



Duncan Avenue  
**Worcester, Massachusetts**

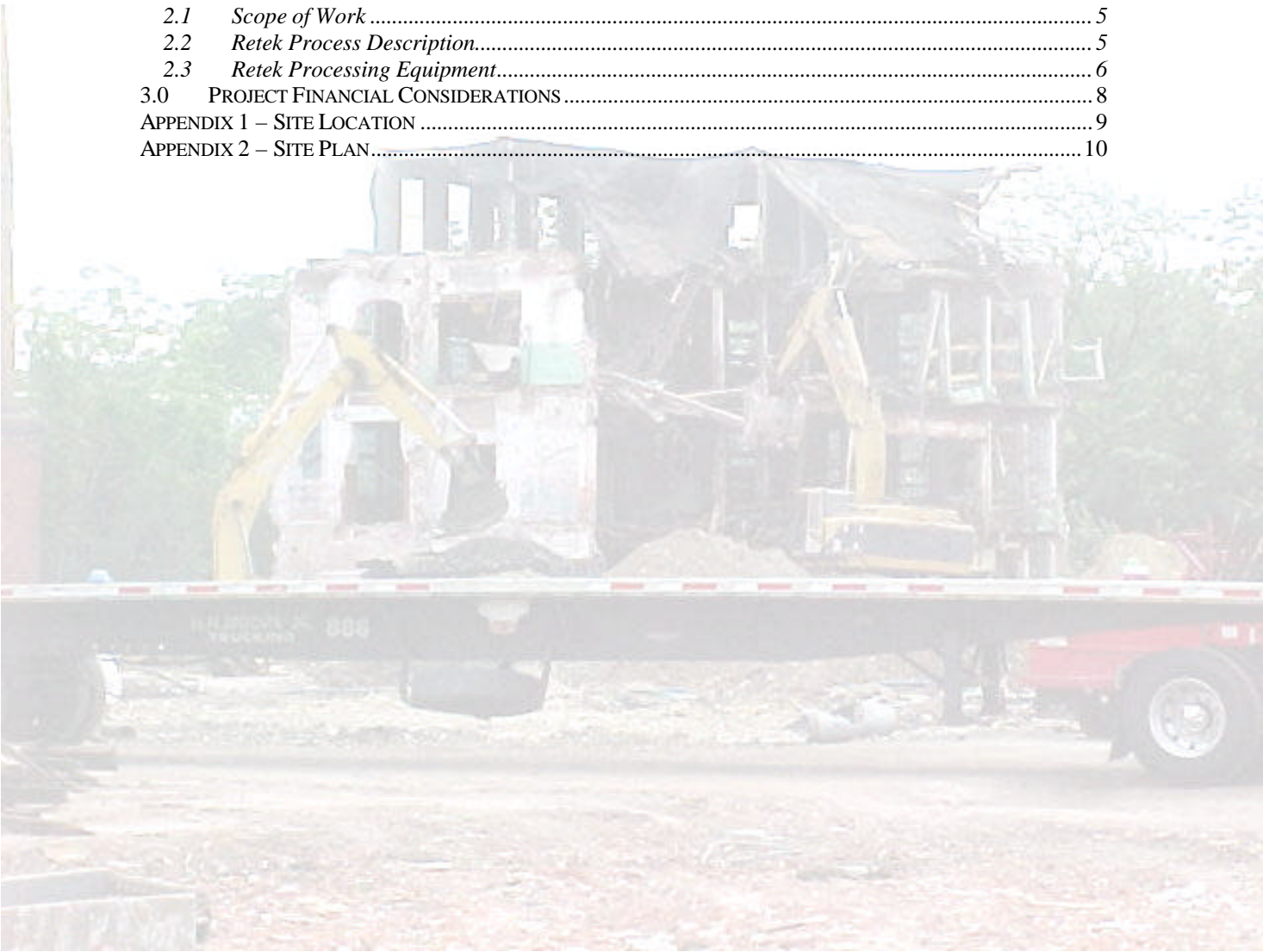
**A Brownfield Project**



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## 1.0 Introduction

This case study of the property, formally known as the Reed and Prince factory located in Worcester Massachusetts. The facility was used for manufacturing metal fasteners and associated metal products from the early 1900's to 2000.

The case study will outline the history of the site, the causes of contamination and the necessary remediation being undertaken by United Retek. In addition we will outline the financial incentives, from different sources used by the owners of the property to offset the cost of remediation.

