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September 22, 2008

Larry Rosenmann
NYS Department of Environmental Conservation
Division of Solid and Hazardous Materials
625 Broadway
Albany, NY 12233-7258

Re: Carrier Corporation, Thompson Road Facility, Syracuse, NY
Corrective Action Order – Index CO 7-20051118-4
CO Update 2008 – FCMS Building TR-3

Mr. Rosenmann,

Please find attached one copy of the Focused Corrective Measures Study (FCMS) for the referenced facility. This report was prepared in response to a letter that was received from NYSDEC on May 23, 2008 requesting additional work be performed at the site. Some changes were made following a meeting between NYSDEC and UTC/Carrier personnel and were outlined in meeting minutes submitted to you on July 14, 2008.

Please call me if you have any questions at (615) 255-9300.

Sincerely,

EnSafe Inc.

May M. Heflin

May Heflin, PE

Encl. CO Update 2008 – FCMS Sanders Creek Sediments

cc: Mr. Mark Sergott — NYSDEC (1 hard copy)
Mr. Tim DiGuilio — NYSDEC (1 hard copy)
Mr. James E. Gruppe — NYSDEC (1 hard copy)
Mr. William Penn — UTC (electronic copy via e-mail)
Mr. Nelson Wong — Carrier Corporation (electronic copy via e-mail)

FOCUSED CORRECTIVE MEASURES STUDY
Building TR-3
(former degreaser location)

Revision No.: 0

United Technologies/Carrier
Thompson Road Facility
Syracuse, New York

EnSafe Project No.: 0888806464

Prepared for:

United Technologies Corporation
UTC Shared Remediation Services
United Technologies Building
Hartford, Connecticut 06010

Prepared by:

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September 2008

Table of Contents

List of Figures

List of Tables

INTRODUCTION

Carrier Corporation (Carrier), a wholly-owned subsidiary of United Technologies Corporation (UTC) has prepared this abbreviated Corrective Measures Study (CMS) in response to the requests outlined in the New York State Department of Environment and Conservation (NYSDEC) letter dated May 23, 2008. In this letter, NYSDEC raised several environmental concerns related to the investigation(s) and subsequent findings related to Corrective Action Order — Index CO 7-20051118-4 (order) dated February 13, 2006. The three primary environmental concerns deal with:

- Soil vapor intrusion to buildings on the Carrier campus
- Adequacy of Carrier's groundwater monitoring program at Building TR-3 and in deep groundwater
- Polychlorinated biphenyl (PCB) contamination in sediments of Sanders Creek

On July 2, 2008, UTC and Carrier personnel met with NYSDEC representatives to discuss the requests made in the referenced letter. Meeting minutes were submitted to NYSDEC by Mr. William Penn on July 14, 2008 via e-mail. A summary of the minutes is provided below:

Soil Vapor Intrusion

- The vapor migration pathway appears to be related to the storm water lines that emanate from the Solid Waste Management Units 1 through 4 source area. In lieu of continued indoor air and sub-slab vapor investigations, Carrier proposes to perform mitigation at some of the locations.
- In addition Carrier will evaluate information on historical manufacturing operations that used chlorinated solvents and propose additional soil vapor, indoor air sampling if warranted.

The work plan addressing soil vapor intrusion was submitted to NYSDEC on August 11, 2008.

Groundwater Monitoring

The remedial approach for site-wide groundwater involves the containment of waters at the site boundary. Shallow groundwater flow is toward the storm water system and is being collected by the storm water system and the bedding material collection system. Deep groundwater, except for one event, has been demonstrated to flow to the north-northwest. Prior Hydro-punch sampling in the deep horizon did not detect contaminants to the east of the current boundary deep wells.

- Carrier will abandon MW-13D and install a replacement well, install a new shallow well at TR-3, and perform annual groundwater monitoring.

- Carrier will submit an abbreviated CMS for TR-3 area groundwater.

Carrier submitted to NYSDEC a Groundwater Monitoring Work Plan on August 25, 2008. The abbreviated CMS for TR-3 area groundwater is presented in the following report.

Sanders Creek

PCB detections in the creek appear to be associated with the releases through the facility's storm water system. A rigorous monitoring program, being performed in compliance with the site's State Pollutant Discharge Elimination System permit, has detected PCBs in the storm water. Based on the data to date, it is expected that a treatment system will be installed sometime in 2010 to address PCBs in storm water above the permit requirements.

