICAL SUMMARY

The Houston Project is a part of LIM's Schefferville Projects and as such is a continuation of LIM's previous operations and ongoing activity in the Schefferville area. LIM has indicated that the company will build on the studies, knowledge, and experiences gained in the Schefferville Projects and will develop the Houston Project in accordance with LIM's environmental and corporate policies and procedures.

The Houston Project consists of the Houston property, which includes the Houston 1, Houston 2, and Houston 3 Mineral Resources, located in Labrador, and the Malcolm property, which includes the Malcolm Mineral Resources and is contiguous to the northwest and located in Québec as shown in Figure 18-1. The PEA proposes development of the Houston Project in phases, with operations starting with Houston 1 and Houston 2, followed by the development of Malcolm and Houston 3.

The Houston Project site is currently undeveloped, with activity currently limited to vegetation clearing of the product haul road right-of-way and the rail siding and train loading area. The Houston Project proposes open pit mining of high-grade iron ore mineralization from the estimated Mineral Resources, processing of said mineralization with a semi-mobile dry sizing plant, a dedicated haul road and train loading area, and support infrastructure. It is planned for the mineralization to be processed on site in the province in which it is mined, initially in Labrador and with the dry sizing plant relocated to Québec for proposed Malcolm operations.

LIM has established policies, practices, and procedures addressing environmental, social, health, and safety aspects.

LIM initiated environmental baseline data collection programs in 2005 in the Schefferville Projects area, including the Houston Project area, and the programs are ongoing. The programs include: traditional environmental knowledge; land use studies; heritage and archaeological resources; wildlife (including Caribou); natural history; avifauna; terrestrial and aquatic habitat and vegetation; fish and fish habitat; air quality; species at risk; noise and vibration; acid rock drainage (ARD) potential; surface and groundwater quality; and geochemistry.

LIM has adopted a staged approach to regulatory permitting for the proposed Houston Project, whereby mining and processing will begin on the Houston 1 and 2 deposits, which was released under the Newfoundland and Labrador Environmental Protection Act and the Canadian Environmental Assessment Act. Houston 1 and 2 received regulatory approval for operations in 2014, along with various other permits required to begin construction. In general, the permits and approvals are still in good standing and only require administrative activation to re-activate. Malcolm and Houston 3 are at an earlier stage in planning.

The proposed Houston Project plans to mine Houston 1 and 2 deposits in the first half of the LoM, allowing adequate time for regulatory approval of the Malcolm and Houston 3 deposits prior to their proposed start of production in Year 6 and Year 8 of the production schedule respectively. Additional environmental assessment and permitting will be required for the development of Malcolm and Houston 3.

LIM believes that Houston 3 will likely be released under both the federal and provincial environmental assessment processes with the submission of a Project Registration document, as was the Houston 1 and 2 Project, and that approval could be obtained within a period of 12 to 18 months. It is anticipated that the environmental assessment of Malcolm will take longer, however, the timeframe will be reasonable in relation to the proposed production schedule.

The Houston 1 and 2 Project Registration document (LIM, 2011) provides information on Houston 1 and 2, including available baseline information, addresses some of the potential future effects of Houston 1 and 2, and discusses environmental and social management measures. The Houston 1 and 2 Project Registration document concludes that overall construction, operation, and decommissioning are not likely to result in significant adverse environmental effects on the valued environmental components (VEC) identified. In addition, no significant adverse cumulative effects were identified for Houston 1 and 2, while it was noted that Houston 1 and 2 will result in socio-economic benefits.

An Environmental Protection Plan (EPP) (LIM, 2012a) was compiled for Houston 1 and 2 and approved by the regulator, Newfoundland and Labrador Department of Environment and

Conservation (DOEC) and describes the management measures to be instituted for the Houston 1 and 2 Project. A Waste Management Plan has also been developed. A Newfoundland and Labrador Benefits Plan, including a Women's Employment Plan, has also been approved by the provincial government and is formally in place.

LIM has engaged in community and public consultation activities including consultation with Indigenous communities in both Labrador and Québec, in the Schefferville and surrounding areas since 2008 and has committed to continue to do so. The communities most directly affected by the Houston Project include the Innu Nation of Labrador, the Naskapi Nation of Kawawachikamach, the Innu Nation of Matimekush-Lac John, the Innu Nation of Takuaikan Uashat Mak Mani-Utenam (ITUM), and NunatuKavut Community Council (formerly the Labrador Métis Nation).

LIM entered into Impact Benefit Agreements or Economic Development Agreements (collectively, IBAs) with the four First Nation peoples asserting traditional and native rights to all or part of the area of the Schefferville Projects. LIM also entered into an Economic Partnership Agreement with the NunatuKavut Community Council, representing the Southern Inuit of Labrador.

The primary mine waste produced will be waste rock and collected surface contact water. It is currently proposed that waste rock will be stored on the surface for the Houston Project, however, opportunities may exist to backfill exhausted pits in the future once the full extent and development of the resources are known. One waste rock lithology, namely the Menihek shale, has the potential to generate ARD and poor-quality leachate. A materials handling plan has therefore been developed to manage the Menihek shale.

Surface contact water will be collected during the PEA proposed operations and treated locally in sedimentation ponds prior to authorized discharge to the environment. Included in the Houston 1 and 2 Project proposal is the construction of a water pipeline and associated pumping infrastructure from the mine site to the historic Redmond pit for storage and treatment of collected contact water. This pipeline exists as an alternate option to the PEA proposal for treatment of water locally.

A rehabilitation and closure plan has been developed for the Houston 1 and 2 Project and approved by the provincial regulator (DNR). This plan includes closure and rehabilitation costing for which LIM must provide financial assurance prior to the commencement of construction. For the PEA, similar rehabilitation and closure methods are proposed for Malcolm and Houston 3.

LIM has a proven track record for planning, developing, operating, and closing an iron ore mine in the Schefferville region of Labrador, namely the James Mine and its Silver Yards processing facilities (dry and wet processes). LIM is in the final stage of completing the rehabilitation and closure requirements for the James Mine and Silver Yards.

ENVIRONMENTAL STUDIES

Detailed baseline reports for the Houston Project area have been compiled. In addition, the following documents outline the baseline conditions, potential impacts, and management measures for the Houston Project:

- Project Registration for the Houston 1 and 2 Deposits Mining Project (LIM, 2011).
- Houston 1 and 2 Deposits Mining Project Environmental Protection Plan (Supplemental to the Schefferville Area Iron Ore Mining Project Construction and Operation Activities EPP) (LIM, 2012a).
- Technical Report Mineral Resource update of the Houston and Malcolm 1 Property (SGS, 2013).

ENVIRONMENTAL AND SOCIAL SETTING

LIM initiated baseline data collection programs in 2005 in the Schefferville Projects area and these programs are ongoing. These include programs in traditional environmental knowledge, heritage and archaeological resources, wildlife, avifauna, fish and fish habitat, air quality, noise and vibration, ARD potential, surface and groundwater quality, and geochemistry. Several baseline studies have also been conducted specifically over the Houston Project area, including archaeological studies, sound and vibration, avifauna, fish and fish habitat, wildlife, aquatic and terrestrial habitat.

Key baseline information is summarized below (SGS, 2013; LIM, 2011; Aecom 2011; Intermesh Enterprises, 2011; Parks Environmental, 2011a, b; Geochemico Consulting Inc., 2013; WESA, 2013) for the Houston Project area:

- Location: The Houston 1, 2, and 3 deposits are located in Labrador, approximately 20 km southeast from the town of Schefferville, Québec. Malcolm lies north of the Houston deposits, within Québec.
- Nearest communities: The closest community is Schefferville, Québec. Schefferville was established by the IOC in 1954 to support mining operations in the area and now includes Matimekush-Lac John. Other nearby communities include Kawawachikamach in Québec; and Labrador City / Wabush and Happy Valley – Goose Bay in Labrador. Socio-economic baseline data was collected from both primary sources through personal and telephone interviews with key informants with groups and agencies at the community, regional and provincial levels, as well as from secondary sources such as a census database.
- Geology: The Houston 1 and 2 deposits represent two separate areas of iron enrichment with a continuously mineralized zone of over two kilometres in strike length, which remains open to the south. These deposits are stratigraphically and structurally controlled, and consist of hard and friable banded, blue, and red hematite that locally becomes massive. Manganese mineralization occurs in relatively low concentrations.

  Geochemical testing of representative rock samples, as well as geochemical modelling was conducted in 2013. The key results include (Geochemico Consulting, 2013):

  - Menihek Shale is likely to generate ARD immediately upon extraction for slightly more than one and a half years.
  - Acid digest tests found potential contaminants of concern to be silver (Ag), arsenic (As), bismuth (Bi), selenium (Se), and tellurium (Te), however, Ag, Bi, Se, and Te were determined not to be soluble by further testing and were ruled out as elements of concern. Arsenic remains as a potential element of concern.

  These results were then used to develop a plan to manage leachate generated by Menihek Shale in the open pit operations and after mine closure. These management plans include placement of the rock in a dedicated area of waste rock on a bed of compacted benign waste rock, applying lime to the open pit sump, managing any leachate generated, and regular monitoring. Additional kinetic testing will also be conducted during operations. At closure, the plan is to flood the open pits and possibly backfill some of the pit areas.

  Geochemical characterisation must still be conducted for the Malcolm property area.
- Permafrost: Permafrost has not been identified within the Houston Project area.
- Air quality: There is no industry in the area and background concentrations of air contaminants are expected to be minimal. Fugitive dust levels in the area may be slightly higher due to the use of predominantly dirt roads for transportation.

  An ambient air quality monitoring program was conducted between August and October 2009 to monitor average daily concentrations of Total Suspended Particulate (TSP) levels at Houston. All but one of the nine samples were well below (no more than 41% of) the Newfoundland and Labrador Department of Environment and Conservation (NLDEC) ambient air quality standard for TSP (120 µg/m^3). The remaining sample, from October 7, 2009, was slightly above the NLDEC TSP standard (139 µg/m^3), however, there was no drilling activity at the

Houston site on this day and this level is therefore considered to represent ambient conditions.

Habitat: Houston 1, 2, and 3 are situated at the southern edge of the forest tundra. The area has been subject to surface disturbance associated with historical exploration activities. The predominant habitat type in the area is Black Spruce/Lichen Woodland. The Malcolm property is comprised of upland, wetland and disturbed areas. Open white spruce with moss woodland are the dominant vegetation types in the upland areas. The wetlands are predominantly fen wetlands. Terrestrial and wetland communities observed were considered common and typical of the Province of Québec.
Various field surveys were undertaken to identify the presence of wildlife species. These include wildlife and vegetation surveys conducted in August 2009, two caribou surveys conducted in May 2009 and May 2010, and additional surveys conducted by AECOM during the summer 2011.

- Rare plants: No federally protected plant species listed under Schedule 1 of the *Species at Risk Act* (SARA) or provincially protected under the *Newfoundland and Labrador Endangered Species Act* (NLESA) have been identified or are suspected to occur in the Houston 1 and 2 area. One provincially rare plant was observed in the Malcolm area in 2011, *Geum macrophyllum*, but this species is not protected.

  It is noted that there were insufficient timber volumes to consider the Houston 1 and 2 area suitable for the harvest of merchantable timber.

- Wildlife: Various field surveys have been undertaken to identify the presence of wildlife species in the vicinity of the Houston Project area. These include wildlife and vegetation surveys conducted on the Houston Property in August 2009, two caribou surveys conducted in May 2009 and May 2010 and surveys during the summer 2011 of the Malcolm property. No animal species at risk were identified, however, the area does overlap with the range of the migratory George River Caribou Herd (GRCH). There is no evidence of sedentary caribou near the area reported in the Project Registration document, however, this document does note that they were reported historically. The Committee on the Status of Endangered Wildlife in Canada listed the sedentary caribou populations of Labrador as "Threatened". Caribou surveys conducted in May 2009 and May 2010 showed no use of the area by caribou at that time. A caribou skull and antlers were found in the Malcolm property area during a 2010 survey, but this is not clear evidence of the presence of caribou since these could have been moved there.

  The Malcolm property area was determined to have the lowest diversity of bird species and the lowest density compared with the other properties surveyed for the Houston Project. The Rusty Blackbird was identified in the Malcolm area and is listed as having special concern with COSEWIC (Committee for the Status of Endangered Wildlife in Canada) and listed as vulnerable provincially.

- Surface water. A major watershed flow divide exists between Houston Lake and the proposed Houston 1 and 2 open pit areas. Drainage in the Houston Lake catchment area flows northwest as part of the Knob Lake catchment, which is part of the larger Ungava Bay drainage basin watershed. Drainage from the Houston 1 and 2 open pit areas and the area of the Houston-Redmond road is within the Astray Lake catchment and within the Petitsikapau catchment, both part of the Churchill River drainage basin watershed.

The Houston 1 and 2 area has two surface water features, Tom's Pond and Houston Creek. Tom's Pond is a small surface water feature with no connection to any other surface water systems. The Houston Creek also traverses the Houston 3 footprint.

Water quality monitoring in and around the Houston property area was reported to be completed annually since 2008. Surface water from Tom's Pond indicated that in-situ water quality parameters during late winter months are extremely anoxic and correspond to freshwater criteria exceedances for the protection of aquatic life in aluminum, iron, copper, magnesium, nickel, and zinc. Houston Creek surface water samples indicated that the aesthetic value for colour and magnesium Drinking Water Quality standard is occasionally exceeded at various times of the year and was attributed to the seasonality of the associated wetlands.

The Houston product haul road corridor will cross the Gilling River and a tributary. Sampling in these rivers found total zinc concentrations in exceedance of Freshwater Criteria. There has been no known disturbance within the road corridor that could explain the noted zinc values and so this was considered to be representative of naturally occurring baseline conditions.

Third party water users were not identified in the Houston 1 and 2 Project Registration document.

- Groundwater: Five groundwater test wells (TW1 to TW5) were installed in the Houston 1 and 2 area in 2010 and 2011. Test wells TW1, TW2, TW4, and TW5 are low yielding wells. TW3 was found to be a very good producing well. Water quality observations made during a long-term pumping test indicated that groundwater is very clear. No actual monitoring data (groundwater depth and quality) was presented and third-party water users were not identified in the Project Registration document.

  WESA conducted further field data collection in 2010 and 2012 and this included borehole drilling and pump testing. Groundwater flow was determined to flow from Houston 1 and 2 northeast towards Houston Creek, with some discharge into the local surface water features, and southeast along the bedrock valley. Groundwater immediately east of the creek is expected to flow approximately southwest towards the creek and then southeast along the bedrock valley. Groundwater depth ranged from less than one metre to 10 m. Water quality sampling was conducted in five boreholes and the data was presented but was not compared to applicable guidelines or standards. The highest concentrations reported include calcium ranging from 760 mg/L to 3,220 mg/L, magnesium 259 mg/L to 3,390 mg/L, potassium 180 mg/L to 1,360 mg/L, and silicon 1,000 mg/L to 3,400 mg/L. PH ranged from 5.59 to 8.93. The WESA study also estimated pit inflows based on pump tests (WESA, 2013).