The information contained in this document is also intended as a primer to explain the technology used by United Retek to clean up the site, and the formation of a paradigm to be used in developing other contaminated or "Brownfield" properties.

### Site History and Background

The former Reed and Prince factory has been used for manufacturing metal products since the early 1900's. The site location is shown in appendix 1 and is located in an urban area of mixed residential, industrial, and commercial use in the City of Worcester, Massachusetts. The actual site layout is shown in appendix 2. The original manufacturing buildings, which consist of a series of interconnected brick buildings, have been demolished in July 2002.

In 1998, 24 underground storage tanks were excavated and removed from the site. The tanks had been used to store a variety of petroleum products, ranging from #6 fuel oil to gasoline. Leakage from the tanks over the years have contaminated the soils and ground water in areas C & D.

A series of environmental investigations were performed on behalf of the potential developers between March 1997 and June 2001. The investigation activities identified a third area with impacts to soil and ground water in area G, along with other areas of concern.

A Release Abatement Measure (RAM) Plan was prepared and submitted to the Department of Environmental Protection (DEP) in November 2000. The RAM plan proposed to access the buildings for hazardous waste constituents, to excavate contaminated soil, and to remediate residual petroleum in ground water using Fenton's reagent (hydrogen peroxide and iron). No RAM activities were performed and a revised RAM plan was resubmitted in March 2002. This RAM plan outlined responsibilities and procedures for excavating and treatment of impacted soils.

### Disposition of the Property

The 10.5 acre industrial mill site will be redeveloped into a 68, 652-sq/ft Price Chopper Supermarket. The project requires the demolition and removal of the existing 230,250-sq/ft industrial mill complex.

## **Project Members**

Owner; Reed and Prince Acquisition Corp

Developer: O'Connell, Worcester, LLC

Project Manager: Environmental Resource Management (ERM)

Sub-Contractors: United Retek Corporation – Soil Remediation



## 2.0 United Retek's Role

### 2.1 Scope of Work

It had been the initial intention to excavate and transport the contaminated soil to either a treatment facility or landfill. United Retek's on-site remediation technology was chosen instead as the processed material can be used as structural fill and paving base for the parking lot, representing additional project savings as compared to trucking in backfill to the site.

United Retek's scope of work on the project is:

1. Mobilization to the site of our Pugmill, cement silo, power screener, and asphalt emulsion tanker.
2. Transfer soil from stockpile to Pugmill.
3. Solidification/Stabilization of contaminated soil by mixing asphalt emulsion and Portland cement for use as structural backfill or base paving material for a parking lot.
4. Test treated soils to demonstrate that it will not leach contaminants into the environment.

