www.storycountyiowa.gov/conservation

Tedesco Environmental Learning Corridor

1815 Plaza Loop
Ames IA 50010

In 2017, this stream had a major restoration completed and a stream buffer installed.

The goals of the stream restoration were to:

- Demonstrate innovative approaches to stream bank stabilization;
- Slow down the flow of water to reduce erosion;
- Re-vegetate the shoreline to protect and stabilize banks;
- Protect existing trees where possible;
- Remove invasive vegetation and replace with native plant communities and;
- Improve in-stream habitat.

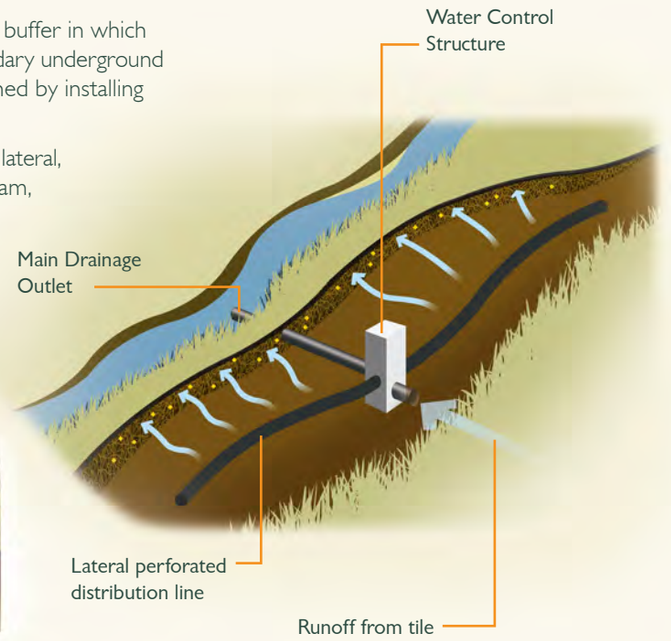
Previously stormwater runoff scoured the banks of the stream and washed soil into the water.

SATURATED BUFFER

A saturated buffer is a vegetated, riparian stream edge buffer in which the water table is artificially raised by providing a secondary underground outlet for the tile line along the buffer. This is accomplished by installing a water control structure in the main drainage outlet.

The structure diverts the flow from the tile outlet to a lateral, perforated distribution line running parallel to the stream, along the vegetated buffer strip. (During periods of high flow in the tile system, the structure is set to bypass excess flow to the main drainage outlet.)

As the drain water is introduced to the buffer through the distribution line, the soil becomes saturated.



As the water flows into the buffer area, the plants and soil organisms have time to remove nutrients and other potential pollutants from the tile before it reaches the stream.

NATIVE PLANTS

Native grasses, forbs, and trees were added along both sides of the stream. These will develop deep roots that help hold soil in place, and keep it from eroding away each time the ground is saturated.

PERMEABLE PAVING

A surfacing called FilterPave® was used within the park for trails that take visitors down to the stream.

The pavement is made from rock and post-consumer recycled glass, material that would typically go to the landfill. The highly permeable surface is designed to allow water to trickle through the porous surface, reducing stormwater runoff.

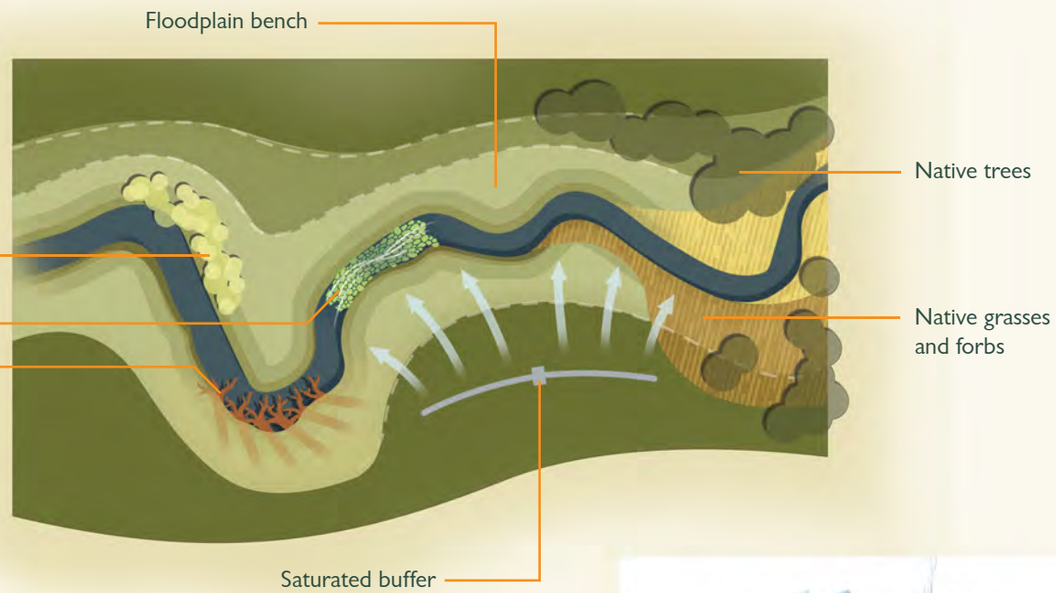
The bonding adhesive is comprised of 2/3 natural plant-based resin, safe for aquatic and plant life.