- Fish and fish habitat: Houston 1 and 2 is not expected to impact existing fish habitat and will maintain a 15 m buffer from fish bearing habitat observed at Houston Creek that originates to the northeast of the resource deposits. Houston Creek contains a low productive cold-water fishery with the presence of brook trout being noted during various field surveys in this first order stream (AECOM 2010 as cited in LIM, 2011). Due to the anoxic conditions and the remoteness of Tom's Pond with no surface connectivity to any fish bearing habitat, it has been determined that it is highly unlikely that this pond contains fish habitat and is not considered fish habitat by Department of Fisheries and Oceans (DFO). Malcolm Lake is fished seasonally where launch areas are known by local people north of the Malcolm property. Two small streams were identified as providing fish habitat and potentially a migratory corridor to the lake, as well as providing high quality salmonid spawning habitat for the existing Brook Trout population.

- Heritage resources: A Stage 1 Historic Resources Overview Assessment was completed in June 2008 prior to commencement of exploration activities. In 2011, an archaeological assessment was conducted of the proposed Houston 1 and 2 haul road route options. No archaeological or cultural sites are known or registered in the Houston 1 and 2 area, and the studies found that there is a low potential for historical resources to occur in the area. Stage 1 and 2 surveys were also conducted in the Malcolm property area. No archeological sites were found however some features of the modern period were identified. These include a Hudson's Bay survey post likely used in the 1940 and 1950s, and several old trenches cut to expose iron ore ridges. In terms of heritage resources, there is a memorial erected just north of the Malcolm property, which commemorates the loss of a local First Nations member.

Current activities on site are limited to vegetation clearing for the establishment of drill pads, trenching, and a bulk sample pit. The right-of-way for the permitted Houston product haul road and the permitted rail siding have also been cleared. There is an existing public gravel road that provides direct access to the open pit areas. LIM reports that currently no personnel are on site.

ENVIRONMENTAL ASSESSMENT

The environmental assessment (EA) of the Houston 1 and 2 Project, which included the product haul road and railway siding, entailed the filing of an enhanced Project Registration document in December 2011, under the Newfoundland and Labrador Environmental Assessment Regulations, 2003, the Environmental Protection Act, and the Canadian Environmental Assessment Act. This document identified VECs on the basis of a scoping exercise, to form the basis of the environmental and social effects assessment. These included (LIM, 2011):

- Caribou as they have important cultural and recreational benefits for residents.
- Other wildlife and protected habitats.
- Employment and business due to potential concern that economic benefits accrue to local communities, Labrador, and the Province as a whole. This includes benefits to the population and economy as a whole and to underrepresented groups.
- Communities as the socio-economic environment may be affected. The communities most likely to be affected are the primary places of residence of the

proposed labour force: Labrador West, Upper Lake Melville, Schefferville, and Kawawachikamach.

The potential environmental effects were assessed for the Houston 1 and 2 Project and included potential cumulative effects as well as effects that could result from malfunctions or accidental events that may occur in connection with the development. The assessment considered the spatial scale, frequency of occurrence, duration of effect, magnitude of effect, reversibility, and likelihood of occurrence of each identified potential effect. Residual effects (after mitigation) were also considered.

ALTERNATIVES CONSIDERED

The Houston 1 and 2 Project Registration document included a brief discussion on the following alternatives considered (LIM, 2011):

- Two options were considered for the construction of the product haul road connecting Houston 1 and 2 to the Redmond 1 mine site and proposed rail siding.
- Two sites were considered for a previously proposed wet beneficiation plant; however, this PEA report does not address the wet beneficiation plant as it is not currently included in the Houston Project.

IDENTIFICATION OF ENVIRONMENTAL AND SOCIAL RISKS

The EA methods implemented for the Houston 1 and 2 Project Registration document were consistent with those used in the Schefferville Area Mine Environmental Impact Statement (EIS) (LIM 2009) and were intended to (LIM, 2011):

- Focus on issues of greatest concern.
- Address regulatory requirements.
- Address issues raised by the public and other stakeholders during project-specific consultation.
- Integrate engineering design, mitigation, and monitoring programs into a comprehensive environmental management planning process.

Potential environmental and social effects identified and assessed in the Houston 1 and 2 Project Registration document include (LIM, 2011):

- The loss or reduction of potential caribou and other wildlife habitat from site clearing, and/or sensory (e.g., noise) disturbance. This change in habitat can also result in an alteration of caribou movements specifically and distribution into lower quality habitat, and enhanced susceptibility to predation. In addition, hunting pressure on caribou and other wildlife could be increased as a result of improved access, and mortalities could occur through collisions with vehicles or other equipment.

- Positive economic effects, both direct and indirect, resulting from providing local employment and business opportunities; providing an important opportunity for participation by the Innu Nation of Labrador and women in the provision of services, businesses, employment and training; increasing the capacity and skills of local labour force and businesses, in advance of projects; and facilitating further mining development by putting in place these new labour and business capabilities, thereby making existing and new Labrador projects more competitive globally.
- Potential adverse effects on communities were considered to be reversible and not significant. This was based on the predicted low level of increased demand on social and physical infrastructure, including health care, and use of a commute system and accommodations camp for non-local workers.

The Houston 1 and 2 Project Registration document concluded that overall construction, operation, and decommissioning are not likely to result in significant adverse environmental effects on any of the VECs identified. No significant adverse cumulative effects were identified, however, it was noted that the proposed development would result in socio-economic benefits.

The Environmental Protection Plan (EPP) for Houston 1 and 2, subsequently approved by DOEC, includes management measures and protocols to addresses the potential effects identified in the Project Registration document.

CUMULATIVE IMPACT ASSESSMENT

Cumulative effects were considered as part of the project-specific environmental effects analyses in the Houston 1 and 2 Project Registration document. Other projects or activities that were determined to potentially interact cumulatively with Houston 1 and 2 include the NML Elross Lake Mine (now TSMC Timmins Area mining operations), increased railway traffic as a result of the Bloom Lake Railway, Alderon's proposed Kami development, and LIM's mine operations at James, Redmond, and Silver Yards. RPA notes LIM's former operations at James, Redmond, and Silver Yards, have been dismantled and rehabilitated in the case of Redmond, while rehabilitation is mostly complete at James and Silver Yards, and LIM does not plan to renew these operations. The assessment of cumulative environmental effects included consideration of (LIM, 2011):

- Temporal and spatial boundaries.
- Interactions among the Houston 1 and 2 Project's environmental effects.

- Interactions between the Houston 1 and 2 Project's environmental effects and those of existing projects and activities.
- Interactions between the Houston 1 and 2 Project's environmental effects and those of planned projects and activities.
- Mitigation measures employed toward a no-net-loss or net-gain outcome (e.g., recovery and restoration initiatives that can offset predicted effects).

No significant adverse cumulative effects were predicted to occur as a result of the construction and operation of the Houston 1 and 2 Project.

CONCLUSION OF IMPACT ASSESSMENT

Following a review of the Registration Document, the Newfoundland and Labrador Minister of Environment and Conservation informed LIM that, in accordance with the Environmental Protection Act, Houston 1 and 2 were released from further EA, subject to a number of conditions. The Canadian Environmental Assessment Agency (CEAA) also determined that the Houston 1 and 2 Project was not subject to the *Canadian Environmental Assessment Act* and no Federal EA was required.

LIM has complied with the conditions of the provincial Environmental Release as follows:

- The Schefferville Area Iron Ore Project Environmental Protection Plan was updated to include the Houston 1 and 2 Project.
- A hydrogeology study was completed and dewatering rates determined.
- LIM plans to enter into a Memorandum of Understanding with the Water Resources Management Division to establish a real time water quality monitoring network once the Houston 1 and 2 Project is sanctioned,
- The Schefferville Area Iron Ore Project NL Benefits Plan and the Woman's Employment Plan were updated to include the Houston 1 and 2 Project.
- LIM completed a request for review under the Fish Habitat Protection Provisions of the Fisheries Act which was submitted to Department of Fisheries.
- LIM obtained the required permit for the construction and operation of a railway.

An environmental impact assessment, including an assessment of any cumulative impacts, has not yet been conducted for the Malcolm and Houston 3 portions of the Houston Project.

In February 2013, LIM filed an Environmental Registration document with the Government of Newfoundland and Labrador and a Project Description document with CEAA for the proposed development of a wet beneficiation plant. In April 2013, CEAA notified LIM that a Federal EA was not required and in May 2013, the Newfoundland and Labrador Minister of Environment and Conservation released the development of the wet beneficiation plant from the Provincial EA process, subject to conditions. RPA notes that the proposed development of the wet beneficiation plant is not part of the current Houston Project.

PROJECT PERMITTING

LIM has provided the following key points in regard to regulatory approval for the Houston Project, which has been planned in three stages:

- Stage 1: Regulatory approval for the Houston 1 and Houston 2 deposits in Newfoundland and Labrador was completed in 2014. This includes the mine pits, dumps, roads, plant, and rail siding, although some permits have expired and will need to be renewed or applied for again. LIM holds a Certificates of Approval for the construction of all components of the Houston 1 and 2 Project. The proposed Houston Project plans to mine Houston 1 and 2 deposits in the first half of LoM.
- Stage 2: Will address regulatory approval for the Malcolm deposits in Québec. The Malcolm deposit lies south of the 55th parallel and as such is subject to the Chapter 1 of the Québec Environmental Quality Act (EQA) EIA process. Under the EQA, mining projects with a production capacity of less than 7,000 tpd are exempt from the comprehensive environmental assessment and approval procedure and as such only require an environmental certificate of authorization with no public hearings; this process would typically not exceed 15 months. If Malcolm is deemed to require an EIA, a certificate of authorization in accordance with Section 31.5 of the EQA will be required; typically this process takes 36 to 40 months. In addition Malcolm will also be filed under the Canadian Environmental Assessment Act. If a comprehensive environmental assessment is required, a cooperative environmental assessment committee, composed of representatives of both levels of governments, would be set up.
- Stage 3: Will address the regulatory approval for the Houston 3 deposit in Newfoundland and Labrador. LIM anticipates that the Houston 3 Project is likely to be released under both the federal and provincial EA processes with the submission of a Project Registration document and would be completed within a period of 12 to 18 months, similar to the Houston 1 and 2 process.

The major component of the EA and approval process for the Houston 1 and 2 Project was completed with the release of the Houston 1 and 2 Project from both the provincial and federal EA processes. This allowed the remaining permitting of the Houston 1 and 2 Project to proceed. Subsequently, LIM obtained all the permits and approvals required to allow construction and operation of the Houston 1 and 2 Project. It is noted that some expired permits will need to be renewed or applied for again, however, LIM believes this to be a simple administrative process. LIM provided a list of significant permits and approvals relevant to the

Houston 1 and 2 Project, and subsequently the Houston Project, dated December 31, 2020, as summarized in Table 20-1.

LIM further indicated that the major permits obtained for the Houston 1 and 2 Project include the following:

- A Certificate of Approval for the construction of the Houston Haul Road was issued by the Newfoundland and Labrador Department of Environment and Conservation (DOEC) on January 3, 2013.
- A Certificate of Approval for the construction of the Houston Rail Siding was issued by the DOEC on March 28, 2013.
- Approval of the Development, Rehabilitation and Closure Plan for the Houston Haul Road by the Mineral Development Division, Department of Natural Resources (DNR) was issued on January 3, 2013.
- Approval of the Development, Rehabilitation and Closure Plan for the Houston Rail Siding by the Mineral Development Division, DNR was issued on March 28, 2013.
- Approval of the Development, Rehabilitation and Closure Plan for the Houston 1 and 2 Pits and Infrastructure by the Mineral Development Division, DNR was issued on December 3, 2014.
- A permit pursuant to Section 2 of the NL Rail Service Act (2009) for the construction of a railway line (Labrador Iron Mines Houston Railway Line), by the NL Department of Transportation and Works was issued on August 13, 2013.
- Approval under the Federal Navigable Waters Protection Act for the construction of a bridge across Gilling River by Transport Canada was issued on July 17, 2013.
- A Certificate of Approval for the construction of the Houston Pits and Infrastructure was issued by DOEC on February 17, 2016.

According to LIM, as per the standard practice of the DOEC, the Certificate of Approval for the operation of the Houston 1 and 2 Project will be issued upon the commencement of construction. Similarly, the operating permit for the Houston Railway Line will be issued by the Newfoundland and Labrador Department of Transportation and Works, following inspection and certification of the completed railway line.

Stage 1 of the permitting process for the Houston Project (i.e., the Houston 1 and 2 Project), was completed in 2014. As noted above, the proposed Houston Project schedule plans to mine the Houston 1 and 2 deposits in the first half of the LoM (Years 1 to 6), thus allowing adequate time for regulatory approval of stages 2 and 3, to enable the Malcolm and Houston 3 deposits to be ready for production starting in Year 6 and Year 8 of the production schedule respectively.