### 2.2 Retek Process Description

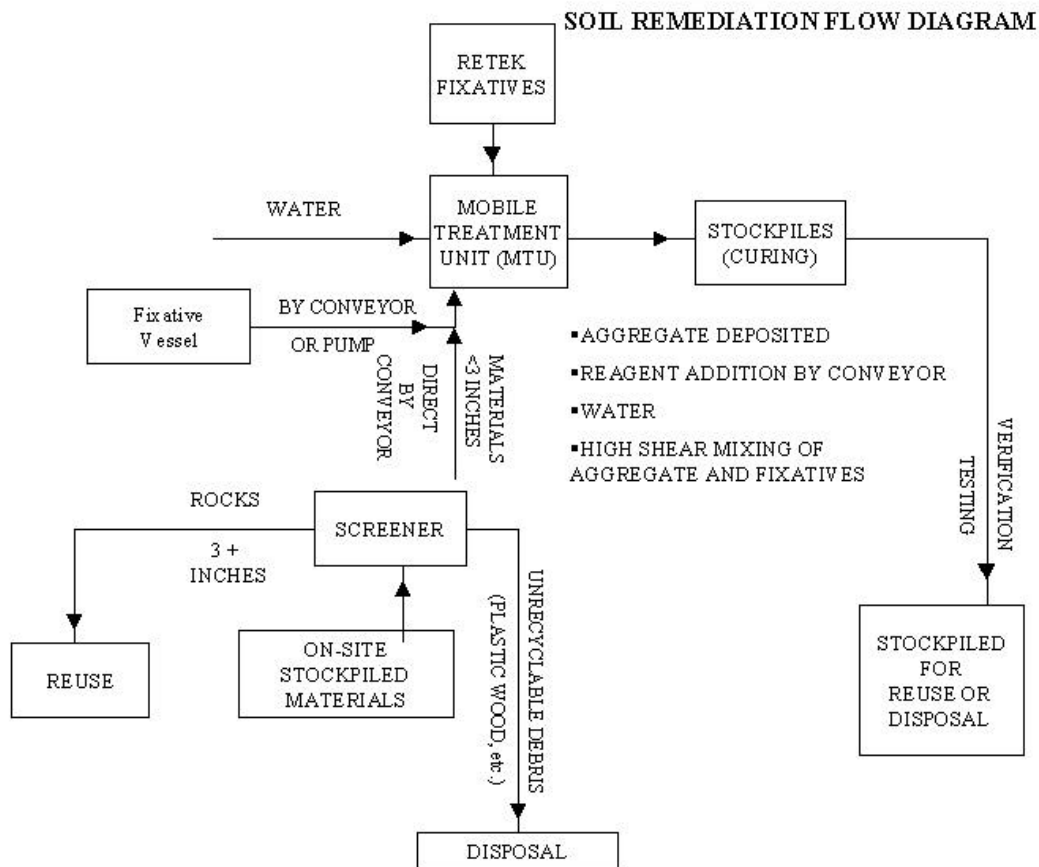
#### Pugmill Method

The first step in the pugmill process involves crushing and/or screening to produce a physically uniform (3-inch maximum) material. Miscellaneous debris, unsuitable for inclusion in the final product, is separated from the recyclable soil. The recycling process involves blending the contaminated soil and other aggregates with asphalt emulsion and Portland Cement for the stabilization and structural integrity of poor soil types as needed. As the soil passes through a series of counter-rotating blades in the pugmill, the reagents are applied at a predetermined blending ratio.

During curing, the stockpile is covered or uncovered, depending on precipitation potential.

#### Processing Information

For petroleum-impacted soils, contamination levels up to 60,000 ppm TPH (total petroleum hydrocarbons) have been permitted in some jurisdictions and can be successfully recycled. Recycling of petroleum-contaminated soils on-site involves screening followed by pugmill mixing of asphalt emulsions to produce a cold mix asphalt paving product. This method has proven effective for many years and has resulted in the beneficial re-use and recycling of soils at previously contaminated sites and underground storage tank locations. Not only is the petroleum contamination remediated, but also the property is improved by the installation of the cold mix pavement or road base for parking areas using materials from the site. Structurally inferior soils can be upgraded by adding Portland cement or other additives.



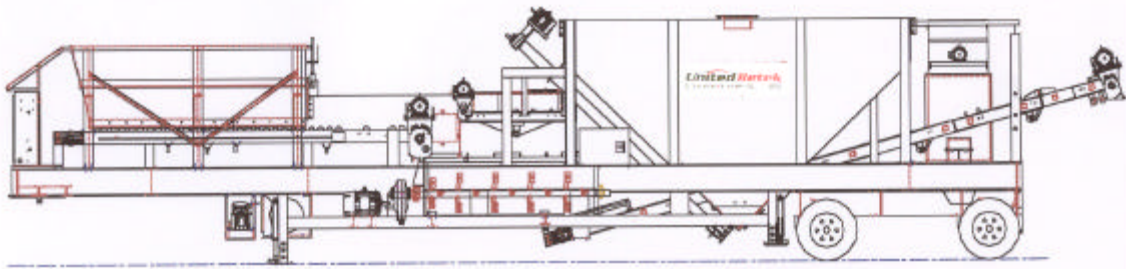
**Figure 1 Typical Petroleum Contaminated Soil Remediation**

- |  |
|--|
| <b>Notes:</b>  |
| <ol style="list-style-type: none"> <li>1. All work is done at ambient temperature. No heating of contaminated materials is required.</li> <li>2. The Retek Fixatives are transported to the site in bulk trucks.</li> <li>3. Unrecycled material consists of waste debris and rock.</li> </ol> |

### 2.3 Retek Processing Equipment

United Retek Corporation owns the equipment required to perform on-site solidification/stabilization of soils. In the case of on-site insitu processing with our Retek-HMSD we typically use excavators and loaders at the project site.

When pugmilling is the method of choice our uniquely modified Pugmill mixer and a special equipped silo unit is used for mixing our suite of fixatives, as well as proprietary additives.



**Figure 2 - Typical United Retek Pugmill**

In addition, excavators, loaders, stacking conveyors and portable screening units are owned and available to allow maximum recycling options. All field personnel are OSHA 40 hour trained for hazardous materials operations and have many years of experience in soil recycling procedures



### 3.0 Project Financial Considerations

The developers received considerable financial incentives from local, state, and federal programs. United Retek has been told that approximately **80% of the cost** of the site cleanup has been **recovered** through the following programs.