TEDESCO ENVIRONMENTAL LEARNING CORRIDOR

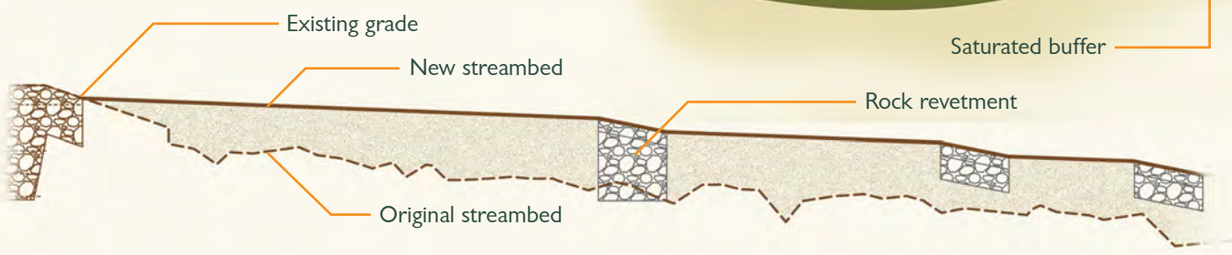
STREAM RESTORATION & WATER QUALITY PRACTICES

STREAM RESTORATION

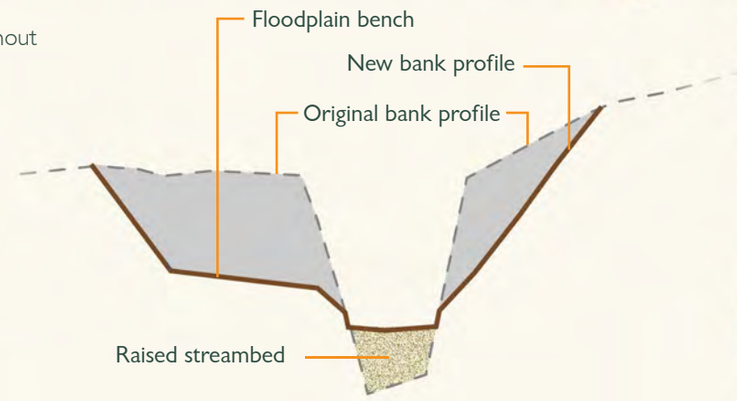
Restoration goals were accomplished through implementation of multiple restoration and water quality practices including rootwad revetment, live stakes, rock riffles, soil lifts, floodplain benches, and saturated buffers.



First, the stream bed was raised to create an even flow downstream and the banks were resculpted from their original profile to a more gentle 3 to1 slope.



The stream was reconnected to the floodplain throughout the corridor by raising the streambed or by excavating floodplain benches adjacent to the channel.



Providing floodplain connection allows the stream to leave its banks during large storm events which allows water to spread over a larger area, reducing its velocity and erosive force. It can also reduce flooding in areas downstream of the park.