TABLE 20-1 LIST OF ENVIRONMENTAL PERMITS AND APPROVALS (AS OF DECEMBER 31, 2020)
Labrador Iron Mines Holdings Limited – Houston Project

Permit/Approval	Project Component	Regulator /Agency	Date Submitted	Date Permit Issued / Approved	Expiry Date
PHASE 1					
Release of Environmental Assessment	Houston 1 and 2	Department of Environment & Conservation (DOEC) - Environmental Assessment (EA) Division	December 20, 2011	March 26, 2012	NA
Environmental Protection Plan	Houston 1 and 2– condition of EA release	DOEC - EA Division	April 11, 2012	May 29, 2012 & June 5, 2012	NA
NL Benefits Plan	Houston 1 and 2– condition of EA release	DOEC - EA Division	April 13, 2012	June 1, 2012	NA
Women's Employment Plan	Houston 1 and 2– condition of EA release	DOEC - EA Division	April 13, 2012	June 1, 2012	NA
Real Time Water Quality Monitoring	Houston 1 and 2– condition of EA release	DOEC		March 27, 2013	March 31, 2016
Hydrogeological Study	Houston 1 and 2– condition of EA release	DOEC Water Resource Division	April 11, 2013	Pending	NA
Mineral Rights & Mining Lease	Houston 1 and 2	Department of Natural Resources (DNR) – Mineral Land Division	April, 2013	September 26, 2012	September 26, 2017 and September 26, 2037
Surface Lease	Houston 1 and 2	DNR – Mineral Lands Division	Feb. 9, 2012	Oct 5, 2012	
Permit to Construct Non-Domestic Wells – HSDW3-5 & HMW1-5	Houston 1 and 2	DOEC – Water Resource Division	March 7,2011	June 8, 2011	June 8, 2012
Water Use Licence - HSDW3-5 & HMW1-5	Houston 1 and 2	DOEC – Water Resource Division	March 10,2011	June 8, 2011	December 31, 2015
Cutting, Operating and Burning Permit	Haul Road and Rail Siding	DNR - Forestry Division	March 28, 2012	April 2, 2012	December 31, 2012
Fording	Haul Road - cutting	DOEC - Water Resources Division	March 30, 2012	May 17, 2012	May 17, 2014

Permit/Approval	Project Component	Regulator /Agency	Date Submitted	Date Permit Issued / Approved	Expiry Date
Work Within 15 m	Haul Road - cutting	DOEC - Water Resources Div.	March 30, 2012	May 17, 2012	May 17, 2014
Letter of Advice	Haul Road and Rail Siding – culvert and bridge installation	Department of Fisheries and Oceans (DFO)	April 4, 2012	May 9, 2012 & July 4, 2102	NA
Geotechnical Investigation	Haul Road, Rail Siding	DNR - Mineral Lands Division	April 19, 2012	October 12, 2012	September 30, 2013
Bridge Installation	Haul Road	DOEC - Water Resources Division	May 1, 2012	September 18, 2012	September 18, 2014
Culvert Installation	Haul Road	DOEC - Water Resources Division	May 14, 2012	September 18, 2012	September 18, 2014
Culvert Installation	Rail Siding	DOEC - Water Resources Division	May 23, 2012	September 18, 2012	September 18, 2014
Development, Rehabilitation & Closure Plan	Haul Road	DNR – Mineral Development Division	June 4, 2012	January 3,2013	NA
Development, Rehabilitation & Closure Plan	Rail Siding	DNR – Mineral Development Division	September 5, 2012	March 28, 2013	NA
Development, Rehabilitation & Closure Plan	Houston 1 and 2 Pits Infrastructure	DNR – Mineral Development Division	April 26, 2013	December 3, 2014	NA
Operating Permit	Rail Siding	Department of Transportation & Works	June 22, 2012	August 13, 2013	NA
Navigable Waters	Haul Road – Gillings River	Transport Canada	May 9, 2012	July 17, 2013	NA
Certificate of Approval (C of A) for Construction	Haul Road & Siding	Department of Environment & Conservation (DOEC) – Pollution Prevention Division	December 12, 2012	January 4, 2013	No Approval Required as per DOEC
Certificate of Approval (COA) for Construction	Pits and Infrastructure	DOEC	February 17, 2014	February 17, 2016	NA

ENVIRONMENTAL PROTECTION PLANNING

Management measures, including monitoring and follow-up actions were determined for each potential effect identified in the Houston 1 and 2 Project Registration document. The main documents aimed at managing environmental and social effects include the Environment Protection Plan (EPP) and Waste Management Plan (WMP) as described briefly below:

- The EPP outlines practical procedures required for all personnel, contractors, or suppliers to reduce or eliminate potential adverse environmental effects associated with the Houston 1 and 2 Project. The EPP outlines roles and responsibilities for the company, the designated Vice President of Environment and Permitting, the General Manager of Menihek Operations, the Site Health, Safety, and Environment Manager, as well as contractors, subcontractors, LIM representatives, and site personnel.
- The WMP provides direction on waste handling, storage, transport, and treatment of various waste produced.

LIM has indicated that these management plans will be revised to include Houston 3 as required. Management plans for Malcolm will be developed during the permitting process compliant with Québec legislation.

The Houston 1 and 2 EPP addresses aspects such as minimizing disturbance; establishment of buffer zones to protect habitat and wildlife; vegetation clearing protocols; dust management; erosion prevention and sediment control; dewatering management; storage, handling and transfer of potentially polluting substances; waste management; traffic management; noise control, drilling and blasting protocols; and management of wildlife such as caribou. Water management is also described in the EPP and will consider regulatory requirements under the Metal Mine Effluent Regulations (these have been revised and are now known as the Metal and Diamond Mining Effluent Regulations), provincial Certificates of Approval, and Environmental Control Water and Sewage Regulations. Water management will involve:

- Separation of clean and dirty water.
- All water coming in contact with mine workings, infrastructure, or waste will be controlled and handled to ensure no free water release from the site during construction or operations.
- Water that comes in contact with mine workings, infrastructure or waste rock will be controlled, monitored, and treated to ensure that any chemistry (TSS, hydrocarbons, pH, metals, etc.) is maintained below regulatory release requirements.

- Reuse and recycling of water will be maximized across the site to minimize the use and impact of clean water resources.
- A real time water quantity and quality monitoring program will be established on site.
- Disturbance or alteration to existing water resources will be minimized.

The EPP also includes contingency planning for fuel and hazardous material spills, wildlife encounters, forest fires, and discovery of historic resources. The Houston 1 and 2 Project Registration document also indicates that the Schefferville Area Iron Ore Project Emergency Response Plan applies to Houston 1 and 2.

These management plans will be updated, as necessary, to reflect any required changes and enforced for the duration of the proposed operations. Prior to commencing operations all workers will be properly trained in the WMP, EPP, and emergency procedures and responsibilities.

It is noted that the Houston 3 pit footprint will impact on a section of the Houston Creek and the potential impacts of this will need to be properly assessed and management measures included in the EPP as appropriate. The Malcolm infrastructure will also lie within relatively close proximity of a watercourse as well, and the pits may possibly encroach on a watercourse as per Figure 18-1. Negotiations may also be required with DFO regarding the potential impacts on fish habitat in Houston Creek resulting from the development of these projects. In this regard LIM proposes using the higher quality fish habitat and additional fish habitat created for the James Mine as part of the mitigation strategy to propose to the DFO.

The company will be required to report greenhouse gas emissions to Environment Canada when construction and operations commence.

During the current COVID-19 pandemic, it is considered relevant to note that LIM reports that the company has relevant protocols in place. There are currently no workers or employees engaged on-site at the Houston Project.

ENVIRONMENTAL MONITORING

Environmental Effects Monitoring requirements described in the Houston 1 and 2 Project Registration document (LIM, 2011) include:

- Monitoring of Caribou and wildlife activity within the Project area;
- Monitoring of Project employment and expenditures; and
- Environmental monitoring including air quality monitoring, avifauna monitoring, groundwater and surface water quality monitoring, and real time water monitoring.

Compliance monitoring, site inspection protocols, and environmental compliance standards are provided in the approved EPP.

As a condition of an Environmental Release, the Houston 1 and 2 Project is required to implement a real time water quality and quantity monitoring network (refer to the Environmental Permitting section above and the table of permits provided).

The Houston Project is not required to implement any other monitoring programs at this stage, however, the monitoring requirements for the operation of the Project will be specified in the Certificate of Approval for Operation to be issued by the DOEC upon the commencement of project construction.

MANAGING MINE WASTE

It is currently proposed that waste rock will be stored on surface for the Houston Project, however, opportunities may exist to backfill exhausted pits in the future once the full extent and development of the resources are known. By example, waste rock from the Houston 3 open pit development could be used as backfill in Houston 1 to reduce the overall footprint for Houston 3. Suitable waste material may also be used for construction projects, such as the Malcolm product haul road.

One waste rock lithology, namely the Menihek shale, has the potential to generate ARD and poor-quality leachate. Materials handling plans have therefore been developed to manage the Menihek shale. These management plans include placement of the RoM rock in a dedicated area of waste rock storage on a bed of compacted benign waste rock, applying lime to the open pit sump, managing any leachate generated, and regular monitoring. Additional kinetic testing will also be conducted during operations.

Permanent waste rock and overburden will be stockpiled and contoured in a manner that conforms to provincial guidelines and regulations. Where applicable, waste rock storage areas will be built up in lifts to limit the overall dumping height. The stockpiled materials will be managed to limit the possibility of suspended solids being introduced into site drainage or adjacent waterbodies. Overburden (organic material) will be used during site reclamation to support re-vegetation (LIM, 2011).

ENVIRONMENTAL ORIENTATION AND TRAINING

The Houston 1 and 2 EPP describes how orientation and ongoing awareness training will be implemented. All workers will receive an orientation from an immediate superior prior to the start of any new activity and thereafter on an as-needed basis. All new personnel arriving at the site during the construction and operations phases will also receive an orientation. The orientation will include a presentation on environmental protection procedures to be applied to all work.

The impact assessment and management measures and plans from the initial development phase of Houston 1 and 2 will be developed for Malcolm and Houston 3, incorporating any new data and experience from the initial development phase of Houston 1 and 2 and in compliance with relevant legal requirements.

REHABILITATION AND CLOSURE

LIM prepared a rehabilitation and closure plan for the Houston 1 and 2 Project covering the open pits and infrastructure in May 2014. This plan was amended in June 2014 for the haul road change and November 2014 for changes to the rail siding. The original plan and the two amendments were approved by the DNR.

The plan includes progressive rehabilitation during operations, rehabilitation measures at closure, and post-closure monitoring and treatment. The plan is noted to be a "live document" and updated regularly. The overall objectives of the rehabilitation and closure activities proposed for Houston 1 and 2 include (LIM, 2014a):

- Restoration of the land to as close to a natural state as possible.
- Creation of a landscape which is compatible with surrounding terrain and land use.
- Mitigation and control to within acceptable levels, the potential sources of pollution, fire risk, and public liability.
- Provision of an environment and landscape that is suitable for long term public access and use.

The plan outlines rehabilitation and closure activities aimed at achieving both physical and chemical stability of the entire Houston 1 and 2 Project area based on a progressive rehabilitation approach, followed by a comprehensive closure and environmental effects monitoring program (LIM, 2014a). Specific objectives are provided for physical and chemical stability, natural aesthetics, re-vegetation and wildlife, water management, air quality, noise levels during rehabilitation, and long-term land use.

The open pits will be decommissioned through a sequence of events designed to help ensure their long-term stability. The pit walls will be excavated to a stable slope angle during mining operations. Flooding of the pit will be allowed to occur naturally from groundwater inflows and precipitation. The total estimated time to flood the pits is approximately six years after which the pits are expected to overflow. Pit water will be monitored on a regular basis as flooding proceeds. Pit benches will be graded and contoured above and just below the final water surface for safety and access over portions of the pit perimeter. The overflow water will be directed into Houston Creek via an engineered ditch/channel lined with riprap. Adequate erosion control measures will be investigated prior to closure. It is currently proposed that waste rock will be stored on surface for the Houston Project, however, opportunities may exist to backfill exhausted pits in the future once the full extent and development of the resources are known.

The overburden and waste rock stockpiles will be designed for closure and benched, with waste placement in tiers starting at the lowest elevation. Organic materials will be used over the life of the mine for use in progressive rehabilitation and in the final closure phase. Associated drainage infrastructure will be maintained until the pile surface areas are stabilized then rehabilitated.

Potential land use options after closure being considered include commercial and industrial use, agricultural, residential, recreational, and forestry uses. LIM indicates in the plan that all potential land use options will be evaluated throughout the Houston 1 and 2 Project life and will be detailed in the final rehabilitation and closure document developed approximately 12 months prior to site closure.

LIM will undertake post-closure monitoring in consultation with the relevant regulatory agencies and following the relevant regulations and standards in place at the time.
The cost estimate to complete the Houston 1 and 2 – Open Pits and Infrastructure Rehabilitation and Closure program was determined to be approximately $1.9 million (LIM, 2014a). The cost includes a contingency, but excludes engineering and project management costs. The approval letters from the DNR indicate that the relevant financial assurances must be in place prior to commencement of construction.

Closure planning has not yet been addressed for the Malcolm and Houston 3 components of the Houston Project, however, RPA has assumed a similar program to that identified for Houston 1 and 2 for the PEA. On this basis, the total cost estimate for the Houston Project closure program, including Houston 1 and 2 estimated costs escalated to current costs, is approximately $8.4 million. This includes consideration for three years of post closure monitoring after the completion of operations.

It is relevant to note that LIM is in the final stage of successfully closing and rehabilitating its past-producing James Mine and its Silver Yards processing facilities. LIM therefore has a proven track record for planning, developing, operating, and closing an iron ore mine in Labrador. LIM reports that this work was conducted in accordance with an approved closure and rehabilitation plan prepared by an independent engineer. As a component of the fishery resources mitigation plan for the James Mine, a fish habitat enhancement project was successfully undertaken near the Redmond Mine. The enhanced habitat was considered higher value than the disturbed habitat at the mine site. In addition, the open pit at the former James mine has filled with surface water and is now accessible to fish.

PUBLIC ENGAGEMENT, EMPLOYMENT, AND COMMUNITY HEALTH

STAKEHOLDER ENGAGEMENT

LIM reports that it has been in continual contact with the First Nation communities with a stated interest in or historic connection to the area since early exploration activities in 2005. LIM also identified third parties living in cabins within the region and initiated communications with these stakeholders (LIM, 2011). LIM maintains contact with the civic administration of the towns of Labrador City, Wabush, Happy Valley-Goose Bay, and the town of Schefferville. LIM further states that stakeholder consultation activities in these communities included frequent meetings with Band Councils, Mayors and Councils, local businesses, local political representatives, local interest groups, provincial and federal regulators, educators, and a wide variety of consultants that are involved with stakeholders (LIM, 2011).

Stakeholder engagement has not been conducted recently for the Houston Project, however, once a definitive execution plan for the Houston Project is developed, LIM intends to re-establish community relations offices in local communities and will reactivate its stakeholder engagement plan for the overall Houston Project. LIM states that the company is dedicated to providing early and clear information to the community and working with all communities towards the common goal of positive, respectful, and sustainable development in the area (LIM, 2011).

EMPLOYMENT AND PROCUREMENT

As stated in the Houston 1 and 2 Project Registration document, LIM is committed to the creation and implementation of employment equity practices to help achieve maximum employment and training benefits for the region, including the recruitment, training, and advancement of qualified visible minorities and women, and, as such, has prepared a Women's Employment Plan which has been approved by the Environmental Assessment Division of the DOEC.

In 2014, LIM developed a Recruiting Action Plan for Houston 1 and 2 with approximately 214 jobs identified. The total number of jobs for the Houston Project described in this PEA could differ from the planning prepared in 2014. The recruiting plan aimed to optimize the utilization of the organization's people resources and to have available the required number of people with the appropriate qualifications, skills, and abilities to fill vacancies wherever and whenever they occur. The plan includes setting up career fairs at local schools and communities.

Employment and procurement issues are dealt with in the Newfoundland and Labrador Benefits Plan for the Houston Project. LIM's commitments include:

- Project employment targets representing minimum levels of employment for residents of the province, members of certain First Nations communities, and women.
- Goods and services procurement targets representing minimum levels of procurement from companies and suppliers in the province.

