

J&J Paving

Water Management Plan

Indian Brook Quarry Extension

Environmental Assessment #2400
Quarry Permit Application File #71113448

Prepared: May 25, 2026

Quarry Water Management Plan

1. Site Context and Key Risks

Site Description

- **Site Area:** 6.24 hectares (62,400 m²)
- **Topography:** Sloping terrain toward a stream located approximately 180 metres downslope and outside the project boundary
- **Hydrology:** No watercourses, ponds, or wetlands located within the quarry footprint

Primary Water Management Risks

Potential environmental risks associated with quarry operations include:

- High-volume stormwater runoff during extreme rainfall events
 - Sediment transport to nearby watercourses
 - Erosion of exposed quarry surfaces and drainage channels
 - Water quality degradation, including increased turbidity, suspended solids, and potential hydrocarbon contamination.
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2. Stormwater Runoff Estimation 1:100 Year – 24 Hour Rainfall Event

Design Assumptions

The following assumptions were used for preliminary runoff calculations and are considered representative of Atlantic Canadian conditions with a climate change allowance incorporated:

- **Design Rainfall Depth (1:100 year, 24-hour event):** 150 mm (0.15 m)
- **Runoff Coefficient (C):**
 - Quarry / Pit (Sand and Granular soils) .25-.35
 - Use C = 0.4 (Conservative)

Runoff Volume Calculation

Calculated runoff volume:

Runoff Volume = Rainfall x Area x C

$$\text{Runoff Volume} = 0.15 \times 62,400 \times 0.4 = 3,744 \text{ m}^3$$

Peak Flow (simplified Rational Method context)

Assuming:

- Rainfall intensity: 75 mm/hr
- Runoff coefficient: 0.40
- Drainage area: 6.24 ha

$$Q = 0.278xCxIx A$$

$$Q = 0.278 \times 0.4 \times 75 \times 6.24 = 52.0416 \text{ m}^3/\text{s}$$

Design Implications

- Stormwater management infrastructure should safely accommodate approximately **4,000 m³** of runoff storage.
- Drainage conveyance systems should accommodate peak flows in the range of **80–100 L/s** during extreme rainfall events.

3. Stormwater Management Strategy

A. Surface Water Collection System

The quarry drainage system will be designed to collect, direct, and manage runoff while minimizing erosion and sediment transport.

Proposed Measures

- Construction of perimeter diversion ditches upslope of the quarry to prevent clean runoff from entering disturbed areas
 - Development of an internal drainage network to direct quarry runoff toward controlled low points
 - Grading of haul roads with cross slopes between 2% and 4% to promote controlled drainage
 - Use of vegetated areas to slow runoff and promote infiltration prior to discharge.
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4. Erosion Prevention Measures

A. Surface Stabilization

- Progressive rehabilitation of inactive quarry areas.
- Regrading and stabilization of disturbed slopes as operations advance.
- Establishment of vegetation on exposed surfaces where practical.

B. Slope Management

- Construction of benched slopes to reduce runoff velocity.
- Limiting slope gradients to less than 2H:1V where feasible.
- Installation of berms and flow interruption controls to reduce erosion potential.

C. Drainage Protection

- Directing ditch flows through vegetated areas prior to discharge.
 - Installation of check dams within drainage ditches where required.
 - Installation of silt fencing during active construction or disturbance periods as required.
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5. Water Quality Protection

A. Sediment Control Measures

The following sediment control measures will be implemented as required:

- Perimeter silt fencing.
- Temporary sediment traps.

- A temporary or permanent sedimentation pond/sediment control basin will be installed if monitoring or site conditions indicate elevated sediment transport potential.

B. Pollution Prevention

Fueling and maintenance activities will occur only within designated areas equipped with:

- Impermeable working surfaces.
- Spill containment materials and spill response kits.
- Proper storage and handling procedures for fuels and lubricants.

No untreated process water will be discharged directly to the surrounding environment.

C. Monitoring

The quarry operations supervisor will conduct routine inspections:

- Following major rainfall events.
- During active construction and operational periods
- Following implementation of erosion and sediment control measures

6. Protection of Nearby Stream

Stream Located Approximately 180 m Downslope

Key Environmental Risk

Due to site topography, uncontrolled runoff has the potential to transport sediment toward the nearby stream system.

Mitigation Measures

A. Vegetated Buffer Zone

- A minimum 150 m undisturbed vegetated buffer will be maintained between active quarry operations and the ordinary high-water mark of the nearby watercourse.
- Preserve existing natural vegetation within the buffer corridor wherever possible.

B. Flow Attenuation Measures

- Eliminate direct drainage pathways from the quarry to the stream.
- Utilize vegetated swales and level spreaders to disperse runoff flows.

C. Emergency Overflow Controls

- Direct emergency overflow toward vegetated infiltration areas rather than watercourses
 - Install armoured spillways or erosion-resistant outlets where required.
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7. On-Site Drainage Water Management

The site drainage system will separate clean runoff from quarry-affected water.

Clean Water Management

- Undisturbed runoff will be diverted around operational areas using diversion ditches and natural drainage pathways.

Quarry Runoff Management

- Quarry runoff will be directed toward controlled drainage areas and sediment management systems.

Maintenance Activities

Regular maintenance will include:

- Removal of accumulated sediment from ditches and control structures
 - Inspection and repair of drainage channels
 - Monitoring of flow conditions and erosion areas
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8. Climate Change Adaptation

To improve long-term resiliency, the stormwater management system will incorporate climate adaptation considerations, including:

- Increasing design storm intensity assumptions by 15–25%
- Providing additional runoff storage capacity where practical

- Designing infrastructure for more frequent extreme precipitation events
 - Incorporating secondary overflow pathways and redundant drainage controls
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9. Maintenance and Inspection Program

Inspection Frequency

Following Major Rainfall Events

- Inspect erosion and sediment control measures.
- Inspect ditch stability and drainage pathways.
- Confirm proper functioning of runoff controls.

Quarterly Inspections

- Assess sediment accumulation levels.
- Inspect drainage channels and ditch integrity.
- Review condition of vegetated stabilization areas.

Annual Review

- Reassess runoff storage capacity.
 - Conduct erosion and drainage performance audit.
 - Update mitigation measures as required.
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10. Summary of Key Design Elements

Component	Design Criteria
Estimated Runoff Volume	~4,000 m ³
Estimated Peak Flow	80–100 L/s
Primary Controls	Diversion ditches, vegetated drainage areas, sediment controls
Stream Protection	150 m vegetated buffer
Water Quality Protection	Sediment and erosion control measures
Climate Adaptation	Increased storm design capacity and overflow redundancy

Objective

The overall objective of this Water Management Plan is to ensure quarry operations are conducted in a manner that:

- Prevents untreated runoff from reaching nearby watercourses.
- Minimizes erosion and sediment transport.
- Protects downstream water quality and aquatic habitat.
- Maintains compliance with applicable environmental protection requirements and best management practices for quarry operations in Newfoundland and Labrador.



NOTES:

LEGEND

DATE	NO.	REVISIONS	CH.	APP.	APP.

CLIENT
J&J PAVING LTD
CORNER BROOK

PROJECT
J&J Quarry SITE PLAN

PROJECT ENGINEER	DESIGN
PROJECT MANAGER	PREPARED
	CHECKED
SCALE:	DRAWING
HMM PROJECT NO.	PREPARED G.F.
	CHECKED

DRAWING NO. 2025-11-17

REVISION
1