Raising the streambed to reconnect to its historic floodplain

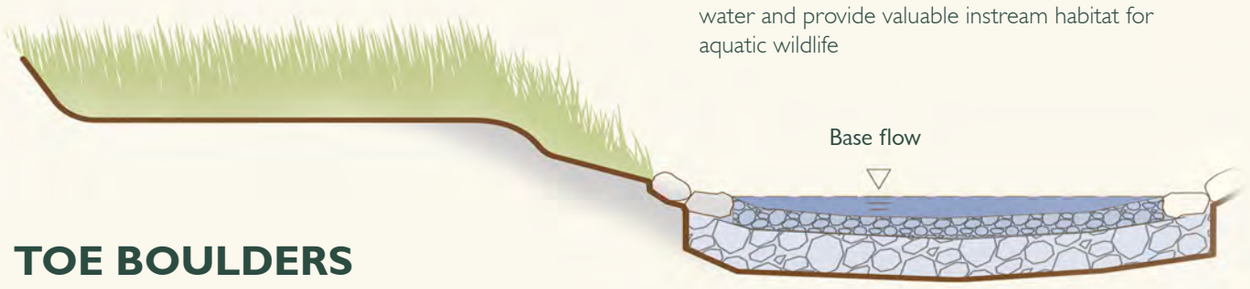
Stormwater wetlands were created to accomodate water run-off as part of the construction project for buildings and parking areas in the Research Park, as well as future development.

The wetland is also designed to accept excess water from the stream in case of a flood event.

The geotextile fabric encapsulates the soil lift and provides structure and stability while the vegetation becomes established. Once established, the root systems of the willows and other vegetation stabilize the bank and decrease the speed of water flowing through the stream, reducing erosion of the streambank.

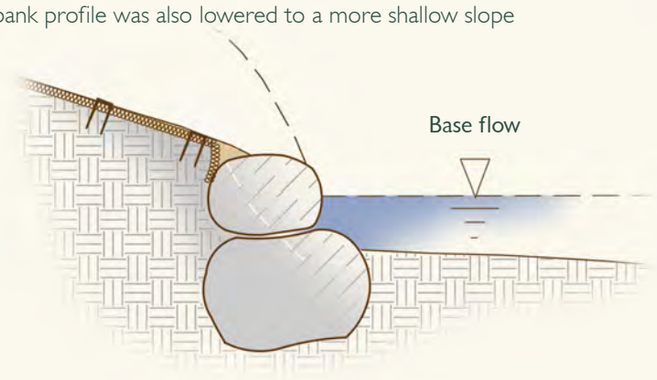
FLOODPLAIN BENCH

A benched bank gives the stream access to the floodplain during high water flow conditions. The benched bank is the flatter area just outside the normal stream channel. This allows the stream to widen and slow down the water flow. Additionally, the volume of water held back in the floodplain bench area may contribute to reduced flooding downstream of the park.



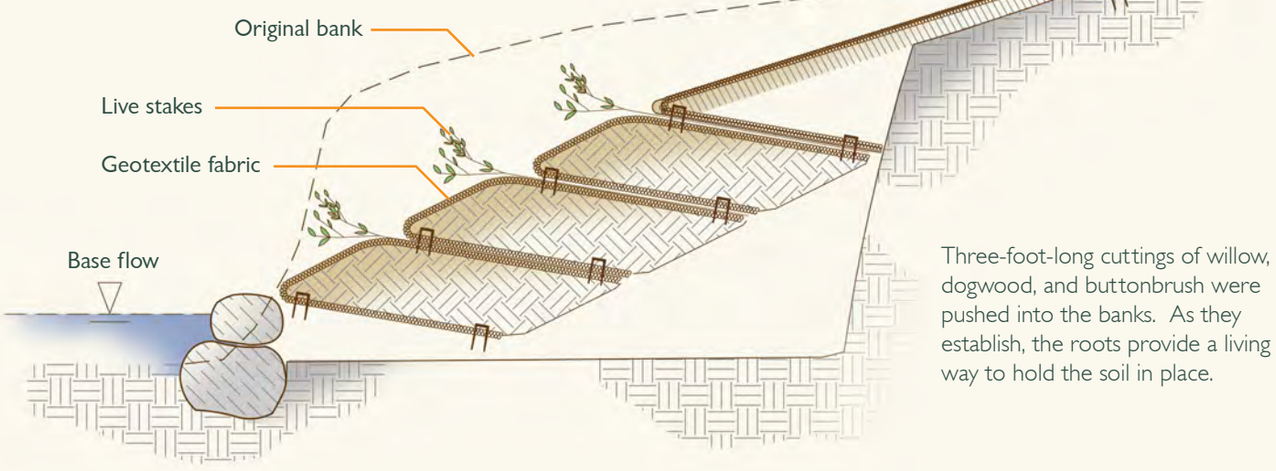
TOE BOULDERS

Toe boulders are placed at the toe of the streambank to prevent scouring and erosion of the bank. At TELC, the bank profile was also lowered to a more shallow slope



SOIL LIFTS

A soil lift consists of layers of soil (lifts) taken from the eroded streambank and wrapping it in geotextile fabric to form a new edge for the stream.