LIM established a Labrador Iron Mines Limited Newfoundland and Labrador Benefits Policy (Benefits Policy) that will apply to LIM and all Houston Project contractors and subcontractors and has developed the Newfoundland and Labrador Benefits Plan (LIM, 2012b) to implement the Benefits Policy. The Newfoundland and Labrador Benefits Plan and Women's Employment Plan will be applied to Houston 3. LIM states in this plan that it will implement an employment strategy that ensures residents of the province are given full and fair opportunity and first consideration for employment, and that the company will also implement training programs that allow for employment of residents within all levels of the Houston 1 and 2 Project. LIM also entered into an IBA with First Nation communities in which LIM has agreed to commitments and undertakings with regard to business opportunities, employment, and other matters.

LIM submitted regular employment and business reports on the Schefferville Area Iron Ore Mine in relation to the Newfoundland and Labrador Benefits Plan to the province providing year to date (YTD) percentages and 12-month rolling averages for all reportable criteria. The YTD employment summary reported for December 2013 showed that of the 193 workers employed through the year, 59% were residents of Newfoundland and Labrador, 16% were female, and 20% were aboriginal. The 12-month rolling average showed similar results (LIM, 2014d). The goods and services procurement data showed that the total expenses incurred in 2013 were approximately $96 million, of which $77 million (80%) was expended in Newfoundland and Labrador.

LABOUR AND WORKING CONDITIONS

It is assumed that approximately 20% of the Houston workforce will come from the local area, including Schefferville, as has been the case for previous LIM mining operations (James Mine). The remaining 80% will likely be based further afield in Labrador City, Happy Valley-Goose Bay, and other Newfoundland and Labrador communities, as well as from Québec, primarily Sept-Iles, Québec City, or Montreal, and will fly in and fly out of the operations.

The fly in and fly out personnel will be accommodated in a mine camp previously owned by LIM, but sold to a third party who now operates it. The majority of personnel would work on a two-week-on two-week-off schedule, working for 12 hours a day.

COMMUNITY HEALTH AND SAFETY

Based on LIM's prior operating experience, there will be a low level of increased demand on social and physical infrastructure, including health care, therefore the adverse effects on the communities associated with Houston 1 and 2 are not considered significant as stated in the Houston 1 and 2 Project Registration document. Key mitigation measures include (LIM, 2011):

- Use of a commute system and camp accommodations for workers.
- Minimizing time that commuting workers spend in communities while en route.
- Rigorous occupational health and safety provisions and implementation.

Monitoring of key community health indicators will not be conducted by LIM. LIM has indicated that monitoring of demands on community services and infrastructure is undertaken by the relevant government departments and agencies, as part of their normal planning processes. LIM will assist by liaising with such government departments and agencies, as requested, and through the timely provision of information about Houston Project activity and plans (LIM, 2011).

INDIGENOUS PEOPLES CONSULTATION AND ENGAGEMENT

As described in the Houston 1 and 2 Project Registration document, the Québec-Labrador Peninsula area has one of the most complicated patterns of First Nation settlement in eastern Canada with six or possibly seven First Nation peoples asserting traditional and native rights to all or part of the area of the Schefferville Projects.

The First Nation groups of the Québec-Labrador Peninsula most directly affected by the Houston Project include the Innu Nation of Labrador, the Naskapi Nation of Kawawachikamach, the Innu Nation of Matimekush-Lac John, the Innu Nation of Takuaikan Uashat Mak Mani-Utenam (ITUM), and NunatuKavut Community Council (formerly the Labrador Métis Nation). These groups may have overlapping land claims or traditional claims covering large area of western Labrador and eastern Québec (LIM, 2011).

LIM has consulted with First Nation communities extensively on all phases of the Schefferville Projects, as well as the Houston 1 and 2 Project, and obtained concurrence on the permits required for construction and operation activities (LIM, 2011). During the engagement process, the First Nations identified issues for LIM to consider. These included (LIM, 2011):

- Economic benefits and revenue sharing.

- Sustainable economic development within the region in order to provide employment and business opportunities for First Nation community members.
- Environmental and cultural sustainable development including specific emphasis on the protection of any caribou observed.
- Protection for the environment.
- Training and education programs.
- Cultural and heritage protection and development.
- Protection of the trapping activities in the region.

A Traditional Ecological Knowledge (TEK) program, including the collection of hunting, trapping, berry picking, and other traditional activities, was undertaken by LIM. This program included consultation with an Elder's Committee as well as a mail-out of letters and summary reports prior to and after the 2009 and 2010 Caribou Surveys (LIM, 2011).

LIM reports that through discussion and engagement during and subsequent to conducting IBA negotiations , the parties reached satisfactory agreement on all of these issues, including the processes for implementation, coordination, and oversight of mitigation strategies to address these issues (LIM, 2011).

LIM has entered into IBAs with the Innu Nation of Labrador (July, 2008), the Naskapi Nation of Kawawachikamach (September 2010), the Innu of Matimekush-Lac John (Schefferville) (June 2011), and the Innu Takuaikan Uashat Mak Mani-Utenam (Sept-Iles) (February 2012) with respect to the development and operation of the Schefferville Projects. LIM also entered into an Economic Partnership Agreement (December 2012) with the NunatuKavut Community Council, representing the Southern Inuit of Labrador.

Under the IBAs, LIM agreed to use its best efforts to provide employment and training opportunities for members of these communities and business opportunities for local aboriginal-owned and operated businesses. LIM also agreed to provide these aboriginal groups with a financial participation in the Schefferville Projects based, in part, on iron ore production. LIM further agreed to take certain social and environmental protection measures to mitigate the impact of the Schefferville Projects on local communities. Through the IBAs and Economic Partnership Agreement, the First Nations groups have consented to the company's projects and have agreed to provide LIM continuing and unobstructed access to, and equitable enjoyment of, the iron ore projects and properties.

LIM has noted that the IBA agreements cover both Newfoundland and Labrador and Québec properties, with the exception of the agreements with the Innu Nation of Labrador and the Naskapi Nation of Kawawachikamach that must be extended to cover Québec for the Malcolm component of the Houston Project.

In 2015, LIM suspended its IBAs, and the ongoing financial commitments under such agreements, with various First Nations communities in accordance with the terms of such agreements until mining operations resume and plans to re-establish consultation and engagement with these communities and reactivate the IBAs prior to commencement of development of the Houston Project.

RPA has been provided with copies of these agreements and LIM has confirmed that these agreements remain applicable for all of LIM's Schefferville deposits and plans to re-establish consultation and engagement with these communities and reactivate the IBAs prior to commencement of development of the Houston Project. The agreements include processes for the respective communities to directly participate and/or be actively consulted going forward through (LIM, 2011):

- Implementation committee.
- Community collaboration committee.
- Training and education committee.
- Establishing employment and workplace conditions.
- Business and contracting opportunities.
- Environmental monitoring committee.
- Traditional knowledge collection.
- Heritage resource and cultural protection.
- Economic benefits.

Engagement with First Nation communities has not been conducted recently for the Houston Project and, once a definitive execution plan for the Houston Project is developed, LIM has indicated to RPA that the company intends to engage its First Nations communities and other stakeholders, re-establish consultation and engagement with these communities, and reactivate the IBAs prior to commencement of development of the Houston Project.

CULTURAL HERITAGE

As described in the Environmental and Social Setting subsection above, no archaeological or cultural sites are known or registered in the Houston 1 and 2 Project area, nor in the Malcolm or Houston 3 areas. A procedure is included in the EPP in the event of chance heritage finds or discoveries (LIM, 2012a).

CORPORATE POLICIES AND COMMITMENTS

LIM has adopted an Environmental and Social Responsibility Policy to express its commitment to protection of the environment and support of the local communities in which it works. LIM has also adopted a Health and Safety Policy. This policy states that the company and its management are committed to conducting operations in a professional manner in pursuit of excellence in business practices and in compliance with all applicable health and safety legislation. LIM reports that the company implemented an effective Health and Safety system at the company's operations between 2011 and 2013.

Additional LIM policies include:

- Code of Ethics
- Whistleblower Policy
- Committee Guidelines
- Disclosure Policy
- Charter of Audit Committee

CONCLUSIONS

- LIM has developed a staged approach to permitting whereby proposed mining will begin in Houston 1 and 2 while regulatory approvals are obtained for Malcolm and Houston 3.
- The Houston 1 and 2 Project has been released from the Newfoundland and Labrador Environmental Assessment Act and the Canadian Environmental Assessment Act. The provincial Environmental Release included conditions which LIM has met. The Houston 1 and 2 Project Registration document does include an assessment of effects on selected VECs.
- Houston 1 and 2 have an approved EPP that provides management measures to address potential environmental effects. The EPP will be regularly revised.

- Houston 1 and 2 have an approved waste management plan, an approved Newfoundland and Labrador Benefits Plan, and a Woman's Employment Plan.
- Houston 1 and 2 have received all required approvals for the construction and operation and the company maintains a list of these permits and approvals. LIM expects reactivation of expired permits to be an administrative process.
- Vegetation clearing activities of the product haul road right-of-way and the rail siding have been completed for the Houston Project.
- A rehabilitation and closure plan has been developed for Houston 1 and 2 and approved by the DNR, which will be regularly updated during operations. A similar rehabilitation and closure plan is proposed for Malcolm and Houston 3 for the PEA.
- Malcolm and Houston 3 are at an earlier stage of planning and additional studies will need to be conducted, with particular consideration of Houston Creek, which traverses the proposed Houston 3 pit footprint.
- LIM has conducted stakeholder engagement and specifically engaged First Nations communities in the area. LIM has signed agreements with several First Nation communities aimed at establishing a positive ongoing relationship for the development and operation of the Houston Project with economic benefits directed at these communities. These agreements were suspended in 2015 until mining operations resume, however, LIM plans to re-establish stakeholder consultation and engagement and reactivate the IBAs prior to commencement of development of the Houston Project.

RECOMMENDATIONS

- Review all permitting requirements for Houston 1 and 2 permits and update/revise permits as needed.
- Reactivate the IBAs and ensure all Houston Project areas and activities are addressed as the Houston Project moves forward.
- Conduct additional ARD testing of the Menihek shale lithology as required by the Houston 1 and 2 Project approvals in the first year of operation and adjust the material management plan if needed.
- Ensure that the closure financial costing is calculated based on execution by a third party and that a closure bond or suitable mechanism be established prior to any construction activities as per applicable regulatory requirements.
- Undertake environmental assessment, stakeholder engagement, and permitting of the Malcolm and Houston 3 components of the Houston Project as soon as possible.
- During the permitting of Malcolm and Houston 3, assess potential impacts on fish habitat and implement appropriate management measures.
- The following best practice actions are recommended as the Houston Project progresses:

a) Develop a comprehensive Environmental and Social Management System (ESMS) to assess and manage potential environmental and social risks and effects

b) Re-establish stakeholder engagement by developing and implementing a stakeholder engagement plan prior to commencement of development activities and update this plan regularly. Stakeholder engagement must be inclusive and should consider the current COVID-19 pandemic in terms of how interaction with stakeholders and communities can be achieved both effectively and safely, until the pandemic is no longer a significant factor.

21 CAPITAL AND OPERATING COSTS

All costs are expressed in fourth quarter 2020 or first quarter 2021 Canadian dollars ($) unless otherwise noted.

CAPITAL COSTS

The estimated cost to construct the Houston Project as described in this PEA is approximately $86.8 million, which includes $13.3 million in contingency (approximately 18% contingency). This amount includes the direct field costs for execution and equipment acquisition through Year 1, plus indirect and owner's costs associated with construction. Cost estimates are based on the PEA design and are considered to have an accuracy of +/- 35%. Construction and sustaining capital costs are summarized in Table 21-1.

TABLE 21-1 SUMMARY OF HOUSTON PROJECT CAPITAL COSTS
Labrador Iron Mines Holdings Limited – Houston Project

Area	Initial Capital ($ millions)	Sustaining Capital ($ millions)	LoM Capital ($ millions)
Direct Costs:			
Equipment	15.5	36.7	52.2
Infrastructure:			
Dry Sizing Plant	6.4	0.6	7.0
Power and Site Distribution	1.7	3.0	4.7
Product Haul Road	14.9	2.5	17.4
Rail Siding	5.8	0.0	5.8
Site Buildings and Other Facilities	3.3	1.8	5.1
Site General	1.3	0.0	1.3
Development	2.3	11.6	13.9
Subtotal - Directs	**51.3**	**56.3**	**107.6**
Indirect Costs:			
EPCM Costs	11.3	2.4	13.7
Owner's Costs:			0.0
Personnel	2.3	0.0	2.3
Personnel (non-payroll)	3.5	0.0	3.5
Site Services	2.2	2.9	5.1
Equipment, Supplies, Other	2.9	0.9	3.8

Area	Initial Capital ($ millions)	Sustaining Capital ($ millions)	LoM Capital ($ millions)
Subtotal - Indirects	**22.2**	**6.2**	**28.4**
Contingency	13.3	5.2	18.6
Total Capital Costs	**86.8**	**67.7**	**154.5**
Closure and Reclamation	3.5	4.9	8.4
Total Capital Including Closure and Reclamation	**90.3**	**72.6**	**162.9**

Note: values may not sum due to rounding.

Exclusions from the capital cost estimate include, but are not limited to, the following:

- Project financing and interest charges (with the exception of the mobile equipment capital lease).
- Working capital.
- Escalation during construction.

Initial capital spending begins in the second half of Year -1 and consists primarily of owner's costs and indirects related to the mobilization of contractors. The majority of construction earthworks and equipment and facilities purchasing and installation is completed in the first half of Year 1. Remaining first purchases of equipment in the second half of Year 1 are also included in the initial capital. Costs associated with processing high-grade iron ore mineralization starting in the second half of Year 1 are captured as operating costs (i.e., the mining, processing, and site G&A costs).

The estimated cost of sustaining capital over the LoM is approximately $67.7 million. Sustaining capital primarily includes equipment first purchases and replacements incurred starting in Year 2 through the end of the mine life and the cost of relocating the dry sizing plant in Years 6 and 8. The major mobile equipment fleet (i.e., drills, excavators, loaders, trucks, dozers, and graders) are purchased under a capital lease arrangement over a period of three to five years and the payments and associated financing costs are included in the sustaining capital.

The cost of reclamation and closure is captured prior to the start of activity in an area. Total reclamation and closure cost is estimated at approximately $8.4 million, which includes ongoing monitoring costs for three years post mining operations.

OPERATING COSTS

Operating costs are estimated for a steady state of approximately 2.0 Mdmtpa production on a year-round operating basis, except for train loading, which is performed seasonally at approximately 200 days per year. Full year operating costs range between $52 million and $75 million per year. LoM operating costs total approximately $747 million ($32.84/dmt sold). Table 21-2 summarizes the Houston Project's operating costs.

