

Project No. READ-0054

August 25, 2021

Reading Conservation Commission
Attn: Charles Tirone, Conservation Administrator
16 Lowell Street
Reading, MA 01867
ctirone@ci.reading.ma.us



Subject: 445 Pearl Street (Map 46, Lot 14)
Restoration Plan

Dear Commission Members,

As you are aware, the homeowner of 445 Pearl Street is subject to an Enforcement Order (EO) issued by the Reading Conservation Commission in the late winter of 2021. According to the EO, the homeowner, Mr. Rivers, had done work to manage the streams flow. As a result, fill was placed along the southern portion of the stream, which diverted the flow towards the northern bank. This resulted in the undercutting and destabilization of approximately 50' of the northern portion of stream bank.

Please find attached a Restoration Plan and restoration narrative which outlines a detailed approach to reestablishing the original stream location and a stabilized bank.

We look forward to presenting this information at the next scheduled public hearing. If you should have any questions regarding this information, please do not hesitate to contact our office.

Sincerely,

WILLIAMS & SPARAGES LLC

Thorsen Akerley
Thorsen Akerley, R.S.
Project Scientist

cc: Michael Rivers



Introduction:

The subject property is located in northcentral Reading just east of Main Street (Route 62). The property is located approximately 500 feet southeast of the Pearl and Main Street intersection. The property is bounded by residential properties along Pearl Street. The parcel is currently occupied by a single family home, driveway, attached garage, swimming pool and two sheds in the rear. According to the Reading Assessor's, the existing dwelling was constructed in 1965. The subject property is located within Single Family 20 (S-20) zoning district. The property is not located within the Town's Aquifer Protection District.

In total, the site is 20,0002 s.f. in size according to the Reading Assessor's Department. Topographically, the site generally slopes west to east towards the rear of the property. Between the dwelling and property line to the north exists an intermittent stream channel, which flows from a BVW to the west across Main Street. This stream channel continues along the northern property boundary and towards properties along Beaver Road. This channel appears to also collect street drainage and is of importance for this portions of the Town's flood control.

According to the NRCS Web Soil Survey, soils within the subject parcel are predominantly mapped as 255B Windsor loamy sand. The property is not mapped as Priority Habitats of Rare Species by the Natural Heritage and Endangered Species Program (NHESP), nor is the subject parcel located within an Area of Critical Environmental Concern (ACEC).

Ecological Assessment:

The project site was assessed based on preliminary data review, an on-site inspection, and conversations with both the Conservation Administrator, Mr. Tirone, and the homeowner. A topographic instrument survey was completed by Williams & Sparages LLC (W&S) on August 12, 2021, to locate the delineated resource areas the property, and to conduct a topographic mapping of the property. A site inspection was also made by Thorsen Akerley of W&S in late April of 2021, and on August 10, 2021.

Based on our review of the information, site history, and site itself, it is evident that approximately 50' of the northern portion of this intermittent stream bank has incurred significant erosion. Fill material in the form of rocks and gravel was placed along the southern limit of the stream bank, and as a result the streams flow was diverted further north. With flow directed towards the northern bank, the additional water and increased flow velocity appears to have scoured and eroded portions of the northern bank over the years. As a result, 3-5' of soil is now vertically exposed along the northern bank. Vegetation is not able to establish roots along this area of the bank and therefore



further erosion and degradation of the bank should be anticipated if left in its current state.

Restoration Approach:

Given the major instability and slope of the existing northern bank, it is unlikely that this bank could be restored without shifting the stream channel back to its original location. Furthermore, fill and rocks that were placed along the southern portion of the stream will also need to be removed to accomplish this. Once fill is removed from the southern portion of the stream, new bank slopes can be established with live willow stakes, erosion control blankets and erosion control seed mix. Work should be done during a dry period of the year to limit the downstream migration of sediment.

Soil bioengineering techniques are proposed to be used to control erosion of the restored stream. Vegetation established with bioengineering treatments create conditions that allow stable landforms and healthy soils along with a host of functions and values such as water quality improvement and enhanced flood control. Willow stakes approximately 3' long are installed approximately 2.4' deep. The underground portion of the stem grows roots that bind the soil and the aboveground portion slows the near surface flow velocity to eliminate erosion and foster sediment deposition.

