

#### Mineral Creek Project Scope:

1. Gravel Extraction Evaluation/Plan utilizing current permit amounts **Spring 2017**
  - a) Will require some agency coordination
  - b) We will develop a gravel extraction plan showing the areas to remove gravel and provide access to those areas
  - c) We will prepare a brief memo outlying permit stipulations, extraction areas , methods and travel
2. Kicker Dikes below the Bridge (Design, Contract/Bid Assist, Construction Administration – if necessary) **Fall 2017 - due to survey**
  - a) We will survey the area for dike design and construction
  - b) We will prepare plans, and quantities for bidding the project
  - c) We will work with the agencies to ensure that permits are obtained prior to construction
  - d) We will provide bid assistance and CA Services/ oversight during construction
3. Evaluation of Existing Revetment Infrastructure and Development of a Resulting Prioritized Project List **Summer 2017**
  - a) We will investigate the site with the City to observe existing issues and make recommendations for future repairs
  - b) We will develop a project prioritization list, with photos, and approximate costs

#### Valdez Glacier Stream Project Scope:

1. Gravel Extraction Plan for South of the Bridge (material to be used for City and/or NRCS projects) **Spring 2017**
  - a) We will work with resource agencies to acquire necessary permits
  - b) We will develop a gravel extraction plan showing the areas to remove gravel and access to those areas
  - c) We will prepare a brief memo outlying permit stipulations, extraction areas, methods and travel. Report will also include sediment budget analysis used to determine how much gravel, the effects of removal, and recommendations
  - d) NHC will develop a bed material sediment budget for Valdez Glacier stream based on a morphological approach. NHC anticipates that two lines of evidence will form the basis of the budget estimate. First, NHC will estimate the total volume of material eroded from the historic Valdez Glacier outwash fan since formation of the Proglacial lake. Because the bed material sediment input from the lake is known to be zero, this provides a long-term average rate of sediment movement. Second, NHC will examine available aerial photos to document more recent bank erosion, providing information to constrain the relationship between more recent/present day sediment transport rates and the long-term average. Supporting data including pebble counts to characterize bed material and ground-based observations of channel and bank conditions would be collected during a visit of NHC staff to Valdez coordinated with other projects on Mineral Stream and the Lowe River. Results of NHCs analysis will be documented in a brief technical memo with supporting maps and graphics. This memo will be used to aid development of the implementation plan to remove sediment downstream from the Richardson Highway Bridge.

2. Confirm Finalization of Design for Solution between Bridge & TBD NRCS Project Area, Contract/Bid Assist, Construction Administration **Spring 2017**
  - a) We will prepare plans, and quantities for bidding the project
  - b) We will work with the agencies to ensure that permits are obtained prior to construction
  - c) We will provide bid assistance and CA Services/ oversight during construction
3. Confirm Finalization of Design for Plan B if NRCS project is a NoGo; Contract/Bid Assist, Construction Administration **Spring 2017**
  - a) We will prepare plans, and quantities for bidding the project
  - b) We will work with the agencies to ensure that permits are obtained prior to construction
  - c) We will provide bid assistance and CA Services/ oversight during construction
4. Evaluation of Weak Spots Above the Bridge; Solution Designs, Contract/Bid Assist, Construction Administration **Fall 2017 - due to survey**
  - a) We will investigate the site with the City to observe existing issues and make recommendations for repairs
  - b) We will work with the agencies to ensure that permits are obtained prior to construction
  - c) We will survey the area of repairs for design and construction
  - d) We will prepare plans, and quantities for bidding the project
  - e) We will provide bid assistance and CA Services/ oversight during construction

#### Lowe River Project Scope:

1. Review Implementation Plan associated with Lowe River Gravel Extraction Plan; Develop Project Action List **Summer 2017**
  - a) We will work with NHC to review the implementation plan and prepare a project action list for the development of a gravel extraction on the Lowe River
  - b) Based on the results of DOWL and NHCs Lowe River Sediment Budget study (2015-16), we believe an effective approach to developing a sediment removal plan for the Lowe River to be a pilot study approach. This approach will pair project design with post-project monitoring and documentation of project effects. This description and accompanying cost estimate are focused exclusively on initial baseline data collection and pilot project design; future work will be required to monitor river response to the project and iteratively refine the implementation approach.

We propose to have the City of Valdez deploy their drone to collect detailed NADIR photos of the project area. NHC will provide —if needed—planning support and post-processing to use this data to produce a structure-from-motion based digital topographic surface model and orthophoto mosaic of the project area to serve as a base map for project design.

Assumptions: Valdez deploys drone and DOWL provides survey of ten to twenty ground control points for the drone survey. If requested, DOWL/NHC can complete the required drone flights and ground control point survey.

These data and those published in the Lowe River Geomorphic Atlas and Sediment Budget will be used as the basis for design of (a) pilot excavation(s) to be implemented as soon after design as feasible (at least prior to the next freshet). The design will mimic natural channel patterns and be intended to slow local aggradation rates and shift concentrated scouring flows away from the Alpine Woods Levees.

2. Review URS Levee Evaluation; Develop Project Action List for Groins 1 & 2 Summer 2017
  - a) We will review the previously performed levee evaluation and make recommendations for action at groins 1 and 2
3. Conduct Engineer's Assessment if gaps in URS Evaluation Summer 2017
  - a) We will review the area (site visit that may be in conjunction with another visit) to determine if there are any information gaps or needs to be further evaluated
4. Design, Contract/Bid Assist, Construction Administration for Slope Improvements & Armoring to Rick Wade Emergency Groin Construction Summer 2017
  - a) We will prepare plans, and quantities for bidding the project
  - b) We will work with the agencies to ensure that permits are obtained prior to construction
  - c) We will provide bid assistance and CA Services/ oversight during construction
5. Evaluation of Buy Out Option for Nine Parcels Identified due to High Ground Water Flooding Issues Summer 2017
  - a) We will walk the parcels with the city and give a presentation to council in regards to the purchase of the parcels at highest risk
  - b) We will prepare a report describing the hydraulics of the Lowe River with pros and cons of possibly purchasing properties at highest risk
  - c) We will call into task force/ council meetings on the subject (2)