- A future remedial action in Sanders Creek will address PCBs in sediments.
- Additional sampling may be needed to support the remedial measure.

Carrier submitted to NYSDEC a Focused CMS for sediments in Sanders Creek on September 19, 2008.

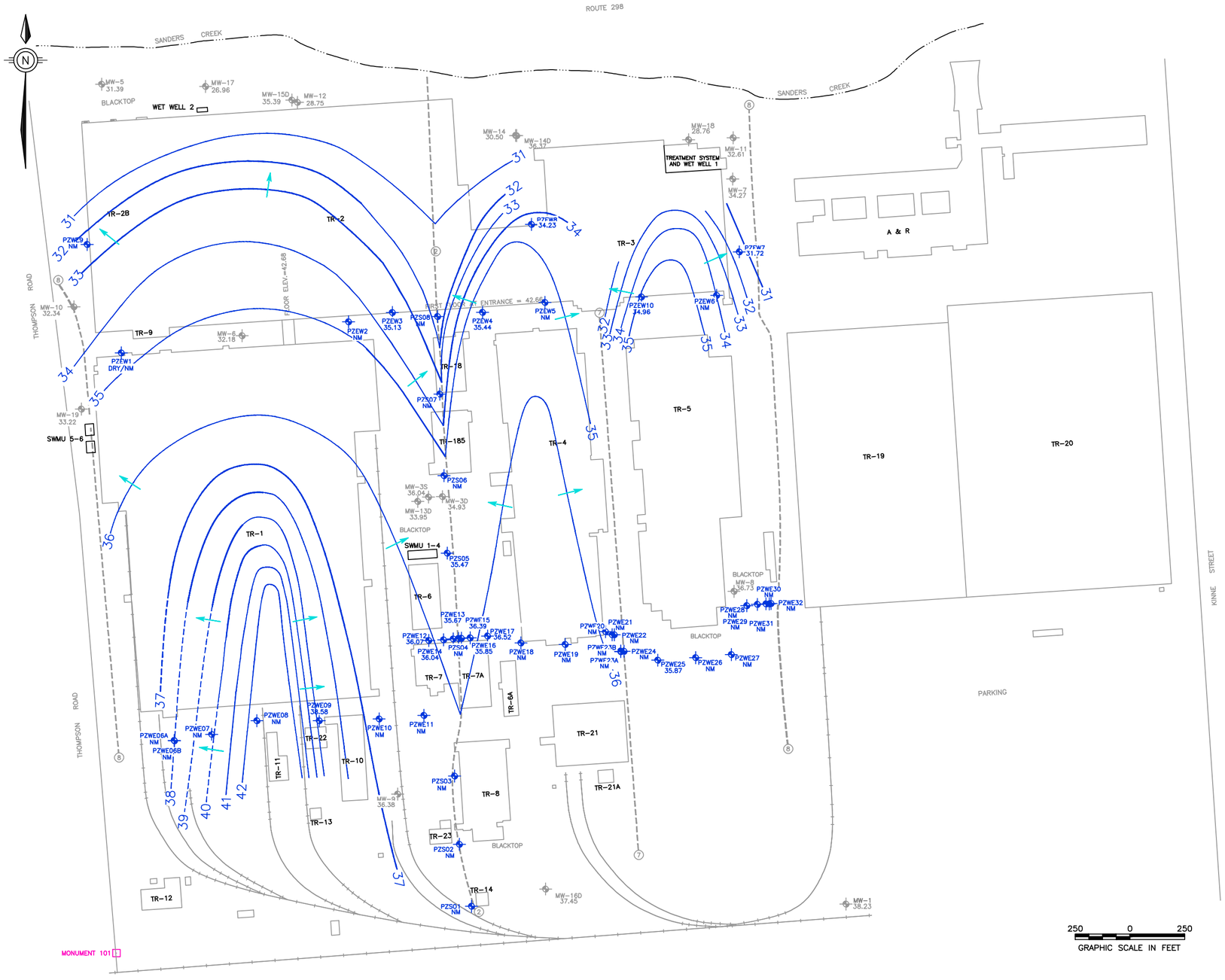
1.0 BACKGROUND

Carrier Corporation (Carrier), a wholly-owned subsidiary of United Technologies Corporation (UTC) has prepared this focused Corrective Measure Study (CMS) in response to New York State Department of Environment and Conservation (NYSDEC) correspondence dated May 23, 2008, related to the requirements outlined in the NYSDEC Corrective Action Order - Index Consent Order CO 7-20051118-4 (order) dated February 13, 2006 and a follow-up NYSDEC letter dated February 9, 2007, from Larry A. Rosenmann to William E. Penn of UTC, in which Carrier was directed to address the source of the volatile organic compounds (VOCs) detected in well MW-18, just north of Building TR-3. EnSafe, on behalf of Carrier Corporation, submitted a groundwater investigation work plan for the MW-18 vicinity on March 29, 2007 and a subsequent *Monitoring Well MW-18 Source Investigation Report* on July 11, 2007. EnSafe has designed this focused CMS to address potential offsite migration of contaminants from this source area.