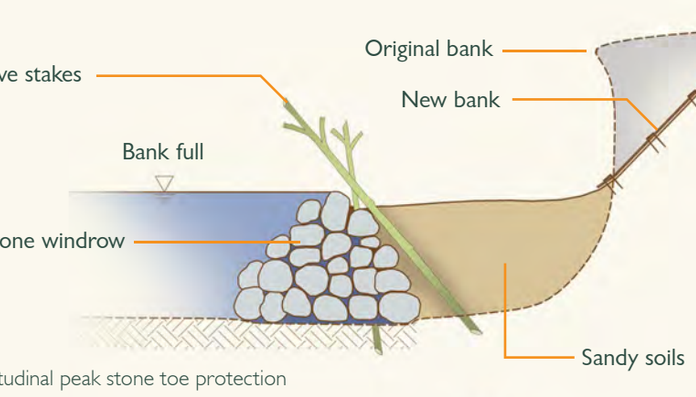
Three-foot-long cuttings of willow, dogwood, and buttonbrush were pushed into the banks. As they establish, the roots provide a living way to hold the soil in place.

ROCK RIFFLES

Rock riffles help control the speed of the stream and prevent it from eroding deeper which causes bank instability. In addition, riffles oxygenate the water and provide valuable instream habitat for aquatic wildlife

Rock riffles

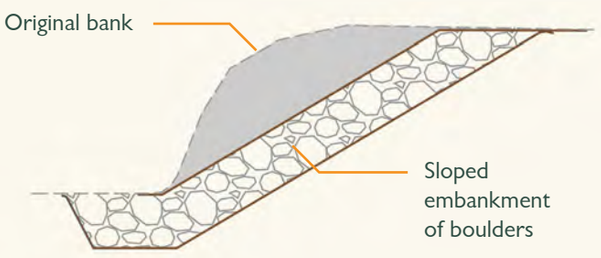
Toe boulders



Longitudinal peak stone toe protection

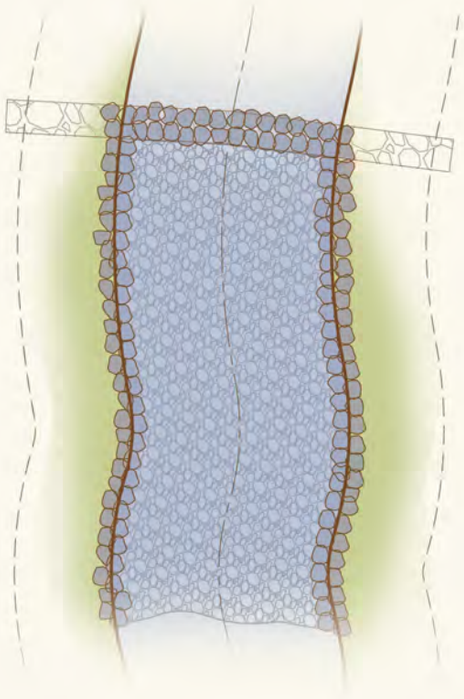
ROCK LETDOWNS

Rock letdowns provide extra protection on slopes in locations where concentrated runoff from the surrounding area flows down the bank and into the stream. The rock acts to prevent erosion of the streambank, which is vulnerable to heavy water flow during heavy rain or flood events.



