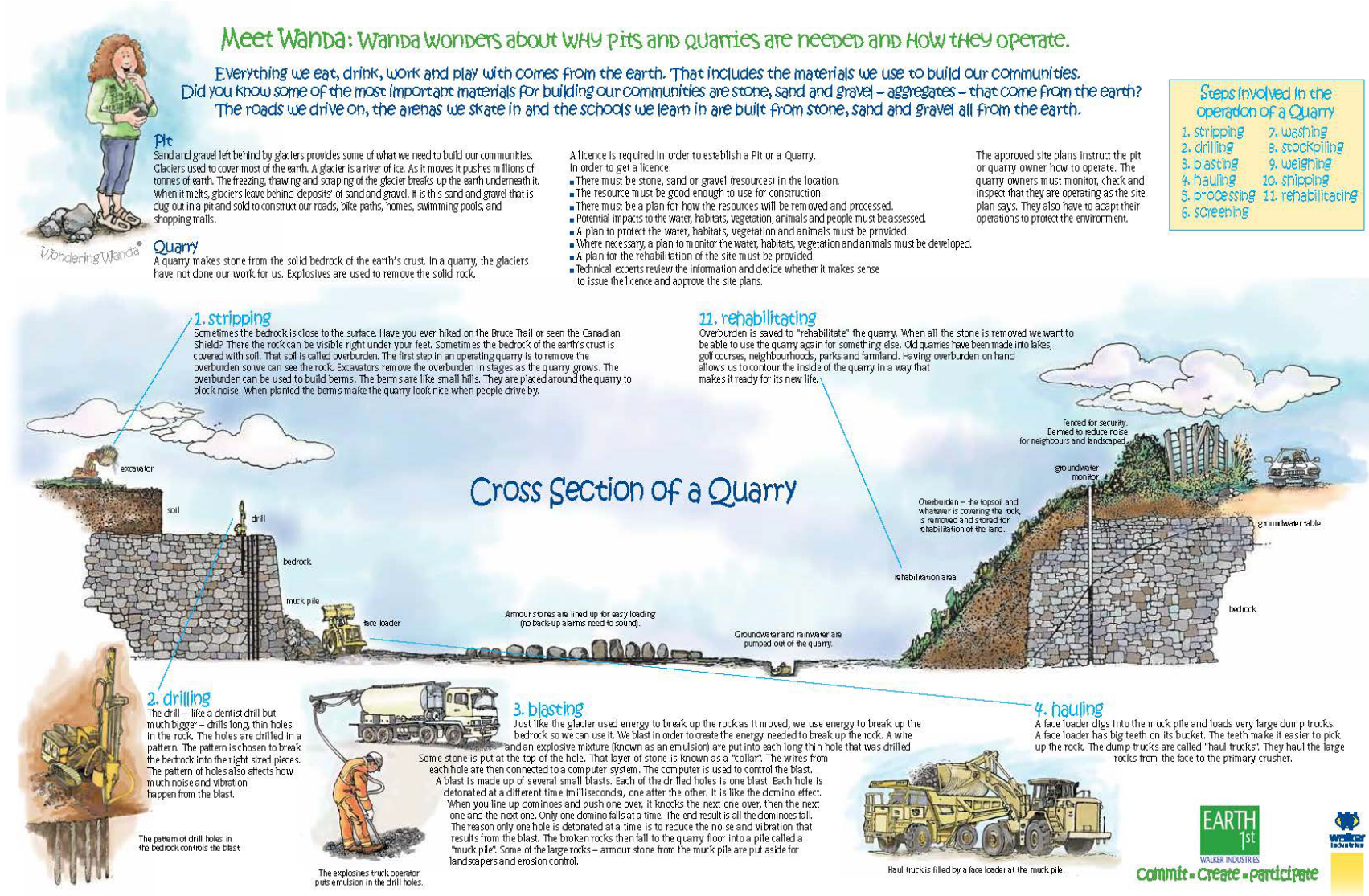
Meet Wanda: Wanda wonders about why pits and quarries are needed and how they operate.
Everything we eat, drink, work and play with comes from the earth. That includes the materials we use to build our communities.
Did you know some of the most important materials for building our communities are stone, sand and gravel – aggregates – that come from the earth?
The roads we drive on, the arenas we skate in and the schools we learn in are built from stone, sand and gravel all from the earth.
Wondering Wanda®
Pit
Sand and gravel left behind by glaciers provides some of what we need to build our communities. Glaciers used to cover most of the earth. A glacier is a river of ice. As it moves it pushes millions of tonnes of earth. The freezing, thawing and scraping of the glacier breaks up the earth underneath it. When it melts, glaciers leave behind 'deposits' of sand and gravel. It is this sand and gravel that is dug out in a pit and sold to construct our roads, bike paths, homes, swimming pools, and shopping malls.
Quarry
A quarry makes stone from the solid bedrock of the earth's crust. In a quarry, the glaciers have not done our work for us. Explosives are used to remove the solid rock.
A licence is required in order to establish a Pit or a Quarry.
In order to get a licence:
There must be stone, sand or gravel (resources) in the location.
The resource must be good enough to use for construction.
There must be a plan for how the resources will be removed and processed.
Potential impacts to the water, habitats, vegetation, animals and people must be assessed.
A plan to protect the water, habitats, vegetation and animals must be provided.
Where necessary, a plan to monitor the water, habitats, vegetation and animals must be developed.
A plan for the rehabilitation of the site must be provided.
Technical experts review the information and decide whether it makes sense to issue the licence and approve the site plans.
The approved site plans instruct the pit or quarry owner how to operate. The quarry owners must monitor, check and inspect that they are operating as the site plan says. They also have to adapt their operations to protect the environment.
Steps involved in the operation of a Quarry
1. stripping
2. drilling
3. blasting
4. hauling
5. processing
6. screening
7. washing
8. stockpiling
9. weighing
10. shipping
11. rehabilitating
1. stripping
