

# AG PARTNERS FEED MILL EXPANSION

Location: Goodhue, MN

Project Type: Industrial



**DUROTERRA™**



## DUCTILE IRON PILE ADVANTAGES

- Low vibration installation adjacent to existing building
- Ability to work in limited access areas
- Rapid installation
- Moderate capacity solution

### PROJECT DESCRIPTION

Expansion of the existing Ag Partners Feed Mill Facility involved construction of a new loading/receiving expansion immediately adjacent to the existing structure. Multiple new elevated ingredient storage bins were planned to be supported by a mat foundation. Axial loads were 422 kips plus footing weight along with a wind-induced overturning moment of 1,500 k-ft for the elevated structure.

### GEOTECHNICAL CONDITIONS

Soil conditions consisted of up to 20 feet of fill containing loose silty sand and soft silt and clay. The fill was underlain by weathered sandstone and dolomite. One boring encountered a thin layer of glacial till between the fill and weathered rock. Refusal on competent rock occurred in all borings around 30 feet below grade. No groundwater was encountered.



## PROJECT CHALLENGES

Provide mat foundation support immediately adjacent to an existing facility.

## DESIGN AND CONSTRUCTION SOLUTION

Design team members considered overexcavation and replacement or ground improvement. The overexcavation and replacement option required sheeting because of the proximity to the existing building; this significantly increased the cost and risk. Ground improvement also presented access challenges and a risk for unacceptable vibrations next to existing below grade structures.

Engineers at VAA and Ground Improvement Engineering arrived at a Ductile Iron Pile solution. The Ductile Iron Pile option was installed from pile cap elevation and eliminated the need for excavation and sheeting. The low vibration, driven pile system was also able to be installed immediately adjacent to the existing structure with little risk of vibration impacts.

A Series 118/7.5 Ductile Iron Pile (4.65 inch outer diameter and 0.30 inch wall thickness) was selected to provide a working capacity of 40 tons for mat foundation support. A total of 30 Ductile Iron Pile locations were specified. Piles were installed through the fill and weathered rock to terminate on competent rock at depths around 30 feet. Piles were terminated by achieving a driving rate of less than 1 inch of movement in 50 seconds or more. Following installation, the piles were filled with neat cement grout and capped with bearing plates.

The 30 piles were installed in only 2 working days – considerably shorter duration than other traditional options.



## PROJECT TEAM

**DIP Installation Partner:** Peterson Contractors, Inc.

**DIP Design Partner:** Ground Improvement Engineering, Inc.

**Geotechnical Engineer:** American Engineering Testing, Inc.

**Structural Engineer:** VAA, LLC

**General Contractor:** Lodermeiers, Inc.