TABLE 21-2 SUMMARY OF HOUSTON PROJECT OPERATING COSTS
Labrador Iron Mines Holdings Limited – Houston Project

Department	LoM Cost ($ millions)	Unit Cost ($/dmt sold)
Mining	290	12.75
Processing and Power	74	3.24
Product Haulage	109	4.79
Train Loading	29	1.27
Site G&A	245	10.79
Total Operating Costs	**747**	**32.84**

Note: values may not sum due to rounding.

MINE OPERATING COSTS

The mine operating costs include all operating costs related to the RoM mining operations up to the dry sizing plant stockpiles, including equipment maintenance, contract services (e.g., explosive's contractor services), and consumables (e.g., diesel, tires, explosives, etc.). In addition, the mine operating cost includes supervision of maintenance for the whole site (i.e., the dry sizing plant, product haul, and train loading) while the direct cost of maintenance for these operations is distributed to their respective cost centre. Table 21-3 summarizes the mining operating costs by unit operation. The operating costs were estimated on an annual basis based on the RoM production schedule.

TABLE 21-3 SUMMARY OF MINE OPERATING COSTS
Labrador Iron Mines Holdings Limited – Houston Project

Area	LoM Cost ($ millions)	Unit Cost ($/dmt mined)	Unit Cost ($/dmt sold)
Drilling	17	0.22	0.73
Blasting	43	0.57	1.89
Loading	32	0.42	1.42
Hauling	60	0.78	2.62
Mine Support & Ancillary	52	0.68	2.28
Mine Operations (General)	55	0.73	2.42
Mine Supervision, Technical Services, and G&A	32	0.42	1.39
Total	**290**	**3.82**	**12.75**

Note: values may not sum due to rounding.

PROCESS OPERATING COSTS

The dry sizing plant will operate throughout the year to process approximately 2.0 Mdmtpa. Electrical power will be provided by an on-site diesel generator. Power requirements have been estimated from the motor power for major equipment and estimated utilization, as well as allowances for smaller equipment and utilities, workshop and storage facilities, and offices. Maintenance materials have been factored from the processing equipment capital cost estimate. The processing facilities will require three operators to operate, and operators will work 12-hour shifts. Two electricians, two mechanics, and two helpers will provide planned and breakdown maintenance services on weekdays and emergency breakdown services on an on-call basis. An allowance has been provided for crusher and screen wear parts or consumables. The processing costs are summarized in Table 21-4.

TABLE 21-4 SUMMARY OF PROCESS OPERATING COSTS
Labrador Iron Mines Holdings Limited – Houston Project

Area	LoM Cost ($ millions)	Annual Cost ($ millions)	Unit Cost ($/dmt sold)
Power	25	2.2	1.07
Labour	43	3.7	1.82
Consumables	3	0.3	0.13
Maintenance	3	0.3	0.13
Total	**74**	**6.4**	**3.14**

Note: values may not sum due to rounding.

PRODUCT HAUL OPERATING COSTS

Lump and sinter fines products will be hauled from the dry sizing plant to the rail siding stockpiles year-round. The product haulage cost includes:

- Truck loading at the dry sizing plant.
  - Also included is feeding the plant RoM mineralization, as this activity is performed with the same front-end loader, which alternates between loading trucks and the primary crusher feed hopper.
- Truck haulage from the dry sizing plant to unloading at the rail siding product stockpile.
- Maintenance of the haulage road.
- Equipment maintenance.
- Operating and maintenance labour.
- Diesel and other consumables.

The LoM truck haulage operating cost is approximately $109 million, or $4.79/dmt sold. On an annual basis, costs are approximately $9 million per year when hauling from the dry sizing plant when located in Labrador, and approximately $12 million per year when hauling from the dry sizing plant when located in Québec.

TRAIN LOADING OPERATING COSTS

Train loading of lump and sinter fines products will be performed approximately 200 days per annum, from April through November. The train loading cost includes:

- Train loading with front end loaders from lump and sinter fines stockpiles.
- Train shunting (includes contracted locomotive engineers).
- Stockpile management.
- Maintenance of the rail track and siding facilities.
- Mobile and fixed equipment maintenance (excludes locomotives and rolling stock).
- Operating and maintenance labour (excluding supervision, which is included in the product haul operating cost estimate).
- Diesel and other consumables.

The LoM train loading operating cost is approximately $29 million, or $1.27/dmt sold. On an annual basis, train loading costs are approximately $2.5 million per year.

SITE GENERAL AND ADMINISTRATIVE OPERATING COSTS

The site general and administrative operating costs include all site costs not covered directly under RoM mining, processing, product haul, or train loading, and are generally fixed annual costs. A summary of the site G&A operating costs include:

- Site Manager and Assistant Manager.
- Administrative services for the mine (e.g., human resources, accounting, health and safety, etc.).
- Environmental and permit services and monitoring.
- Operating and maintenance of site infrastructure buildings (e.g., offices, dry, first aid and security facilities, warehouse/purchasing).
- Mine rescue.
- Communications.
- Surface water management.
- Personnel room, board, and travel.
- Contractor and consultant services.

The LoM site G&A operating cost is approximately $245 million, or $10.79/dmt sold. On an annual basis, site general and administrative costs average approximately $22 million per year.

22 ECONOMIC ANALYSIS

The economic analysis contained in this report is based, in part, on Inferred Resources, and is preliminary in nature. Inferred Resources are considered too geologically speculative to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves. There is no certainty that economic forecasts on which this PEA is based will be realized.

The Houston Project economic analysis was performed by RPA using a discounted cash flow model on a pre-tax and after-tax net present value (NPV) basis. Annual cash flow projections were estimated over the LoM based on sales revenue, capital and sustaining costs, and production costs. The estimates of capital, sustaining, and site production costs have been developed specifically for the Houston Project and are presented in Section 21 of this report. The economic analysis confirms a positive economic result for the Houston Project PEA at the base case benchmark iron ore price of US$90/dmt.

All currency is in Canadian dollars unless noted otherwise.

ECONOMIC CRITERIA

After-tax cash flow projections were generated from the LoM production schedule and capital and operating cost estimates and is summarized in Tables 22-1 and 22-2. A summary of the key criteria is provided below.

PRODUCTION

- Total mine life: 12 years:
- Mining rate: up to 9.0 Mdmtpa.
- LoM plant feed average: 2.0 Mdmtpa.
- Fe head grade average: 62.2%.
- Product moisture: 5%.
- Total LoM production: 23.4 Mdmt.
    - Lump production (30%): 7.0 Mdmt.
    - Sinter fines production (70%): 16.4 Mdmt.
- Production losses: 1.5% for dry sizing, product truck haul, and loading trains.

REVENUE

- Exchange rate US$1.00 = $1.33.
- Benchmark iron ore price 62% Fe fines CFR China: US$90/dmt.
  - Lump premium: US$10/dmt.
  - Fe grade differential premium of US$1.61/dmt for the incremental portion of the grade above and below 62% Fe.
  - Penalty for silica at US$1.50/dmt/% over 4%.
- Pay factor: 98.5% (to account for losses during railing and port handling).
- Revenue is recognized at selling point: Freight-on-Board (FOB) train Houston Project rail siding; offtake buyer pays for rail, port, and ocean freight charges.
- Net revenue FOB Houston Project rail siding (after royalties): $50.58/dmt sold (US$37.94/dmt sold).
- Revenue timing: products are only railed to port from May through November (revenue from December production is received in the following calendar year).
- Price participation: for the purpose of the PEA, price participation between LIM and the potential offtake buyer is assumed at 50:50 for benchmark iron ore prices greater than US$90/dmt.

COSTS

- Pre-production period: one year (six months in Year -1 and six months in Year 1).
- Initial capital costs: $86.8 million (major mobile equipment is purchased under capital lease).
- Sustaining capital: $67.7 million (includes payments and financing costs for major mobile equipment capital lease after Year 1).
- Reclamation and closure costs: $8.4 million.
- LoM unit operating cost average of:
  - Mining: $3.82/dmt mined.
  - Processing and Power: $3.14/dmt processed.
  - Product Haulage: $4.64/dmt hauled.
  - Train Loading: $1.25/dmt loaded.
  - Site G&A: $10.47/dmt processed.
- Total unit operating costs of $31.87/dmt processed or $32.84//dmt sold.
- LoM operating costs of $747 million.

TAXATION AND ROYALTIES

- Federal Income Tax rate: 15%.
- Provincial Income Tax:
  - Newfoundland and Labrador: 15%.
  - Québec: 11.6%.

- Mining Tax:
    - Newfoundland and Labrador: 15%.
    - Québec (based on profit margin):
        - 0%-35% profit margin: 16%.
        - 35%-50% profit margin: 22%.
        - 50%-100% profit margin: 28%.
- Tax Pools:
    - Corporate Income Tax pool balances: $300 million.
    - Newfoundland and Labrador Mining Tax pools:
        - Undepreciated capital cost general asset base: $83 million.
        - Processing plant specific asset base: $80 million.
        - Accumulated exploration expenditures: $31 million.
- Royalties
    - Fonteneau royalty: 3.0% of the selling price FOB port per tonne of iron ore produced and shipped from the Houston property payable to Fonteneau, capped at US$1.50 per tonne.
    - HIRL royalty equal to 2.0% of the sales proceeds (FOB Port of Sept-Îles) received by LIM from sales of iron ore from LIM's Houston and Malcolm properties.
    - Hollinger royalty on Malcolm property at $2.00 per tonne.
    - Four royalties negotiated in the First Nations IBAs, equivalent to an overall NSR royalty (FOB Port of Sept-Îles) of approximately 1.1%.

TABLE 22-1 AFTER-TAX CASH FLOW SUMMARY
Labrador Iron Mines Holdings Limited – Houston Project

Parameter	Units	Value
LoM	years	12
Net Revenue, after Charges	**$ million**	**1,253**
Royalties	$ million	(104)
Operating Costs		
Mining	$ million	(290)
Processing & Power	$ million	(74)
Product Haulage	$ million	(109)
Train Loading	$ million	(29)
Site G&A	$ million	(245)
Total Operating Cost	$ million	(747)
Operating Margin (EBITDA)	**$ million**	**403**
Initial Capital		
Direct Cost	$ million	(51)
Indirect Cost	$ million	(11)
Owner's Cost	$ million	(11)
Contingency	$ million	(13)
Subtotal Initial Capital	$ million	(87)
Sustaining Capital	$ million	(68)
Total Capital	**$ million**	**(155)**
Reclamation and Closure	$ million	(8)
Project Net Cash Flow, pre-tax	**$ million**	**240**
Project Net Cash Flow, after-tax	**$ million**	**234**

Note: values may not sum due to rounding.

TABLE 22-2 ANNUAL AFTER-TAX CASH FLOW SUMMARY
Labrador Iron Mines Holdings Limited – Houston Project