Sometimes the bedrock is close to the surface. Have you ever hiked on the Bruce Trail or seen the Canadian Shield? There the rock can be visible right under your feet. Sometimes the bedrock of the earth's crust is covered with soil. That soil is called overburden. The first step in an operating quarry is to remove the overburden so we can see the rock. Excavators remove the overburden in stages as the quarry grows. The overburden can be used to build berms. The berms are like small hills. They are placed around the quarry to block noise. When planted the berms make the quarry look nice when people drive by.
11. rehabilitating
Overburden is saved to "rehabilitate" the quarry. When all the stone is removed we want to be able to use the quarry again for something else. Old quarries have been made into lakes, golf courses, neighbourhoods, parks and farmland. Having overburden on hand allows us to contour the inside of the quarry in a way that makes it ready for its new life.
Cross Section of a Quarry
excavator
soil
drill
bedrock
muck pile
face loader
Armour stones are lined up for easy loading (no back-up alarms need to sound).
Groundwater and rainwater are pumped out of the quarry.
Fenced for security.
Bermed to reduce noise for neighbours and landscaped.
groundwater monitor
Overburden – the topsoil and whatever is covering the rock, is removed and stored for rehabilitation of the land.
groundwater table
rehabilitation area
bedrock
2. drilling
The drill – like a dentist drill but much bigger – drills long, thin holes in the rock. The holes are drilled in a pattern. The pattern is chosen to break the bedrock into the right sized pieces. The pattern of holes also affects how much noise and vibration happen from the blast.
The pattern of drill holes in the bedrock controls the blast.
3. blasting
Just like the glacier used energy to break up the rock as it moved, we use energy to break up the bedrock so we can use it. We blast in order to create the energy needed to break up the rock. A wire and an explosive mixture (known as an emulsion) are put into each long thin hole that was drilled.
Some stone is put at the top of the hole. That layer of stone is known as a "collar". The wires from each hole are then connected to a computer system. The computer is used to control the blast.
