



## **NORTHSTAR SUCCESSFULLY COMPLETES FRONT-END ENGINEERING DESIGN FOR SCALE UP ASPHALT SHINGLE REPROCESSING FACILITY**

***Total anticipated capital cost estimate of approximately C\$11.75 Million (inclusive of 20% contingency)***

VANCOUVER, British Columbia – March 31, 2022 – Northstar Clean Technologies Inc. (TSXV: ROOF, OTCQB: ROOOF) (“Northstar” or the “Company”) has received a front-end engineering design (the “FEED”) technical report completed by independent third-party BBA Engineering Ltd. (“BBA”) for its planned scale up facility to be constructed in Calgary, Alberta (the “Calgary Empower Facility”). As previously announced by the Company on November 1, 2021, the Company engaged with BBA as consulting engineering firm to provide an independent detailed engineering design study of a modular facility to be deployed across Northstar’s expansion facilities. All currencies within this press release are quoted in Canadian dollars.

The following conclusions, subject to the assumptions and parameters set out therein, were reached in the FEED study:

- **Direct Costs: \$8.6 Million**
  - **Equipment Costs: \$7.1 Million**
  - **Labour and Materials: \$1.5 Million**
- **Indirect Costs: \$1.2 Million**
- **Total Direct and Indirect Costs: \$9.8 Million (excluding 20% contingency)**
- **Contingency (20%): \$2.0 Million**
- **Total Capital Cost Estimate: \$11.75 Million (including 20% contingency)**

Mr. Aidan Mills, President & CEO of Northstar, stated, “For a sustainable, ESG-focused business to succeed it needs: Step 1) a technology that works; Step 2) the ability to scale up that technology; and, Step 3) a clear and profitable commercialization strategy. Steady state production of specification products at our Empower Pilot Facility in Delta, B.C. demonstrates Step 1 and our announcement of the successful completion of our FEED means we are on a clear pathway to Step 2. This is an important milestone in the development of Northstar and our scale up facility design. The FEED study is the first independent engineering analysis of our transformational technology, and we are delighted that our initial estimates of capital costs have been confirmed. We are confident that the work carried out by the integrated Northstar and BBA design team has reached an engineering solution that can deliver our scale up objectives on a timeline that meets our plans and at an estimated cost that makes our innovative solution extremely economic, deployable and attractive. Combined with our revised economic analysis, we now believe this scale up solution is a truly compelling way to solve a major environmental issue and to provide triple bottom line

benefits to the environment, to society and to stakeholders, including shareholders, employees and communities where we operate.”

Mr. Geoff Hall, Director of Business Development for BBA, stated, “BBA is pleased to have delivered the FEED to Northstar as consulting engineer for Northstar’s expansion plans to roll out modular asphalt shingle reprocessing facilities across Canada and the United States. The strong collaboration between BBA and Northstar during the FEED process validated the scope and understanding of the project. This was critical in allowing the project team to develop a capital estimate that brings certainty. We look forward to working alongside Northstar as we advance the Calgary Empower Facility in 2022 and further optimize Northstar’s planned facilities moving forward.”

**Table 1: Capital Cost Estimate (all figures in C\$ thousands)**

<b>Direct Costs</b>		
<b>Equipment</b>		
Plant and Yard Mechanical	Mechanical	\$5,724.5
	Electrical	\$625.5
	Automation / Telecommunications	\$725.4
<b>Total Equipment</b>		<b>\$7,075.4</b>
<b>Labour and Materials</b>		
	Civil	\$137.3
	Structural & Architectural	\$185.0
	Piping	\$645.8
	Electrical	\$486.9
	Automation / Telecommunications	\$87.2
<b>Total Labour and Materials</b>		<b>\$1,542.2</b>
<b>Direct Costs Total</b>		<b>\$8,617.6</b>
<b>Indirect Costs</b>		
Plant	Civil and Mechanical	\$196.6
Project Indirect Costs	EPCM and Commissioning Services	\$980.0
<b>Indirect Costs Total</b>		<b>\$1,176.6</b>
<b>Direct Costs Total</b>		<b>\$8,617.2</b>
<b>Direct and Indirect Costs (excluding Contingency)</b>		<b>\$9,793.8</b>
<b>Contingency (20%)</b>		<b>\$1,957.0</b>
<b>Capital Cost Estimate - Grand Total (including Contingency)</b>		<b>\$11,750.8</b>

*Notes: Figures may not add due to rounding. All fees are estimates and are quoted in Canadian dollars based on an exchange rate of 1.265 Canadian dollars for every one United States dollar as per the Bank of Canada exchange rate on March 17, 2022.*

### **Purpose of Front-End Engineering Design**

The purpose of the FEED study was to produce a capital cost estimate (the “Capital Cost Estimate”) for the process, including necessary definition on all process, mechanical and utility equipment, electrical, automation and control. The other primary purpose of the FEED study was

to develop the design details required so that Phase 2 detailed engineering can generate the needed engineering deliverables and construction plans to start construction in 2022.

### **Type and Purpose of the Capital Cost Estimate**

The Capital Cost Estimate has been prepared within the targeted nominal estimate accuracy of +/- 20% with deliverables developed to a level sufficient for supporting a Class 3/4 Pre-Feasibility estimate as defined in AACE International Recommended Practice No. 18R-97.

### **General FEED Design Criteria**

The general design criteria adopted for the FEED are shown in Table 2 below.