Labrador Iron Mines	UNITS	TOTAL LOM	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
MINING																		
Houston - Labrador																		
Fe Mineralization	Mt	18.8	-	0.8	2.1	2.1	2.1	2.1	1.5	-	0.0	2.0	2.1	2.1	1.9	-	-	-
Fe Grade	% Fe	62.2%	-	63.1%	63.3%	62.2%	62.2%	62.1%	62.4%	-	61.4%	61.6%	61.4%	62.2%	62.1%	-	-	-
Waste	Mt	41.5	-	0.1	2.6	4.9	4.9	4.8	1.0	-	1.5	7.0	6.9	6.4	1.4	-	-	-
Total RoM	Mt	60.2	-	0.9	4.7	7.0	7.0	6.9	2.5	-	1.5	9.0	9.0	8.5	3.3	-	-	-
Strip Ratio		2.2	-	0.1	1.2	2.3	2.3	2.3	0.7	-	147.2	3.5	3.3	3.1	0.7	-	-	-
Malcolm - Quebec																		
Fe Mineralization	Mt	4.7	-	-	-	-	-	-	0.5	2.1	2.1	-	-	-	-	-	-	-
Fe Grade	% Fe	62.2%	-	-	-	-	-	-	62.8%	62.3%	61.9%	-	-	-	-	-	-	-
Waste	Mt	11.1	-	-	-	-	-	-	1.3	4.9	4.9	-	-	-	-	-	-	-
Total RoM	Mt	15.8	-	-	-	-	-	-	1.8	7.0	7.0	-	-	-	-	-	-	-
Strip Ratio		2.4	-	-	-	-	-	-	2.4	2.3	2.4	-	-	-	-	-	-	-
Total RoM Mining																		
Fe Mineralization	**Mt**	**23.4**	**-**	**0.8**	**2.1**	**2.1**	**2.1**	**2.1**	**2.0**	**2.1**	**2.1**	**2.0**	**2.1**	**2.1**	**1.9**	**-**	**-**	**-**
Fe Grade	**% Fe**	**62.2%**	**-**	**63.1%**	**63.3%**	**62.2%**	**62.2%**	**62.1%**	**62.5%**	**62.3%**	**61.9%**	**61.6%**	**61.4%**	**62.2%**	**62.1%**	**-**	**-**	**-**
Waste	**Mt**	**52.5**	**-**	**0.1**	**2.6**	**4.9**	**4.9**	**4.8**	**2.3**	**4.9**	**6.4**	**7.0**	**6.9**	**6.4**	**1.4**	**-**	**-**	**-**
Total RoM	**Mt**	**76.0**	**-**	**0.9**	**4.7**	**7.0**	**7.0**	**6.9**	**4.3**	**7.0**	**8.5**	**9.0**	**9.0**	**8.5**	**3.3**	**-**	**-**	**-**
Strip Ratio		**2.2**	**-**	**0.1**	**1.2**	**2.3**	**2.3**	**2.3**	**1.1**	**2.3**	**3.1**	**3.5**	**3.3**	**3.1**	**0.7**	**-**	**-**	**-**
PRODUCT																		
Lump Product	Mdmt	6.8		0.2	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6			
Fines Product	Mdmt	15.9		0.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4			
Total Product	**Mdmt**	**22.7**		**0.7**	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**			
REVENUE																		
Market Price	**Units**																	
Benchmark Fines @ 62.0% Fe US$90/dmt	C$/dmt	$ 120	$ -	$ 122	$ 122	$ 121	$ 120	$ 120	$ 121	$ 121	$ 120	$ 119	$ 119	$ 120	$ 120	$ -	$ -	$ -
Exchange Rate	C$/US$	1.33																
Revenue FOB Rail Siding	**C$ M**	**$ 1,254**	**$ -**	**$ 38.8**	**$ 118.9**	**$ 113.6**	**$ 112.3**	**$ 109.3**	**$ 110.7**	**$ 115.4**	**$ 115.2**	**$ 103.2**	**$ 100.5**	**$ 107.4**	**$ 108.5**	**$ -**	**$ -**	**$ -**
CASH FLOW STATEMENT																		
Royalties	C$ M	$ (104)	$ -	$ (3.1)	$ (9.3)	$ (9.2)	$ (9.2)	$ (9.1)	$ (9.0)	$ (9.5)	$ (9.5)	$ (8.8)	$ (8.8)	$ (9.0)	$ (9.1)	$ -	$ -	$ -
Net Revenue	**C$ M**	**$ 1,150**	**$ -**	**$ 35.7**	**$ 109.6**	**$ 104.4**	**$ 103.1**	**$ 100.2**	**$ 101.7**	**$ 105.8**	**$ 105.7**	**$ 94.4**	**$ 91.7**	**$ 98.4**	**$ 99.4**	**$ -**	**$ -**	**$ -**
Operating Costs																		
Mining	C$ M	$ (290)	$ -	$ (5.7)	$ (19.9)	$ (25.4)	$ (26.0)	$ (26.9)	$ (21.0)	$ (26.1)	$ (30.3)	$ (30.3)	$ (30.9)	$ (31.1)	$ (16.3)	$ -	$ -	$ -
Processing and Power	C$ M	$ (74)	$ -	$ (3.8)	$ (6.4)	$ (6.4)	$ (6.4)	$ (6.4)	$ (6.3)	$ (6.4)	$ (6.4)	$ (6.3)	$ (6.4)	$ (6.4)	$ (6.2)	$ -	$ -	$ -
Product Truck Haul	C$ M	$ (109)	$ -	$ (3.6)	$ (9.0)	$ (9.0)	$ (9.0)	$ (9.0)	$ (9.6)	$ (12.3)	$ (12.3)	$ (8.8)	$ (9.0)	$ (9.0)	$ (8.3)	$ -	$ -	$ -
Train Loading	C$ M	$ (29)	$ -	$ (0.9)	$ (2.5)	$ (2.6)	$ (2.6)	$ (2.6)	$ (2.5)	$ (2.6)	$ (2.6)	$ (2.5)	$ (2.6)	$ (2.6)	$ (2.6)	$ -	$ -	$ -
G&A - Site	C$ M	$ (245)	$ -	$ (9.6)	$ (20.5)	$ (21.1)	$ (21.3)	$ (21.5)	$ (21.1)	$ (22.2)	$ (23.0)	$ (22.2)	$ (22.3)	$ (21.9)	$ (18.7)	$ -	$ -	$ -
Operating Cash Flow	**C$ M**	**$ 403**	**$ -**	**$ 12.1**	**$ 51.3**	**$ 39.9**	**$ 37.8**	**$ 33.9**	**$ 41.3**	**$ 36.3**	**$ 31.1**	**$ 24.4**	**$ 20.5**	**$ 27.4**	**$ 47.4**	**$ -**	**$ -**	**$ -**
Capital Costs																		
Direct Costs:																		
Equipment	C$ M	$ (15)	$ -	$ (15.5)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Infrastructure:																		
Dry Sizing Plant	C$ M	$ (6)	$ -	$ (6.4)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Power and Site Distribution	C$ M	$ (2)	$ -	$ (1.7)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Product Haul Road	C$ M	$ (15)	$ -	$ (14.9)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Rail Siding	C$ M	$ (6)	$ -	$ (5.8)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Site Buildings and Other Facilities	C$ M	$ (3)	$ -	$ (3.3)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Site General	C$ M	$ (1)	$ -	$ (1.3)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Development	C$ M	$ (2)	$ -	$ (2.3)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Subtotal - Directs	**C$ M**	**$ (51)**	**$ -**	**$ (51.3)**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Indirect Costs:																		
EPCM Costs	C$ M	$ (11)	$ -	$ (11.3)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Owner's Costs:																		
Personnel	C$ M	$ (2)	$ (0.8)	$ (1.5)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Personnel (non-payroll)	C$ M	$ (4)	$ (1.2)	$ (2.4)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Site Services	C$ M	$ (2)	$ (0.7)	$ (1.5)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Equipment, Supplies, Other	C$ M	$ (3)	$ (1.0)	$ (1.9)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Subtotal - Indirects	**C$ M**	**$ (22)**	**$ (3.6)**	**$ (18.6)**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Contingency	C$ M	$ (13)	$ -	$ (13.3)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Sustaining Capital Costs	C$ M	$ (68)	$ -	$ -	$ (10.0)	$ (6.9)	$ (7.9)	$ (12.2)	$ (14.3)	$ (6.6)	$ (5.1)	$ (2.4)	$ (1.1)	$ (0.7)	$ (0.3)	$ -	$ -	$ -
Reclamation and Closure	C$ M	$ (8)	$ -	$ (3.5)	$ -	$ -	$ -	$ -	$ (2.0)	$ -	$ (1.5)	$ -	$ -	$ -	$ -	$ (0.5)	$ (0.4)	$ (0.4)
Pre-Tax Net Cash Flow	**C$ M**	**$ 240**	**$ (3.6)**	**$ (74.6)**	**$ 41.2**	**$ 33.1**	**$ 29.9**	**$ 21.7**	**$ 24.9**	**$ 29.7**	**$ 24.4**	**$ 22.0**	**$ 19.3**	**$ 26.7**	**$ 47.1**	**$ (0.5)**	**$ (0.4)**	**$ (0.4)**
Income Tax - Federal	C$ M	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Income Tax - Province	C$ M	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Mining Tax - Province	C$ M	$ (7)	$ -	$ -	$ -	$ -	$ -	$ -	$ (0.5)	$ (2.3)	$ (2.8)	$ (0.9)	$ -	$ -	$ -	$ -	$ -	$ -
After-Tax Cashflow	**C$ M**	**$ 234**	**$ (3.6)**	**$ (74.6)**	**$ 41.2**	**$ 33.1**	**$ 29.9**	**$ 21.7**	**$ 24.4**	**$ 27.4**	**$ 21.6**	**$ 21.1**	**$ 19.3**	**$ 26.7**	**$ 47.1**	**$ (0.5)**	**$ (0.4)**	**$ (0.4)**

CASH FLOW ANALYSIS

The Houston Project economics have been evaluated using the discounted cash flow method, taking into account annual processed tonnages, iron grades, benchmark iron ore price, operating costs, selling charges, royalties, capital and sustaining capital costs, and reclamation and closure costs.

The economic analysis confirms a positive economic result for the Houston Project PEA at the base case benchmark iron ore price of US$90/dmt. The summary of the results of the cash flow analysis is presented in Table 22-3.

TABLE 22-3 CASH FLOW ANALYSIS
Labrador Iron Mines Holdings Limited – Houston Project

Item	Units	Value
Pre-tax NPV at 7% discount	$ million	123
Pre-tax NPV at 8% discount	**$ million**	**113**
Pre-tax NPV at 10% discount	$ million	93
IRR	%	39%
After-Tax NPV at 7% discount	$ million	120
After-Tax NPV at 8% discount	**$ million**	**109**
After-tax NPV at 10% discount	$ million	91
IRR	%	39
Payback	years	2.6

Note: the cash flow analysis is at the base case benchmark iron ore price of US$90/dmt.

The undiscounted pre-tax cash flow is $240 million, and the undiscounted after-tax cash flow is $234 million. The pre-tax NPV at an 8% discount rate is $113 million and the after-tax NPV at an 8% discount is $109 million. The pre-tax Internal Rate of Return (IRR) is 39% and the after-tax IRR is 39%. The after-tax payback period is 2.6 years from the start of operations in July of Year 1.

At recent benchmark iron ore prices of US$160/dmt, adjusted for assumed 50:50 price participation above the base case benchmark iron ore price of US$90/dmt, the pre-tax NPV at an 8% discount rate is $696 million and the after-tax NPV at an 8% discount rate is $459 million. The pre-tax IRR is 233% and the after-tax IRR is 209%. The after-tax payback period is 0.9 years.

SENSITIVITY ANALYSIS

Project risks can be identified in both economic and non-economic terms. Key economic risks were examined by running cash flow sensitivities for:

- Fe grade
- Benchmark iron ore price
- Exchange rate
- Operating costs
- Capital costs

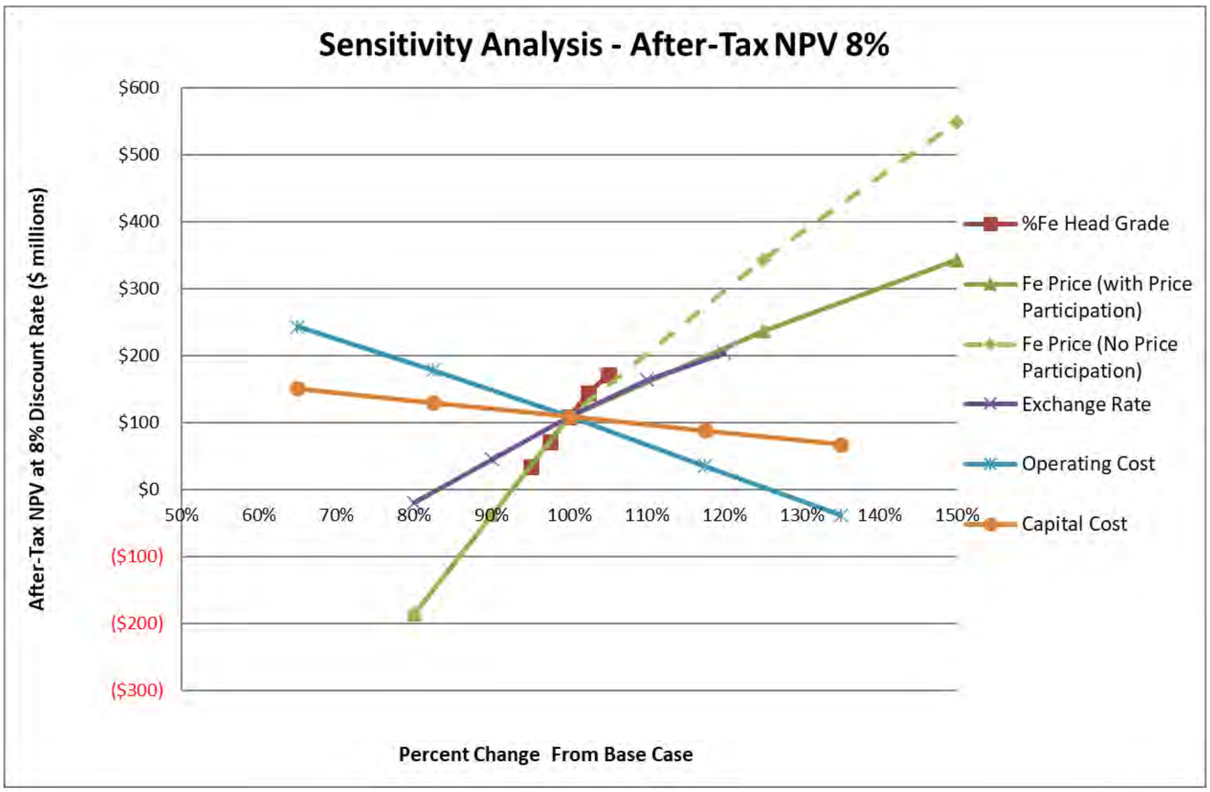
NPV sensitivity over the base case has been calculated for -5% to +5% for Fe head grade, -20% to +50% for benchmark iron ore prices, -20% to +20% for exchange rate, and -35% to +35% for operating costs and capital costs variations. The sensitivities are shown in Table 22-4 and Figure 22-1.

TABLE 22-4 AFTER-TAX SENSITIVITY ANALYSIS
Labrador Iron Mines Holdings Limited – Houston Project

	Head Grade %Fe	NPV at 8% ($ million)
95%	0.59	34
97.5%	0.61	72
100%	0.62	109
102.5%	0.64	145
105%	0.65	171
	Fe Price US$/dmt	**NPV at 8% ($ million)**
80%	72	-185
90%	81	-38
100%	90	109
125%	113	237
150%	135	343
	Exchange Rate US$1.00 = $	**NPV at 8% ($ million)**
80%	1.07	-20
90%	1.20	45
100%	1.33	109
110%	1.47	164
120%	1.60	204

	Operating Costs ($ million)	NPV at 8% ($ million)
65.0%	485	243
82.5%	616	179
100.0%	747	109
117.5%	878	36
135.0%	1,008	-38
	LoM Capital Costs ($ million)	**NPV at 8% ($ million)**
65.0%	109	151
82.5%	138	130
100.0%	167	109
117.5%	197	88
135.0%	226	67

FIGURE 22-1 AFTER-TAX NPV SENSITIVITY GRAPH



In addition to the benchmark iron ore price sensitivity with assumed 50:50 price participation over US$90/dmt, a sensitivity excluding any price participation is presented in Figure 22-1 (SLR notes the after-tax NPV of the no price participation sensitivity is calculated with an assumption that all taxes are paid by LIM on all incremental income per the listed economic criteria and that there are no additional capital or operating cost requirements). At the recent benchmark iron ore price of US$160/dmt, the after-tax NPV at an 8% discount rate is $778 million without price participation.

The Houston Project's after-tax NPV is most sensitive to head grade and benchmark iron ore prices, followed by capital costs and operating costs.

23 ADJACENT PROPERTIES

The QP has not verified the information regarding the adjacent properties described in this section. The information described in this section is not necessarily indicative of the mineralization on the Houston Project.

There are several additional deposits of iron mineralization in the Knob Lake Iron Range within approximately 65 km of the Houston Project. Some of the deposits formed part of the former operations of IOC during the period 1954-1982. LIM holds two mining leases (including the Houston mining lease) and 39 mining rights licences (including the licence covering the Houston property), issued by the Department of Natural Resources, Province of Newfoundland and Labrador, covering approximately 8,400 ha (including the 2,800 ha Houston property).

Through its subsidiary SMI, LIM holds interests in 287 title claims (including the 41 Malcolm claims) issued by the Ministry of Natural Resources, Province of Québec, covering approximately 9,511 ha (including the 1,842 ha Malcolm property) in the Schefferville area.

Mineral Resources were reported in compliance with NI 43-101 for several LIM iron deposits in the Schefferville area by SGS in 2014. Mineral Resources for deposits within approximately ten kilometres of the Houston Project are summarized in Table 23-1.

TABLE 23-1 ADJACENT PROPERTIES - NI 43-101 COMPLIANT MINERAL RESOURCES
Labrador Iron Mines Holdings Limited – Houston Project

Name	Distance from Project (km)	Classification	Tonnes (Mt)	Grade		
				% Fe	% SiO_2	% Mn
Redmond 2B & 5	5 to 10	Indicated	2.1	56.0	10.3	0.7
	5 to 10	Inferred	0.1	53.7	9.7	1.4
Knob Lake	3	Measured	2.8	55.0	10.2	1.0
		Indicated	2.3	54.3	11.2	1.1
		Meas + Indic	5.1	54.7	10.7	1.0
		Inferred	0.6	51.8	13.5	1.2
James	3	Inferred	0.2	52.7	21.7	1.0

In addition to the NI 43-101 compliant Mineral Resources, there are eight deposits with historic resources estimated by IOC. Historic resources for three of the more significant deposits are summarized in Table 23-2. The historic resources pre-date NI 43-101 and should not be relied upon. Of note, IOC reported resources on a natural basis including moisture content.