A blast is made up of several small blasts. Each of the drilled holes is one blast. Each hole is detonated at a different time (milliseconds), one after the other. It is like the domino effect. When you line up dominoes and push one over, it knocks the next one over, then the next one and the next one. Only one domino falls at a time. The end result is all the dominoes fall. The reason only one hole is detonated at a time is to reduce the noise and vibration that results from the blast. The broken rocks then fall to the quarry floor into a pile called a "muck pile". Some of the large rocks – armour stone from the muck pile are put aside for landscapers and erosion control.
The explosives truck operator puts emulsion in the drill holes.
4. hauling
A face loader digs into the muck pile and loads very large dump trucks. A face loader has big teeth on its bucket. The teeth make it easier to pick up the rock. The dump trucks are called "haul trucks". They haul the large rocks from the face to the primary crusher.
Haul truck is filled by a face loader at the muck pile.
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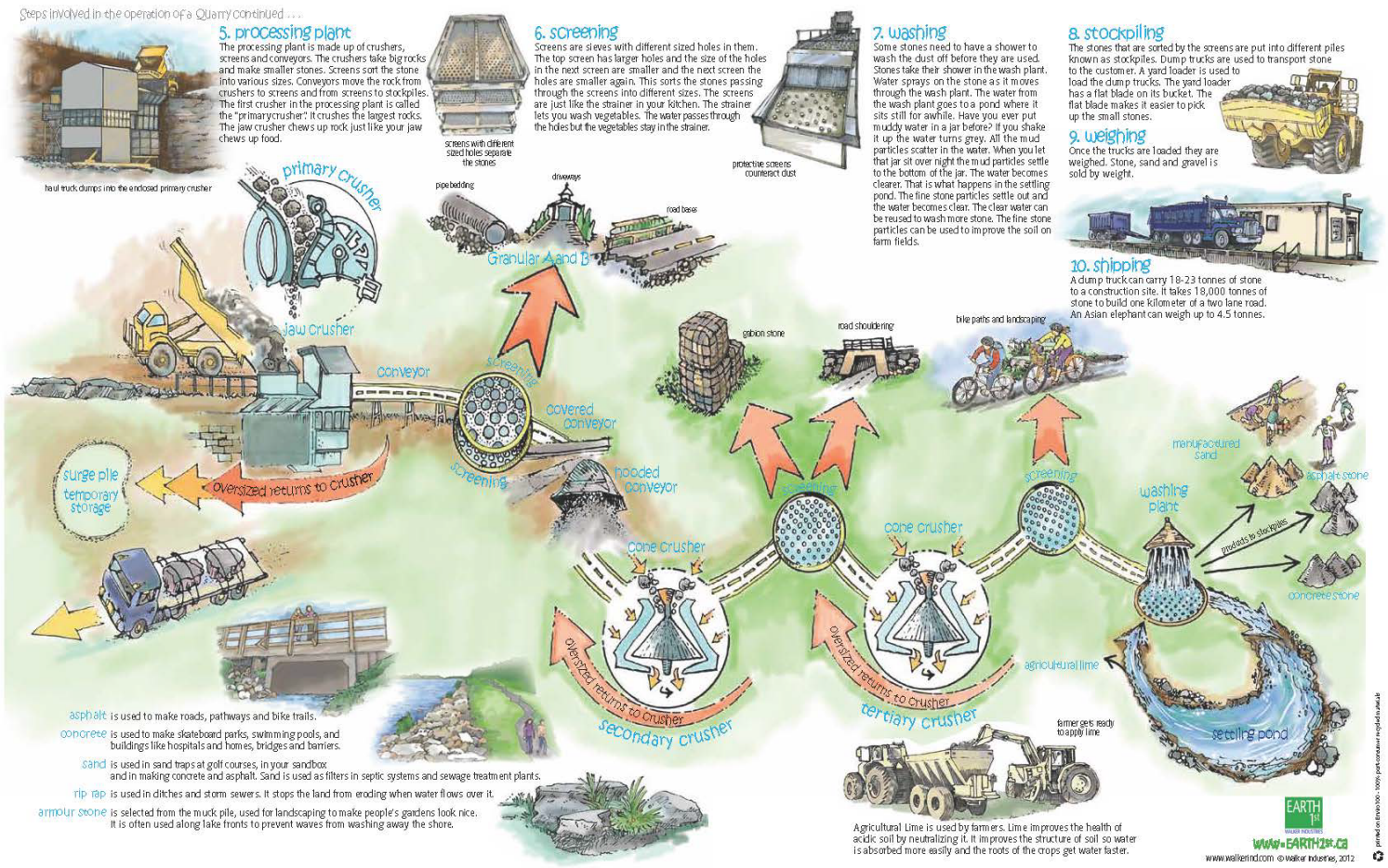
Steps involved in the operation of a Quarry continued . . .
5. processing plant
The processing plant is made up of crushers, screens and conveyors. The crushers take big rocks and make smaller stones. Screens sort the stone into various sizes. Conveyors move the rock from crushers to screens and from screens to stockpiles. The first crusher in the processing plant is called the "primary crusher." It crushes the largest rocks. The jaw crusher chews up rock just like your jaw chews up food.
haul truck dumps into the enclosed primary crusher
primary crusher
jaw crusher
conveyor
surge pile temporary storage
oversized returns to crusher
screens with different sized holes separate the stones
6. screening
Screens are sieves with different sized holes in them. The top screen has larger holes and the size of the holes in the next screen are smaller and the next screen the holes are smaller again. This sorts the stones passing through the screens into different sizes. The screens are just like the strainer in your kitchen. The strainer lets you wash vegetables. The water passes through the holes but the vegetables stay in the strainer.
pipe bedding
driveways
road base
Granular A and B
screening
covered conveyor
screening
hooded conveyor
protective screens counteract dust
7. washing
