# ATTACHMENT 2

# ALTERNATIVES ANALYSIS

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## ALTERNATIVES ANALYSIS – PROCESSING FACILITY

Several locations were considered for the construction of the processing facility. The selected location was chosen due to its proximity to other elements of the overall development and the minimal impact it will have on the surrounding community. The following Site alternatives were considered:

### No Action Alternative

The No Action alternative maintains the Site condition in its current state. The facility would not be constructed on the Site. This alternative:

- Project Goals: Does not meet the goal of developing a facility capable of processing material from nearby quarry.
- Resource Impacts: No impacts to wetlands

### Alternative Sites

Alternative site locations were considered elsewhere on Bowden Point. Selecting a location anywhere other than the northern most edge of Bowden Point would provide less buffering ability from nearby residential properties. The site location was heavily based on the pier location, as described below. Placing the facility as close to the pier as possible will create the least amount of disturbance and traffic generation.

### Avoidance and Minimization

All proposed wetland impacts are associated with the processing facility portion of this project. The proposed development employed several avoidance and minimization measures on the Site.

Avoidance: Site layout was pursued with the locations of wetlands in consideration. The proposed access road was laid out to avoid any impacts to natural resources, other than two proposed stream crossings. Due to the size and grade requirements needed to construct the processing facility, the development will impact wetlands to meet necessary design needs for the site. There are no proposed wetland impacts within the Town's Shoreland Zone.

Minimization: During construction, proper use of erosion control measures will minimize the impact of construction on protected resources.

Several locations were considered for the construction of the pier. The selected location was chosen due to its proximity to other elements of the overall development, the minimal impact it will have on the surrounding community, and the avoidance of impacts to the Penobscot navigable channel. It also utilized a previously disturbed area to the greatest extent possible. The following Site alternatives were considered:

### No Action Alternative

The No Action alternative maintains the Site condition in its current state. A pier would not be constructed on the Site. This alternative:

- Project Goals: Does not meet the goal of developing vessel loading capabilities. Would require extensive land-transport systems (i.e. trucks, trains) to deliver materials to Virginia. Through initial discussions with interested parties it was determined that land transport was not a preferred option given the large volume of trucks required.
- Resource Impacts: No impact to resources in river.

### Alternative Southern Site

An alternative pier location was analyzed south of the proposed location on the eastern shore of Bowden Point. This alternative:

- Proximity to Larger Development: this pier location is approximately six times as far from the proposed quarrying area as the selected location. This would increase haul distance and reduce efficiency of the mineral processing operations.
- Local Community: This Site would require materials to be hauled through residential areas, creating noise and traffic issues. The selected Site is in an undeveloped area and avoids contact with the local residents.
- Navigable Channel: The width of the Penobscot River in this Site is approximately 3,300', versus the ~ 5,200' at the selected location. Constructing the pier in this location has more potential to interfere the with vessel traffic in the river.
- Water Depths: Water depths were analyzed throughout the Bowden Point area to determine how long the pier would need to be in order for the transport vessels to dock without running aground. Water depths were found to be deeper closer to shore along the northern bank, meaning the pier length and resource impacts could be kept to a minimum in the selected location.

### Alternative Construction Methods

In the selected pier location, resource impacts have been kept to a minimum. The possible construction methods are as follows:

- Rock Pier: A rock pier would consist of a pier composed entirely of rock fill material. This method would require the most fill material, resulting in the maximum resource impact, but the lowest construction costs.

- Rock Filled Sheet Piles: The use of sheet piling would allow the rock fill material to be more contained than the previous alternative. The amount of fill material and resource impact would be less, but there would be additional costs for the sheet pile installation.
- Pile-Supported: The use a pile supported pier would require minimal rock fill material and construction costs associated this method will be the highest of all presented alternatives. While this option presents the least amount of resource impacts, the constructability was determined to be impractical due to the pier's position on the channel and the river's soil type. It would not be possible to design and construct this option while meeting standard design standards and construction methods needed to protect the supports from river's current and ice flow.
- Cofferdam-Supported: The proposed construction method is to use a cofferdam-supported pier. This method will require minimal rock fill material and will have the smallest amount of resource impact other than the Pile-supported alternative. Construction costs associated this method will be slightly lower than the Pile-supported alternative.
- Shorter Pier: A shorter pier would result in less impact to the river bottom, but would limit the size of vessel that it could service without bottoming on the river bottom. Ultimately the project is not expected to be economically viable if the vessel size is smaller than what is proposed.