TABLE 23-2 ADJACENT PROPERTIES - HISTORICAL MINERAL RESOURCES
Labrador Iron Mines Holdings Limited – Houston Project

Name	Distance from Project (km)	Classification	Tonnes (Mt)	Grade		
				% Fe	% SiO_2	% Mn
Sawyer Lake	40	Unclassified	2.4	63.4	-	--
Astray Lake	30	Unclassified	7.3	65.6	4.2	--
Kivivic 1 & 2	65	Unclassified	6.0	59.2	9.3	--

SAWYER LAKE

Of the LIM property holdings, the Sawyer Lake property is most relevant to the Houston Project. The Sawyer Lake deposit is located approximately 50 km southeast of the Houston Project and 65 km southeast of the town of Schefferville. It is 1.6 km northwest of Sawyer Lake and adjacent to Astray Lake. An opportunity has been identified to potentially develop this property in conjunction with the Houston Project by operating it as an open pit mine seasonally in the winter. Iron mineralization identified at Sawyer Lake would be targeted for its potential high-grade and high lump attributes.

A gravel road connects the Houston Project to the shores of Astray Lake. The Sawyer Lake property is potentially accessible by a winter road in February and March each year (ice road on Astray Lake), and potentially by barge operation from June through October each year.

The Sawyer Lake deposit was explored by IOC, which published a mineral resource of 2.4 Mt with a grade of 63.4% Fe in 1983. This historical resource pre-dates NI 43-101 and should not be relied upon. Subsequently, LIM conducted exploration activities, including the drilling of 10 RC drill holes. Based on this initial review, further investigations into development of the Sawyer Lake project are warranted.

ADDITIONAL PROPERTIES

TATA STEEL MINERALS CANADA – DSO PROJECT

Tata Steel Minerals Canada Ltd (TSMC) (a member of the Tata Group, the world's sixth largest steel producer), is operating in the Schefferville area currently producing sinter fines from the TSMC DSO project.

TSMC has not publicly reported Mineral Resources or Mineral Reserves for the TSMC DSO project. In 2010, NML published a Feasibility Study on the development of the TSMC DSO project. The TSMC Feasibility Study dated April 10, 2010, amended as of February 16, 2011, reported 64.1 million tonnes of Proven and Probable Mineral Reserves at an average grade of 58.8% Fe, principally from the Kivivic and Goodwood deposits. A ten-year mine life was proposed producing approximately 4.0 million dry tonnes of sinter fines and super fines per year.

Production started in 2015 and the TSMC DSO project continues in a ramp-up stage. In early 2019 TSMC completed an enclosed beneficiation plant that, when fully operational, will increase production while adding higher quality fines to the saleable product mix. During the 2019 season, shipments of crushed and screened ore to Europe totalled approximately 1.0

million tonnes (wet basis). TSMC was in care and maintenance from March 24, 2020, until May 31, 2020, and production resumed on June 1, 2020.

HOWSE PROPERTY

In March 2013, LIM entered into an agreement with TSMC, as part of which LIM sold to TSMC a 51% interest in the Howse property, which is located adjacent to the TSMC DSO project. In March 2015, LIM sold the remaining 49% interest in the Howse property to TSMC.

The Howse project is a proposed open pit iron mine located in Labrador, approximately 25 km northwest of Schefferville. In June 2018, the Minister of Environment and Climate Change re-issued an Environmental Assessment Decision Statement that the proposed Howse Property Iron Mine Project can proceed with mining approximately 46 Mt of iron mineralization over a 15 year mine life, at a rate of up to 25,000 tpd. As of December 2020, TSMC had not started any construction or development activities on the Howse Project. *[Canadian Environmental Assessment Agency - Howse Minerals Limited - Environmental Assessment Report- April 2018.]*

JOYCE LAKE PROJECT

Century Iron Mines Corporation (Century) has filed a Project Description and Registration document with the Government of Newfoundland and Labrador, for its proposed Joyce Lake Direct Shipping Iron Ore Project. The Joyce Lake Project is situated in Labrador, approximately 25 km east of LIM's Houston deposits, and 20 km northeast of the town of Schefferville, Québec. In a 2015 Feasibility Study, the Joyce Lake project was reported by Century to contain 17.7 Mt of Proven and Probable Reserves at an average grade of 59.7% Fe. A target production rate of 2.5 Mtpa over approximately seven years was proposed. The project plan for Joyce Lake described in the technical report indicates road transportation of iron ore products through the Houston Project (south of the Houston 3 pit) to a rail loop to be constructed just north of the Menihek Hydro Dam location, on the east side of the TSH Railway.

ELIZABETH TACONITE DEPOSIT

The Elizabeth Taconite deposit is described in an independent NI 43-101 Technical Report prepared by G.H. Wahl, P.Geo., and filed on SEDAR. The property is owned 100% by LIM. The deposit is located approximately four kilometres west of LIM's former James Mine. During the 2011 and 2012 field seasons, LIM's exploration efforts and drill programs identified a large iron deposit consisting of two areas, Elizabeth 1 and Elizabeth 2. The first independent Inferred Mineral Resource estimate, as of June 15, 2013, was completed for Elizabeth 1, totalling approximately 620 Mt at an average grade of 31.8% Fe. The Elizabeth 2 exploration target was estimated to contain a potential 350 Mt to 600 Mt at an average grade of 31.9%.

NEW MILLENNIUM TACONITE PROJECTS

NML holds a group of seven taconite properties at various stages of development, the most relevant are noted below.

LABMAG AND KÉMAG

The LabMag Property is located approximately 30 km northwest of Schefferville in the Howells River area of Labrador and was reported by NML in a 2014 feasibility study to contain 3.4 billion tonnes of Proven and Probable reserves at a grade of 29.8% Fe. The KéMag deposit is located at Lac Harris, Québec, approximately 50 km to the northwest of Schefferville, was reported by NML in the same 2014 Feasibility Study as LabMag, to contain 1.9 billion tonnes of Proven and Probable Reserves at an average grade of 31.3% Fe. The combined development of the two reserves would produce approximately 23 Mtpa of pellets and pellet feed over a 61-year mine life.

In 2016, NML reconsidered the development of the combined LabMag and KéMag deposits on a smaller scale, focussing on just the KéMag resources and referring to it as the NuTac Project. NI 43-101 compliant Proven and Probable Mineral Reserves for the NuTac Project were reported as 815 Mt at 31.4% Fe, to be mined over a 25 year mine life producing 8.7 Mtpa of concentrate for pellet production.

On August 5, 2020, NML announced that it had arrived at an agreement with Tata Steel to reorganize their relationship. The heads off agreements dated September 24, 2008, and March 6, 2011, between Tata Steel, NML and LabMag Limited Partnership pertaining to the Taconite Properties were terminated. NML retains a 100% ownership of the Taconite Properties and Tata Steel was granted a 1% gross revenue royalty.

NML announced on September 18, 2020, that it had an agreement with Abaxx Technologies Inc. (Abaxx) to effect a transaction that would result in a reverse takeover of NML by the shareholders of Abaxx and continue the business of Abaxx in the technology sector. The agreement was completed in December 2020.

The authors of this Technical Report have not reviewed or audited any of the resource and reserve estimates or property details of the adjacent properties.

24 OTHER RELEVANT DATA AND INFORMATION

No additional information or explanation is necessary to make this Technical Report understandable and not misleading.

25 INTERPRETATION AND CONCLUSIONS

The QP concludes that the Houston Project is a project of merit, with a relatively low capital intensity and positive economics at long term benchmark iron ore prices. In the QP's opinion, LIM should continue to advance the Houston Project. The QP's offer the following conclusions by area.

GEOLOGY AND MINERAL RESOURCES

- The sample preparation, analysis, QA/QC program, and security procedures for the Houston Project are adequate for use in the estimation of Mineral Resources.
- The database is adequate for the purpose of Mineral Resource estimation.
- Both Houston and Malcolm deposits were constrained by wireframe domains based on a 58% Fe cut-off grade, focussing on differentiating the mineralization potentially suitable for crushing and screening in a dry sizing plant and requiring no upgrading to produce a potentially saleable product.
- A block model for Mineral Resource estimation was constructed to include all three of the Houston deposits. A second block model was constructed to cover the entire area of the Malcolm deposit.
- In order to fulfill the CIM (2014) requirement that Mineral Resources have reasonable prospects for eventual economic extraction, RPA developed a conceptual open pit shell to constrain the Houston and Malcolm deposits using all categories of Mineral Resources in the block models.
- Resource classification is based on the confidence in the estimation for iron only. Assaying for iron is more complete whereas assay data is lacking to a varying degree for the other elements.

MINING

- The PEA mine plan has been developed based on Mineral Resources from the Houston and Malcolm properties considering all resource categories. Overall, Measured and Indicated Mineral Resources represent approximately 80% of the production total.
- Four mining areas are developed and mined in order starting at Houston 1 and 2, in Labrador, followed by Malcolm in Québec, and finishing at Houston 3 in Labrador. Houston 1 and 2 were previously permitted and the permits remain in good standing or are available for renewal. The permits cover the first approximately five years of proposed operations.
- The mining schedule targets high-grade iron mineralization domains, which are suitable for the dry sizing process. The pit mining quantities are estimated to total

23.4 Mdmt of high-grade iron mineralization at a diluted grade of 62.2% Fe over the LoM, along with 52.5 Mdmt of waste material.

- The proposed mining production schedule is relatively low risk in that all of the volume within the large and continuous high-grade iron mineralization domains is considered as production, with the exception of a few relatively minor and discrete lower grade pods of mineralization. The selectivity at the hanging wall and footwall contacts is defined by a gradational decrease in iron grades along with an increase in deleterious grades.
- Mining pre-production development is limited to access road development and overburden removal for initial open pit and waste storage areas as the iron mineralization outcrops with sufficient high-grade mineralization accessible for Year 1 operations with negligible waste stripping required.
- Owner-operated mining will be carried out using conventional open pit methods, consisting of the following activities:
  - Production blasthole drilling.
  - Blasting services provided by an explosives' contractor.
  - Loading and hauling operations performed with backhoe excavators and rigid frame haulage trucks.
- The mining fleet major mobile equipment is specified with multiple common units across the Houston Project's unit operations, resulting in a relatively simple fleet to operate and maintain.
- Geotechnical and pit design parameters were based on data, information, and results from previous geotechnical study at Houston 1 and 2.

MINERAL PROCESSING

- The majority of test work was completed on three trench samples obtained in 2011 classified as Hanging Wall (HU1), Footwall (HU2), and DRO.
- Mineralogical studies indicated that iron in the samples was mainly present as hematite and goethite. Minor magnetite content was noted in the DRO sample. A significant amount of the iron in the DRO sample was present in a manganese oxide mineral (FeMnO(OH)). Quartz was the main gangue mineral present.
- Assays of different size fractions of each of the samples showed that iron content decreased with decreasing size, particularly below approximately one millimetre in size, and silica content increased with decreasing size. This implies that removal of finer material and processing it separately could be employed to improve the grade of the sinter fines (and potentially that of future concentrate produced through an upgrading process).
- The DRO and hanging wall samples were of acceptable quality for sale without upgrading iron content (>60% Fe) and require only crushing and screening. Potential for penalty charges exist, in particular for silica and manganese content, however, based on historic LIM sales agreements from the James Mine, these are not expected to be significant.

- The footwall sample was lower in iron content and higher in silica content and lump and sinter fines sourced from footwall material may require upgrading to produce saleable products or may be saleable as low-grade products (<58% Fe) with potential for penalty charges due to elevated silica levels.
- Splits to lump product for the DRO sample ranged from approximately 29% to 33%, and for the hanging wall sample ranged from approximately 42% to 44%. For the footwall sample the split was approximately 49% to 53% to lump product. The PEA has used a 30% split to lump product and 70% to sinter fines product as the operating assumption.
- Various gravity upgrading techniques were tested with limited success.
- The samples were shown to be amenable to upgrading by WHIMS and in the QP's opinion this technique has the potential to form part of a future wet upgrading circuit, particularly for the fines (-1 mm), which are high in silica.

INFRASTRUCTURE

- Other than the existing gravel public access road and a dry materials landfill site owned by LIM, there is no existing infrastructure at the Houston Project site.
- Right-of-way clearing of trees was previously completed for the access and product haul road and rail siding.
- All proposed site buildings and equipment for the dry sizing plant are considered mobile and will only require an engineered fill for foundation (i.e., no concrete foundations).
- Collection and treatment of surface contact water will be managed locally at the various open pits, waste dumps, and dry sizing plant (collectively the mine site), along the product haul road, and at the rail siding.

ENVIRONMENTAL, SOCIAL AND PERMITTING CONSIDERATIONS

- LIM has developed a staged approach to permitting whereby proposed mining will begin in Houston 1 and Houston 2 (the Houston 1 and 2 Project) while regulatory approvals are obtained for Malcolm and Houston 3.
- The Houston 1 and 2 Project has been released from the Newfoundland and Labrador Environmental Assessment Act and the Canadian Environmental Assessment Act. The provincial Environmental Release included conditions which LIM has met. The Houston 1 and 2 Project Registration document does include an assessment of effects on selected VEC.
- Houston 1 and 2 have an approved EPP that provides management measures to address potential environmental effects. The EPP will be regularly revised.
- Houston 1 and 2 have an approved waste management plan, an approved Newfoundland and Labrador Benefits Plan, and a Woman's Employment Plan.
- Houston 1 and 2 have received all required approvals for the construction and operation and the company maintains a list of these permits and approvals. LIM expects reactivation of expired permits to be an administrative process.

- Vegetation clearing activities of the product haul road right-of-way and the rail siding have been completed for the Houston Project.
- A rehabilitation and closure plan has been developed for Houston 1 and 2 and approved by the DNR, which will be regularly updated during operations. A similar rehabilitation and closure plan is proposed for Malcolm and Houston 3 for the PEA.
- Malcolm and Houston 3 are at an earlier stage of planning and additional studies will need to be conducted, with particular consideration of Houston Creek, which traverses the proposed Houston 3 pit footprint.
- LIM has conducted stakeholder engagement and specifically engaged First Nations communities in the area. LIM has signed agreements with several First Nation communities aimed at establishing a positive ongoing relationship for the development and operation of the Houston Project with economic benefits directed at these communities. These agreements were suspended in 2015 until mining operations resume, however, LIM plans to re-establish stakeholder consultation and engagement and reactivate the IBA prior to commencement of development of the Houston Project.

26 RECOMMENDATIONS

The QP offers the following recommendations to advance the Houston Project and evaluate potential opportunities for development.