Some stones need to have a shower to wash the dust off before they are used. Stones take their shower in the wash plant. Water sprays on the stone as it moves through the wash plant. The water from the wash plant goes to a pond where it sits still for awhile. Have you ever put muddy water in a jar before? If you shake it up the water turns grey. All the mud particles scatter in the water. When you let that jar sit over night the mud particles settle to the bottom of the jar. The water becomes clearer. That is what happens in the settling pond. The fine stone particles settle out and the water becomes clear. The clear water can be reused to wash more stone. The fine stone particles can be used to improve the soil on farm fields.
8. stockpiling
The stones that are sorted by the screens are put into different piles known as stockpiles. Dump trucks are used to transport stone to the customer. A yard loader is used to load the dump trucks. The yard loader has a flat blade on its bucket. The flat blade makes it easier to pick up the small stones.
9. weighing
Once the trucks are loaded they are weighed. Stone, sand and gravel is sold by weight.
10. shipping
A dump truck can carry 18-23 tonnes of stone to a construction site. It takes 18,000 tonnes of stone to build one kilometer of a two lane road. An Asian elephant can weigh up to 4.5 tonnes.
gabion stone
road shouldering
bike paths and landscaping
manufactured sand
asphalt stone
products to stockpiles
concrete stone
washing plant
screening
cone crusher
cone crusher
oversized returns to crusher
secondary crusher
oversized returns to crusher
tertiary crusher
agricultural lime
farmer gets ready to apply lime
settling pond
asphalt is used to make roads, pathways and bike trails.
concrete is used to make skateboard parks, swimming pools, and buildings like hospitals and homes, bridges and barriers.
sand is used in sand traps at golf courses, in your sandbox and in making concrete and asphalt. Sand is used as filters in septic systems and sewage treatment plants.
rip rap is used in ditches and storm sewers. It stops the land from eroding when water flows over it.
armour stone is selected from the muck pile, used for landscaping to make people's gardens look nice. It is often used along lake fronts to prevent waves from washing away the shore.
Agricultural Lime is used by farmers. Lime improves the health of acidic soil by neutralizing it. It improves the structure of soil so water is absorbed more easily and the roots of the crops get water faster.
EARTH 1st
WWW.EARTH1ST.CA
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NOTICE