- **Local Government**

Rezoning and real estate tax abatement considerations

- **State Government**

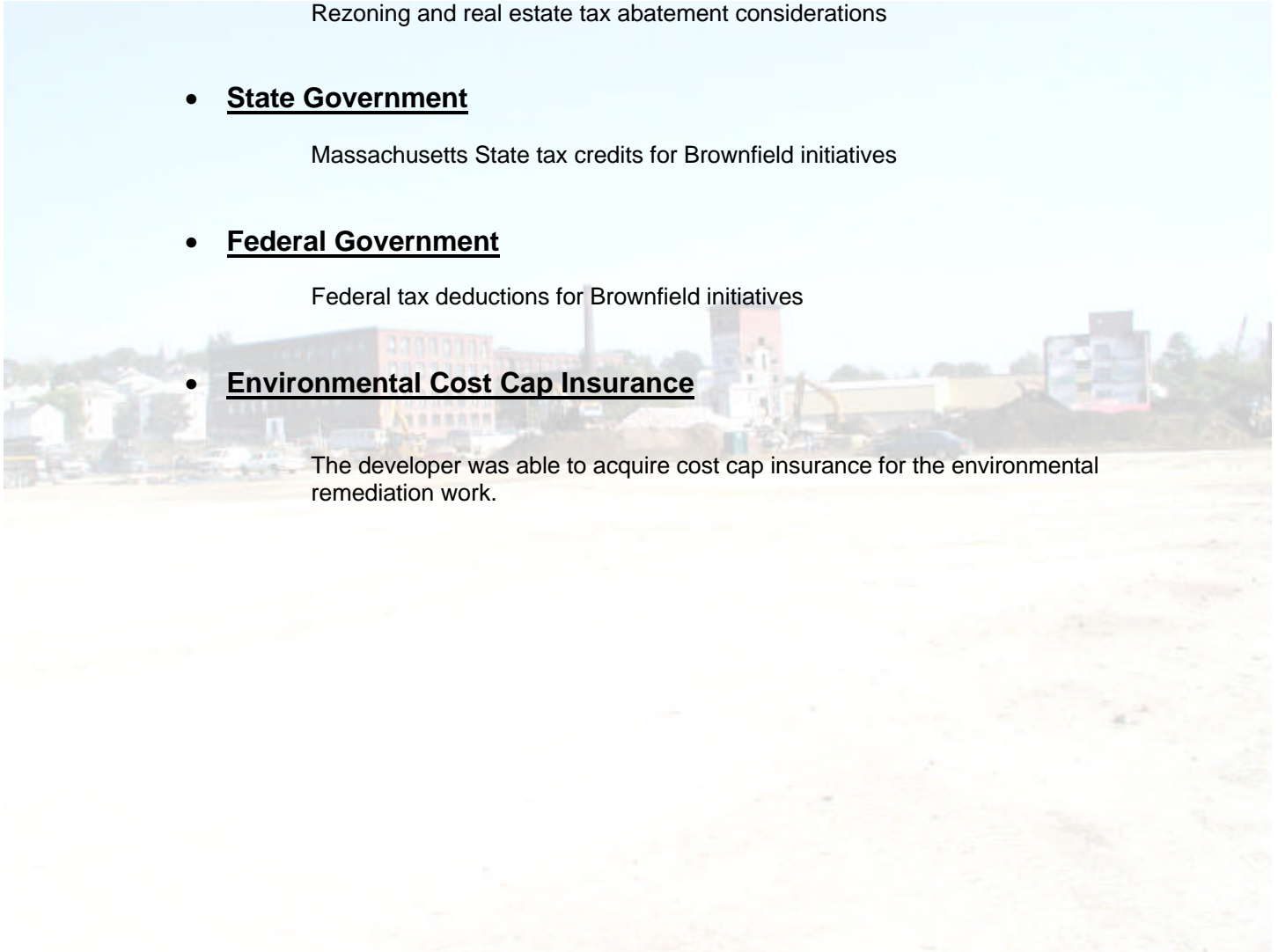
Massachusetts State tax credits for Brownfield initiatives

- **Federal Government**

Federal tax deductions for Brownfield initiatives

- **Environmental Cost Cap Insurance**

The developer was able to acquire cost cap insurance for the environmental remediation work.



## Appendix 1 – Site Location



# Appendix 2 – Site Plan