GEOLOGY AND MINERAL RESOURCES

1. Complete sampling and assaying, where possible, of the 2013 diamond drill holes, which were left incomplete as a result of a halt in company spending in 2014 due to financial circumstances and are excluded from the current Mineral Resource estimate.
2. Complete additional infill exploration drilling to upgrade Inferred Mineral Resources to Measured or Indicated, as well as step out drilling on high priority targets within immediate vicinity of existing defined pits.
3. Incorporate commercially supplied blank samples with zero iron content in future assaying programs.
4. Investigate additional wireframe domaining of lithology units and/or mineralization domains, to further control estimation of not just the iron grades, but also the deleterious elements.
5. A minimum three-metre composite length should be used in future Mineral Resource updates as the majority of sampling was carried out at three-metre intervals.
6. Complete additional density measurement samples in both mineralization and waste in order to interpolate the density values and adjust them for the iron content as appropriate.

MINING

1. Complete geotechnical investigations for Malcolm and Houston 3 pit slope recommendations and for all waste dump facilities.
2. Infill exploration drilling targeting the lower grade mineralization pods excluded from within the high-grade iron mineralization domains to further increase the confidence in grades in the local area.
3. Complete drilling and surface sampling to better define the contact of the Menihek shale within the vicinity of the proposed open pits.
4. Maintain the flexibility to mine Houston 3 prior to Malcolm during permitting, as this will reduce the number of times the operation will need to be relocated.
5. Review potential for construction of a portion of the Houston Project product haul road by LIM, as the mine equipment fleet utilizes similar equipment to that proposed for the construction.

MINERAL PROCESSING

1. Complete additional test work, including variability test work, to confirm results supporting dry processing of high-grade iron ore mineralization to produce lump and sinter fines without upgrading, and to confirm and optimize the process steps required and provide the necessary engineering data for the design of the processing plant.
2. Conduct additional testing on gravity separation and flotation techniques to confirm whether or not gravity separation and flotation could form part of a future concentrator process.

INFRASTRUCTURE

1. Update the surface water management plan for the mine site based on the proposed localized handling and treatment of surface contact water.
2. Review trade-off study for use of a battery electric version of the recommended haul truck.
3. Review the potential to establish grid power from the Menihek hydro-electric facility operated by Nalcor and Québec Hydro, to include relocation of the electrical substation owned by LIM to the project site and a new powerline connect to the grid system. Grid power can be available seasonally, in the warmer months, when the electrical heating demand in Schefferville is lower.
4. Review trade-off study for use of an aerial tramway for transporting product from the dry sizing plant in Labrador to the rail siding. RPA notes this would eliminate the need for a full-size product haul road, while tramways are proven to operate in winter climatic conditions.
5. Complete trade-off study on use of the Redmond property rail right-of-way for the Houston Project's rail loading operations. Although a longer truck haul is required (approximately 1.5 km greater), the Redmond property rail right-of-way was formerly used for loading iron ore trains and includes a rail loop at the end to turnaround, versus the current proposed operation, which requires the train to be split multiple times.

ENVIRONMENTAL, SOCIAL AND PERMITTING CONSIDERATIONS

1. Review all permitting requirements for Houston 1 and 2 permits and update/revise permits as needed.
2. Reactivate the IBAs and ensure all Houston Project areas and activities are addressed as the Houston Project moves forward.
3. Conduct additional ARD testing of the Menihek shale lithology as required by the Houston 1 and 2 Project approvals in the first year of operation and adjust the material management plan if needed.
4. Ensure that the closure financial costing is calculated based on execution by a third party and that a closure bond or suitable mechanism be established prior to any construction activities as per applicable regulatory requirements.
5. Undertake environmental assessment, stakeholder engagement, and permitting of the Malcolm and Houston 3 components of the Houston Project as soon as possible.

6. During the permitting of Malcolm and Houston 3, assess potential impacts on fish habitat and implement appropriate management measures.
7. The following best practice actions are recommended as the Houston Project progresses:
    a) Develop a comprehensive ESMS to assess and manage potential environmental and social risks and effects.
    b) Re-establish stakeholder engagement by developing and implementing a stakeholder engagement plan prior to commencement of development activities and update this plan regularly. Stakeholder engagement must be inclusive and should consider the current COVID-19 pandemic in terms of how interaction with stakeholders and communities can be achieved both effectively and safely, until the pandemic is no longer a significant factor.

The QP recommends the following work programs and proposed budget to advance the Houston Project, as presented in Table 26-1.

TABLE 26-1 RECOMMENDED WORK PROGRAM
Labrador Iron Mines Holdings Limited – Houston Project

Area	Proposed Budget ($000): Pre-construction	Ongoing Malcolm and Houston 3
Trenching and Drilling	250	1,700
Metallurgical Investigation	100	200
Geotechnical and Hydrology	100	300
Environment, Permits, EIS	200	500
Planning and Engineering	200	300
Subtotal	**850**	**3,000**
Contingency	128	450
Total Cost	**978**	**3,450**

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WesTech Engineering Inc., 2012, Sedimentation and Filtration Studies Laboratory Testing Report, prepared for Labrador Iron Mines, 3 May 2012

28 DATE AND SIGNATURE PAGE

This report titled "Technical Report on the Preliminary Economic Assessment of the Houston Project, Labrador and Québec, Canada" with an effective date of December 31, 2020 was prepared and signed by the following authors:

	(Signed and Sealed) Glen Ehasoo
Dated at Toronto, ON February 26, 2021	Glen Ehasoo, P.Eng. Principal Mining Engineer
	(Signed and Sealed) Dorota El Rassi
Dated at Toronto, ON February 26, 2021	Dorota El Rassi, M.Sc., P.Eng. Senior Geological Engineer
	(Signed and Sealed) Marc Lavigne
Saint-Augustin-de-Demiurges, QC February 26, 2021	Marc Lavigne, M.Sc., ing. Principal Mining Engineer
	(***Signed and Sealed) Luke Evans***
Dated at Toronto, ON February 26, 2021	Luke Evans, M.Sc., ing. Technical Director, Geology Group Leader
	(***Signed and Sealed) Stephan Theben***
Dated at Toronto, ON February 26, 2021	Stephan Theben, Dipl.-Ing., SME (R.M.) Mining Sector Lead and Managing Principal

29 CERTIFICATE OF QUALIFIED PERSON

GLEN EHASOO

I, Glen Ehasoo, P.Eng., as an author of this report entitled “Technical Report on the Preliminary Economic Assessment of the Houston Project, Labrador and Québec, Canada” prepared for Labrador Iron Mines Holdings Limited with an effective date of December 31, 2020, do hereby certify that:

1. I am Principal Mining Engineer with Roscoe Postle Associates Inc., now part of SLR Consulting Ltd, of Suite 501, 55 University Ave., Toronto, ON M5J 2H7.

2. I am a graduate of the University of British Columbia, Vancouver, British Columbia, in 1998 with a Bachelor of Applied Science in Mining & Mineral Processing Engineering.

3. I am registered as a Professional Engineer in the Province of British Columbia (Reg. #34935), the Province of Ontario (Reg. #100229435), and the Province of Newfoundland and Labrador (Reg. #1037). I have worked as a mining engineer for a total of 22 years since my graduation. My relevant experience for the purpose of the Technical Report is:
   - Author or co-author of numerous Technical Reports.
   - Open pit operational experience in Canada and abroad.
   - Review and report as a consultant on open pit mining projects and operations in Canada and around the world for studies, audits, due diligence, and regulatory requirements.
   - Open pit mine planning and cost estimation.
   - Project cash flow modelling and economic analysis.

4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

5. I visited the Houston Project on October 28, 2020.

6. I am responsible for overall preparation of the Technical Report and for Section 13 and portions of Sections 2 to 6, 15 to 19, and 21 to 24, and related disclosure in Sections 1, 25, 26, and 27 of the Technical Report.

7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.

8. I have had no prior involvement with the property that is the subject of the Technical Report.

9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 26th day of February 2021

(Signed and Sealed) Glen Ehasoo

Glen Ehasoo, P.Eng.

DOROTA EL RASSI

I, Dorota El Rassi, M.Sc., P.Eng., as an author of this report entitled "Technical Report on the Preliminary Economic Assessment of the Houston Project, Labrador and Québec, Canada" prepared for Labrador Iron Mines Holdings Limited with an effective date of December 31, 2020, do hereby certify that:

1. I am Senior Geological Engineer with Roscoe Postle Associates Inc., now part of SLR Consulting Ltd, of Suite 501, 55 University Ave., Toronto, ON M5J 2H7.

2. I am a graduate of the University of Toronto in 1997 with a B.A.Sc.(Hons.) degree in Geological and Mining Engineering and in 2000 with a M.Sc. degree in Geology and Mechanical Engineering.

3. I am registered as a Professional Geological Engineer in the Province of Ontario (Reg.# 100012348). I have worked as a geologist for a total of 21 years since my graduation. My relevant experience for the purpose of the Technical Report is:
   - Review and report on exploration and mining projects for due diligence and regulatory requirements
   - Mineral Resource estimates on a variety of commodities including gold, silver, copper, nickel, zinc, PGE, and industrial mineral deposits
   - Experienced user of Gemcom, Leapfrog, Phinar's x10-Geo, and Gslib software

4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

5. I did not visit the Houston Project.

6. I am responsible for portions of Sections 7 to 12, 14, and related disclosure in Sections 1, 25, 26, and 27 of the Technical Report.

7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.

8. I have had no prior involvement with the property that is the subject of the Technical Report.

9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 26th day of February 2021

(Signed and Sealed) Dorota El Rassi

Dorota El Rassi, M.Sc., P.Eng.

MARC LAVIGNE

I, Marc Lavigne, M.Sc., ing., as an author of this report entitled “Technical Report on the Preliminary Economic Assessment of the Houston Project, Labrador and Québec, Canada” prepared for Labrador Iron Mines Holdings Limited with an effective date of December 31, 2020, do hereby certify that:

1. I am Principal Mining Engineer with Roscoe Postle Associates Inc., now part of SLR Consulting Ltd. My office address is Suite 210, 334 route 138, Saint-Augustin-de-Desmaures, QC G3A 1G8.

2. I am a graduate of Université Laval, Québec, Québec, Canada, in 1987 with a B.A.Sc. in Mining Engineering, and in 1991 with a M.Sc. in Geostatistics.

3. I am registered as an Engineer in the Province of Québec, member of the Ordre des Ingénieurs du Québec (Reg. #99190). I have worked as a mining engineer for a total of 31 years since my graduation. My relevant experience for the purpose of the Technical Report is:
   - Review and report as a consultant on open pit mining projects and operations in Canada and abroad for audits, due diligence, and regulatory requirements
   - Engineering study work (PEA, PFS, and FS) on many open pit mining projects around the world, including commodities such as precious metals, base metals, bulk commodities, industrial minerals, and rare earths
   - Project cash flow modelling and economic analysis

4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

5. I did not visit the Houston Project.

6. I am responsible for portions of Sections 15 to 19 and 21 to 24, and related disclosure in Sections 1, 25, 26, and 27 of the Technical Report.

7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.

8. I have had no prior involvement with the property that is the subject of the Technical Report.

9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 26th day of February 2021

(Signed and Sealed) Marc Lavigne

Marc Lavigne, M.Sc., ing.

LUKE EVANS

I, Luke Evans, M.Sc., P.Eng., as an author of this report entitled "Technical Report on the Preliminary Economic Assessment of the Houston Project, Labrador and Québec, Canada" prepared for Labrador Iron Mines Holdings Limited with an effective date of December 31, 2020, do hereby certify that:

1. I am Technical Director, Geology Group Leader with Roscoe Postle Associates Inc., now part of SLR Consulting Ltd, of Suite 501, 55 University Ave., Toronto, ON M5J 2H7.

2. I am a graduate of University of Toronto, Ontario, Canada, in 1983 with a Bachelor of Science (Applied) degree in Geological Engineering and Queen's University, Kingston, Ontario, Canada, in 1986 with a Master of Science degree in Mineral Exploration.

3. I am registered as a Professional Engineer in the Province of Ontario (Reg. #90345885) and as a Professional Engineer in the Province of Québec (Reg. #105567). I have worked as a professional geologist for over 30 years since my graduation. My relevant experience for the purpose of the Technical Report is:
   - Author or co-author of numerous Technical Reports.
   - Provide supervision and peer review for a large team of resource geologists on a wide range of projects, mines, and commodities worldwide.
   - Consulting Geological Engineer specializing in resource and reserve estimates, audits, technical assistance, and training since 1995.
   - Review and report as a consultant on numerous exploration and mining projects around the world for due diligence and regulatory requirements.
   - Senior Project Geologist in charge of exploration programs at several gold and base metal mines in Quebec.

4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

5. I did not visit the Houston Project.

6. I am responsible for portions of Sections 2 to 12 and 14 and related disclosure in Sections 1, 25, 26, and 27 of the Technical Report.

7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.

8. I have had no prior involvement with the property that is the subject of the Technical Report.

9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 26th day of February, 2021

(***Signed and Sealed) Luke Evans***

Luke Evans, M.Sc., P.Eng.

STEPHAN THEBEN

I, Stephan Theben, Dipl.-Ing., SME (R.M.), as an author of this report entitled “Technical Report on the Preliminary Economic Assessment of the Houston Project, Labrador and Québec, Canada” prepared for Labrador Iron Mines Holdings Limited with an effective date of December 31, 2020, do hereby certify that:

1. I am Mining Sector Lead and Managing Principal with SLR Consulting (Canada) Ltd. at Suite 715, 55 University Ave., Toronto, ON M5J 2H7.

2. I am a graduate of RWTH Aachen Technical University in 1997 with a Mining Engineering Degree. I also passed the State Exam for Mining Engineering in 2000.

3. I am registered as a Professional Member with the Society for Mining, Metallurgy and Exploration (Membership# 4231099RM). I have worked as a mining environmental professional for a total of 21 years since my graduation. My relevant experience for the purpose of the Technical Report is:
   - Responsible for the preparation and success approval of several Environmental Impact Assessment Reports
   - Responsible for environmental aspects of mine permitting for several projects
   - Responsible for the environmental and geotechnical components of several PEA, PFS and FS studies
   - Experience if reviewing and auditing environmental and permitting data for a multitude of projects
   - Work as a government official in Germany and as a technical expert for the European Union in the area of mine permitting

4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

5. I did not visit the Houston Project.

6. I am responsible for the preparation of Section 20 and related disclosure in Sections 1, 25, 26, and 27 of the Technical Report.

7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.

8. I have had no prior involvement with the property that is the subject of the Technical Report.

9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, Section 20 of the Technical Report for which I am responsible contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 26th day of February 2021

(***Signed and Sealed) Stephan Theben***

Stephan Theben, Dipl.-Ing., SME (R.M.)