Registration of Undertaking for Environmental Assessment ENVIRONMENT ACT

This is to advise that on April 3rd, 2025, CHAPMAN BROS. CONSTRUCTION LTD. registered the KEMPTOWN QUARRY DEVELOPMENT PROJECT for environmental assessment in accordance with Part IV of the Environment Act.

The purpose of the proposed undertaking is to develop the existing <2 ha Kemptown aggregate Quarry located at 1417 Kemptown Road, in the community of Upper Kemptown, Colchester County. The quarry, which was opened in 2023 under a temporary operating permit is located on PID 20343422. The quarry is planned to be expanded up to 30.6 ha within the next 50 years. Levels of activity including blasting, crushing, asphalt production, and heavy equipment operation, will be similar to current operations and with continued estimated production of an average of 25,000-50,000 tonnes of aggregate annually based on market demands. Aggregate from the Kemptown Quarry is used locally for provincial road construction projects.

Copies of the environmental assessment registration information may be examined at the following locations:

- Earltown General Store, 5556 Highway 311, Tatamagouche Nova Scotia
- Truro Public Library, 754 Prince Street, Truro, Nova Scotia
- NSE EA website (when available) http://www.novascotia.ca/nse/ea/
- Nova Scotia Environment and Climate Change, 36 Inglis Place, Truro, Nova Scotia

The public is invited to submit written comments to:

Environmental Assessment Branch
Nova Scotia Environment and Climate Change
P.O. Box 442, Halifax, Nova Scotia B3J 2P8

On or before May 2nd, 2025 or
contact the Department's at (902) 424-3600, (902) 424-6925 (Fax), or e-mail at
EA@novascotia.ca

All comments received from the public consultation will be posted on the Department's website for public viewing. In the case of an individual, the address, email and contact information will be removed before being placed on the website. By submitting your comments, you are consenting to the posting of your comments on the Department's website.

Published by: Chapman Bros. Construction Ltd. 32 Maplewood Drive, New Glasgow, Nova Scotia, B2H 5Y2

James C. Chapman, P.Eng
Chapman Bros. Construction Ltd.
32 Maplewood Drive
New Glasgow, NS B2H 5Y2

19 November 2024

Michelle Glasgow, Chief
Sipekne'katik First Nation
522 Church St.
Indian Brook, Nova Scotia B0N 2H0

Re: Chapman Bros. Construction Limited, Kemptown Quarry Development, 1417 Kemptown Road, Upper Kemptown, Colchester County, Nova Scotia. Class 1 Undertaking – Environmental Assessment, Under Section 9(1) of the Nova Scotia Environmental Assessment Regulations.

Chief Glasgow,

I'm writing to let you know that Chapman Bros. Construction Ltd. intends to register an expansion of its Kemptown aggregate quarry as a Class 1 undertaking under Section 9(1) of the Environmental Assessment Regulations under the *Environment Act.* As part of the process, we are contacting members of the public including government officials, local residents, and the Mi'kmaq to inform them of the project and invite their input and comment.

Chapman Bros. Construction Ltd. is a construction company which operates aggregate quarries throughout Nova Scotia, which are an important source of aggregate material for many local and regional projects. The Kemptown site is in the community of Upper Kemptown, Colchester County, approximately 20 km northeast of Truro and roughly the same distance from Tatamagouche. The company wishes to continue operating the quarry and to expand its footprint in upcoming years, requiring an approval from the Province of Nova Scotia. The scope of operations for the quarry is not expected to change from the present. An Environmental Assessment has been conducted, as required under Part IV of the Nova Scotia Environment Act. The current approved quarry is located at 1417 Kemptown Road, Upper Kemptown, Colchester County, Nova Scotia (PID 20343422).