Primary objectives include:

- Establish native woody riparian vegetation for bank and bed stability;
- Restoring riparian habitat and reconnect the bank corridor;
- Restoring hydrologic regime to natural conditions; and
- Reducing sediment and pollutants from surrounding land uses through dense planting.

Site Design:

The channel bed will be returned to historic elevation and grade. These elevations are shown on the accompanying Restoration Plan, but values may need to be slightly adjusted in the field. Excavation with a mini-excavator will establish elevations within the restored channel bed within the degraded area and tie into the downgradient healthy portion of the stream. A staked 12" Coconut coir log shall be installed at the end of the stream restoration area to limit any downgradient migration of sediment during excavation. Given the stream appears to dry up during the summer, this should not be a significant issue. The new stream bed should be lined with material matching the downslope natural stream and consist of rounded river rock in a 2-4" range.



Following fill removal along the southern stream boundary and excavation of the restored stream bed, 12" diameter Coconut coir logs with wood stakes on either side (see detail) of the restored are proposed along either side of the outer boundary of the new stream bed. Logs should be butted end to end. Clean topsoil in the sandy loam texture range shall be used to create the new banking along the northern and southern portions of the stream with high organic content loam used as topsoil over the new subgrade. The stream banks are proposed be installed at no steeper than a 2:1 slope along the southern portion of the stream and 1.5:1 along the northern portion of the stream. Proposed grades for the banking are shown on the accompanying plan.

Following earthwork, soils will be left rough and loose within the sloped banks where live staking will take place above the high water mark. All equipment traffic will avoid crossing or otherwise encroaching the restored stream channel or bank, as most of this work can be completed from the driveway side of the stream. Willow cuttings will be completed using dense live staking with spacing of two per linear foot. Stakes up to 3' long will be installed approximately 2.4' deep. Willow cuttings may include the species listed below (all native to Massachusetts):

- Shining willow (*Salix lasiandra* or *S. lucida*)
- Bebb's willow (*Salix bebbiana*)
- Pussy willow (*Salix discolor*)
- White willow (*Salix alba*)
- Sageleaf willow (*Salix candida*)
- Black willow (*Salix nigra*)
- Crack willow (*Salix fragilis*)
- Silky Willow (*Salix sericea*)

For live staking, correct methods for collection, care, and installation of willow cuttings are critical to success. Methods are described on the accompanying plan. Necessary monitoring should be in place to guide installation. Areas of exposed soil resulting from construction and not within live staking zones will be seeded using a native erosion control mix.



Construction Schedule:

As discussed above, all work should be done during a dry period of the year, and during a period of likely dry upcoming weather.

1. Mark the boundary of excavation limits.
2. Install staked Coconut coir-logs along downgradient limit of stream.
3. Remove fill material along southern limit of channel. Excavate restored channel. Check the elevation and grade of new channel.
4. Install staked Coconut coir-logs along either side of new stream bed.
5. Install sloped fill along new stream banking to toe of Coconut coir logs along each side of stream. Seed with native erosion control mix.
6. Lay staked erosion control blanket on top of native erosion control mix.
7. Plant live cuttings as per detail in the accompanying restoration plan.
8. Seed any disturbed areas outside of live staking/restoration zone.
9. Monitoring of restored areas for 2 years.

Monitoring:

Monitoring is critical to any restoration project to identify problems in the early stages when corrective measures can be most effective and to ensure that the project goals are being met. As part of the monitoring program, the following activities are recommended:

1. Water willow cuttings once per week during the first growing season;
2. Inspect cuttings for damage by wildlife during each watering; and
3. Inspect slope for erosion.

Erosion Controls:

Erosion Controls in the form of stakes Coconut coir logs are proposed along the end of the stream restoration area and along the toe of the proposed banks. These logs are decomposable, and can remain in place until slopes are well established or allowed to decompose in place.