**Table 2: General Design Criteria**

<b>Parameter</b>	<b>Units</b>	<b>Value</b>
Nominal throughput	Tonnes per hour (“tph”)	15 tph
<b>Shingle Composition</b>		
Aggregate	% weight	50%
Fiber	% weight	25%
Asphalt	% weight	25%
<b>Recovery</b>		
Asphalt	%	>95%
Aggregate	%	>95%
Fiber	%	>95%

### **FEED Engineering Deliverables (Completed):**

The FEED stage engineering deliverables completed were the following:

- Engineering Discovery Meeting Summary;
- Process Flow Diagram;
- Heat Mass Balance;
- Process Design Basis;
- Master Equipment List;
- Process Improvement Studies;
- Preliminary 3D Model ;
- Equipment Layout and Pipe Routing;
- Electrical Load List;
- Emissions Summary.

### **Detailed Design Engineering Deliverables (in Progress):**

Detailed design stage engineering deliverables have commenced in a number of areas including:

- Process and Instrument Diagram (“P&ID”):
- Hazard Area Assessment (“HAZOP”) ;
- Long lead / critical equipment datasheets;
- Long lead or critical equipment technical specs;
- Key process detailed design;
- Hazardous area classification;
- Single line diagram;
- Instrument index;
- Network architect drawing;
- Level 2 schedule (Project timeline);
- Water Management Roadmap (Containment).

### **Next Steps:**

In line with the FEED study deliverables, three key next steps are being progressed:

1. Board of Directors approval has been received to commence detailed engineering (equipment manufacturer drawings and design) for any long lead items required for the project;
2. Detailed engineering studies have commenced on critical processes within the scale up design;
3. Full plant detailed engineering design will commence on the progression of steps 1 and 2 above.

### ***Cautionary Note***

The Company cautions that the FEED is preliminary in nature and is based on technical and economic assumptions which could be further refined and evaluated in the planned detailed engineering report.

### **About BBA**

BBA has been providing a wide range of consulting engineering services for over 40 years. Today, its engineering, environmental and commissioning experts team up to quickly and accurately pinpoint the needs of industrial and institutional clients. The firm’s expertise is recognized in the energy and natural resources industry. With 15 offices in Canada and internationally (Chile) offering clients local support and field presence, BBA is recognized for providing some of the industry’s most innovative, sustainable and reliable engineering solutions and strategic advisory services.

### **About Northstar**

Northstar Clean Technologies Inc. is a Vancouver-based clean technology company focused on the sustainable recovery and reprocessing of asphalt shingles. Northstar has developed a

proprietary design process for taking discarded asphalt shingles, otherwise destined for already over-crowded landfills, and extracting the liquid asphalt, aggregate and fiber for usage in new hot mix asphalt, construction products and other industrial applications. Focused on the circular economy, Northstar plans to reprocess used or defective asphalt shingle waste back into its three primary components for reuse/resale at its Empower Pilot Facility in Delta, British Columbia. As an emerging innovator in sustainable processing, Northstar's mission is to be the leader in the recovery and reprocessing of asphalt shingles in North America, extracting the recovered components from asphalt shingles that would otherwise be sent to landfill.

For further information about Northstar, please visit [www.northstarcleantech.com](http://www.northstarcleantech.com).

**On Behalf of the Board of Directors,**  
Aidan Mills  
President & CEO, Director

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### **Cautionary Statement on Forward-Looking Information**

*Neither the TSXV nor its Regulation Services Provider (as that term is defined in the policies of the TSXV) accepts responsibility for the adequacy or accuracy of this release. The TSXV has neither approved nor disapproved the contents of this press release.*

*This press release may contain forward-looking information within the meaning of applicable securities legislation, which forward-looking information reflects the Company's current expectations regarding future events. Forward-looking statements are often identified by the words "may", "would", "could", "should", "will", "intend", "plan", "anticipate", "believe", "estimate", "expect" or similar expressions. Forward-looking statements in this press release include, but are not limited to, statements regarding the anticipated Capital Cost Estimate and related costs of the Calgary Empower Facility, the transitional nature the Company's technology and its ability to solve a major environmental issue and to provide triple bottom line benefit to the environment, society and stakeholders, as well as any other general statements regarding the perceived benefits of the Calgary Empower Facility and Northstar's technology. Such statements are subject to risks and uncertainties that may cause actual results, performance or developments to differ materially from those contained in the statements, including risks related to factors beyond the control of the Company as well as those risks and uncertainties which are more fully described under the heading "Risk Factors" in the final prospectus of the Company dated June 18, 2021 and in the Company's annual and quarterly management's discussion and analysis and other filings with the Canadian securities regulatory authorities under the Company's profile on SEDAR. The novel strain of coronavirus, COVID-19, also poses new risks that are currently indescribable and immeasurable. No assurance can be given that any of the events anticipated by the forward-looking statements will occur or, if they do occur, what benefits the Company will obtain from them. The Company does not undertake any obligation to update such forward-looking*

*information whether because of new information, future events or otherwise, except as expressly required by applicable law.*

*Should one or more of these risks or uncertainties materialize, or should assumptions underlying the forward-looking statements prove incorrect, actual results may vary materially from those described herein as intended, planned, anticipated, believed, estimated or expected. Although the Company has attempted to identify important risks, uncertainties and factors which could cause actual results to differ materially, there may be others that cause results not to be as anticipated, estimated or intended and such changes could be material. The Company does not intend, and does not assume any obligation, to update the forward-looking statements except as otherwise required by applicable law.*