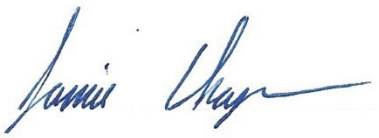
Envirosphere Consultants Ltd. of Windsor, Nova Scotia, is preparing an Environmental Assessment Registration Document that includes information regarding the environmental and socio-economic implications of the Kemptown Quarry, with an anticipated submission to Nova Scotia Environment and Climate Change (NSECC) in early spring 2025. At that time, the document will become available online and at two publicly accessible locations (e.g. Kemptown Community Center and the Truro Municipal office) for review and comment for a 30-day period. A public notification will also appear in the Chronicle Herald and the Truro Daily News on the registration date with details of the quarry expansion project and

availability of the registration document.

The nearest Mi'kmaq communities to the Kemptown Quarry are Millbrook and Sipekne'katik, located near Truro and Shubenacadie and 24 km and 72 km from the quarry site respectively. Davis MacIntyre & Associates completed an Archeological Resource Impact Assessment (Heritage Research Permit A2023NS159) in October 2023, which concluded that no archaeological sites or features were encountered within the study area boundaries.

Chapman Bros. Construction Ltd. extends an invitation to meet and discuss details of the Kemptown Quarry project in the coming weeks. Please contact me at your convenience if you would like to schedule a meeting.

Sincerely,



James C. Chapman
Chapman Bros. Construction Limited
Phone: 902-969-9556
Fax: Fax: (902)- 687 -3545
jamie.chapman@chapmanbros.ca

cc: Chief Bob Gloade, Millbrook First Nation
Chief Lorraine Augustine, Native Council of Nova Scotia
Ms. Twila Gaudet, Kwilmu'kw Maw-klusuaqn Negotiation Office
Ms. Beata Dera, Office of L'Nu Affairs