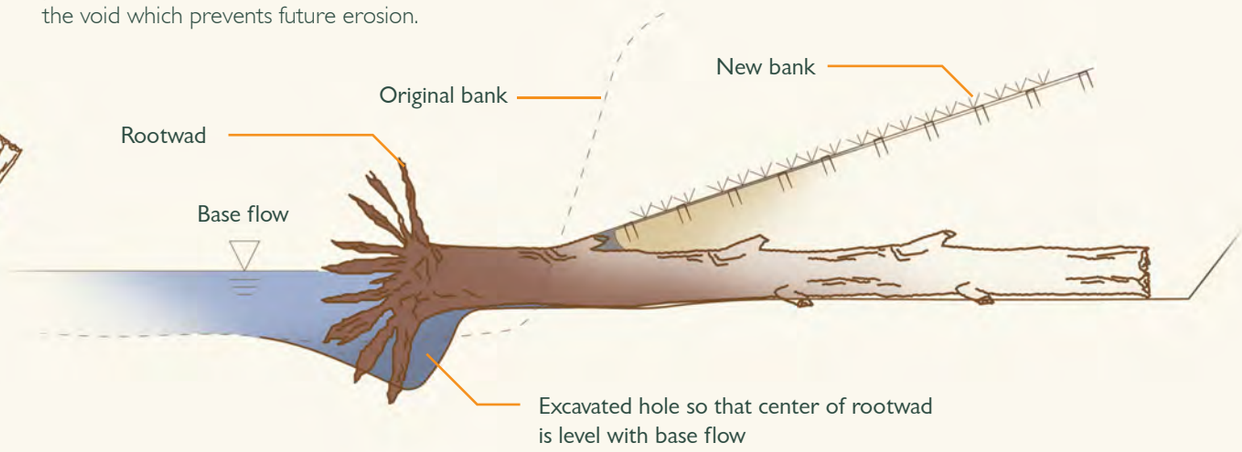
Rock letdown

LIVE STAKES



LONGITUDINAL PEAK STONE TOE PROTECTION

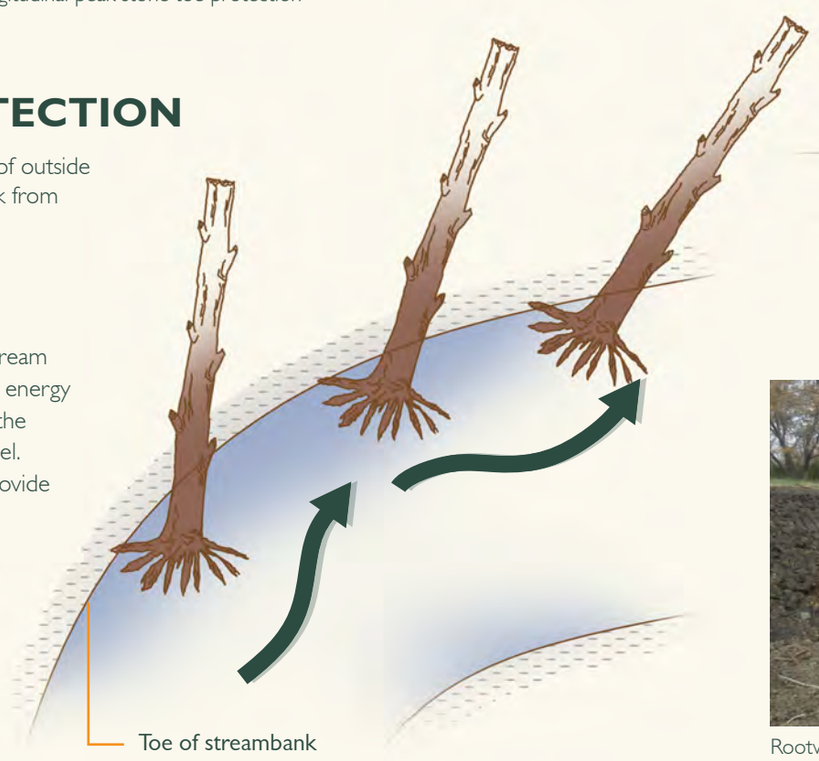
This practice was utilized in a location where the existing sandy streambank soils were not suitable to provide protection against the shear stress from the stream flow. A peaked windrow of stone was placed along the toe of the eroding bank with live stakes placed behind. The stone prevents erosion of the toe while vegetation holds the upper bank in place. If the stream flow starts to erode the bottom of the stone windrow, stones fall into the void which prevents future erosion.



ROOTWAD TOE PROTECTION

Rootwad toe protection strengthens the banks of outside bends of the stream. This keeps the streambank from eroding away and widening due to the water's erosive energy.

This was created reusing the root fan and lower trunks of trees that were removed during the stream restoration. The rootwads dissipate streamflow energy and move the ***thalweg*** (fastest flow) away from the streambank and toward the center of the channel. They protect the bank from erosion and also provide valuable in-stream habitat for aquatic wildlife.



Rootwad toe protection