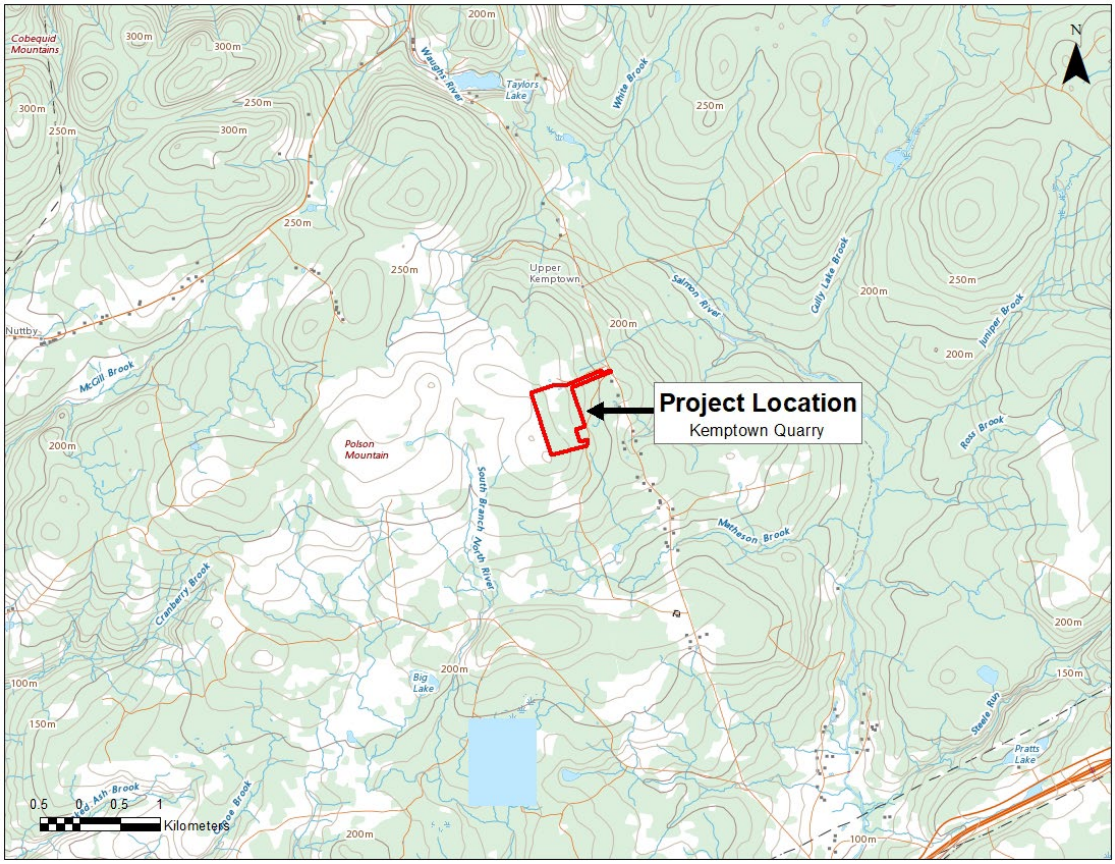


Figure 1. Project location shown on NTS 1:50,000.

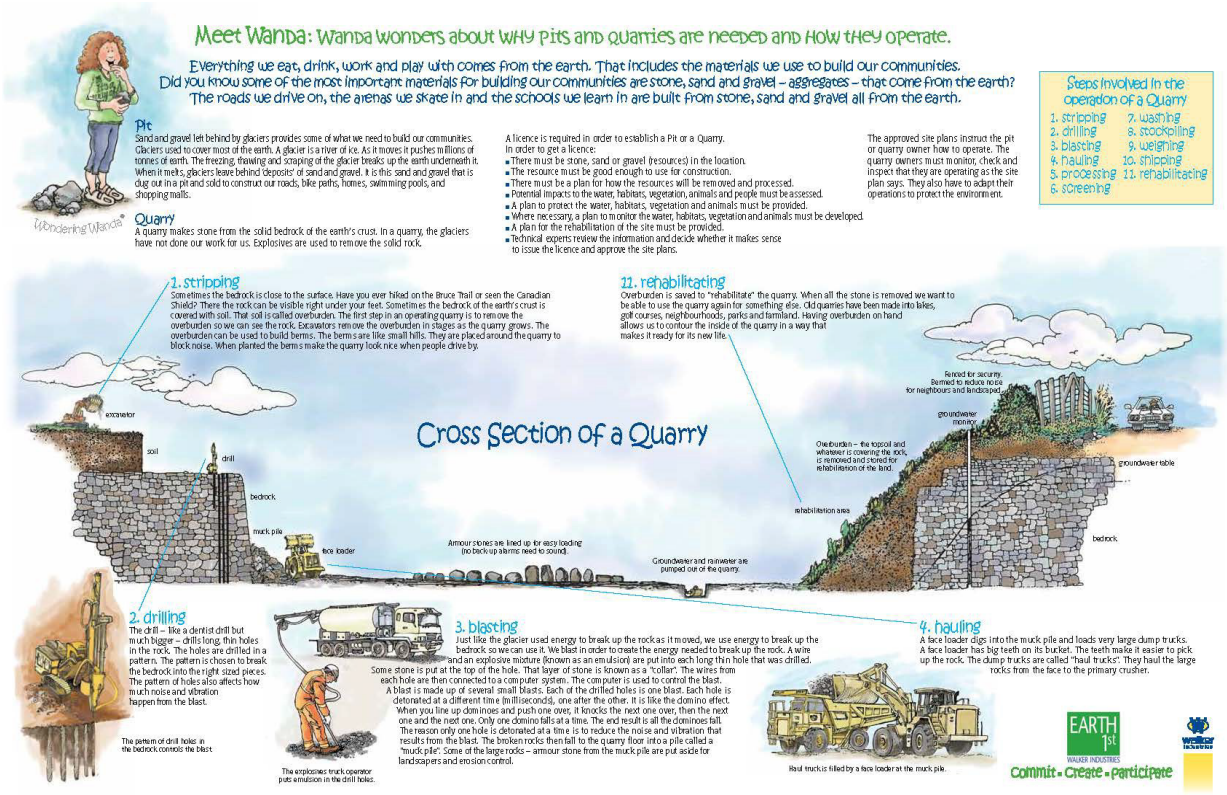


Figure 2. Cross section of quarry operations.