A summary of the corrective measure as presented in three previously submitted reports is described below.

- **Release Assessment Report (January 2001)**

  As outlined in the *Release Assessment Report (January 17, 2001),* water level measurements from a piezometer and groundwater monitoring well network and the elevations of the storm sewer lines located throughout the facility indicate that the main lines of the storm sewer are located below the water table. Based on previous water level elevation data collected, the potentiometric surface map of the facility indicates that the storm sewer system is exerting an influence over the local groundwater flow system (Figure 1-1). This influence is demonstrated by the flow lines (arrows which are perpendicular to the groundwater elevation lines) indicating groundwater flowing toward the main storm sewer lines, as opposed to north toward Sanders Creek.



NOTES:

ELEVATIONS REFERRED TO CITY OF SYRACUSE DATUM. ADD 362.00 FEET TO OBTAIN USGS DATUM OF 1929.

LOCATION OF UNDERGROUND UTILITIES AND OTHER UNDERGROUND STRUCTURES OBTAINED BY FIELD MEASUREMENTS WHERE POSSIBLE, OTHERWISE OBTAINED FROM OTHER SOURCES AND MAY BE APPROXIMATE ONLY.

OTHER UNDERGROUND UTILITIES AND STRUCTURES MAY EXIST, THE LOCATIONS OF WHICH ARE CURRENTLY UNKNOWN.

WATER LEVELS MEASURED AUGUST 20, 2007

BENCHMARKS: (NOT SHOWN)

BM 164 (ELEV.=42.68)
IRON BOLT AT NORTHEAST CORNER OF CONCRETE SLAB, APPROX. 80 FEET NORTH AND APPROX. 30 FEET EAST OF THE SOUTHEAST CORNER OF BUILDING TR-4.

BM 500 (ELEV.=44.87)
CHISELED CROSS ON EAST NUT OF POSITION INDICATION VALVE, APPROX. 75 FEET NORTHWEST OF THE SOUTHWEST CORNER OF BUILDING TR-7 AND APPROX. 90 FEET NORTHEAST OF THE SOUTHEAST CORNER OF BUILDING TR-1.

GROUNDWATER ELEVATION CONTOURS PRODUCED FROM PIEZOMETER DEPTH TO GROUNDWATER MEASUREMENTS.

WELLS SCREENED WERE NOT USED IN CONSTRUCTING POTENTIOMETRIC SURFACE.

MONITORING WELL IDENTIFICATION KEY	
FORMER WELL IDENTIFICATION	NEW WELL IDENTIFICATION
MW-99-01	MW-10
MW-99-02	MW-11
MW-99-03	MW-12
MW-99-04	MW-13D
MW-00-5S	MW-14
MW-00-5D	MW-14D
MW-00-06	MW-15D
MW-00-BG	MW-16D

LEGEND

- TR-2 – BUILDING
- 42.20 – GROUNDWATER ELEVATION, FT
- □ – MONUMENT
- ⊕ – MONITORING WELL
- PZ – PIEZOMETER
- ← – GROUNDWATER FLOW DIRECTION
- 40 – GROUNDWATER ELEVATION CONTOUR
- – STORM DRAIN MAIN LINE
- ⑦ – ENSAFE STORM DRAIN REFERENCE NUMBER
- NM – NOT MEASURED (PIEZOMETER (DESTROYED)
- – FORMER RAILROAD SPUR LOCATION

250 0 250
GRAPHIC SCALE IN FEET

SOURCE:
PHILLIPS & ASSOCIATES
SURVEYORS, P.C.
LIVERPOOL, NEW YORK
(FILE 2700.001)

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FIGURE 1-1
SHALLOW POTENTIOMETRIC SURFACE
AUGUST 2007
CARRIER CORPORATION
SYRACUSE, NEW YORK

DWG DATE: 15SEPT08 | DWG NAME:806464R011

- **Interim Action Report (May 2003)**

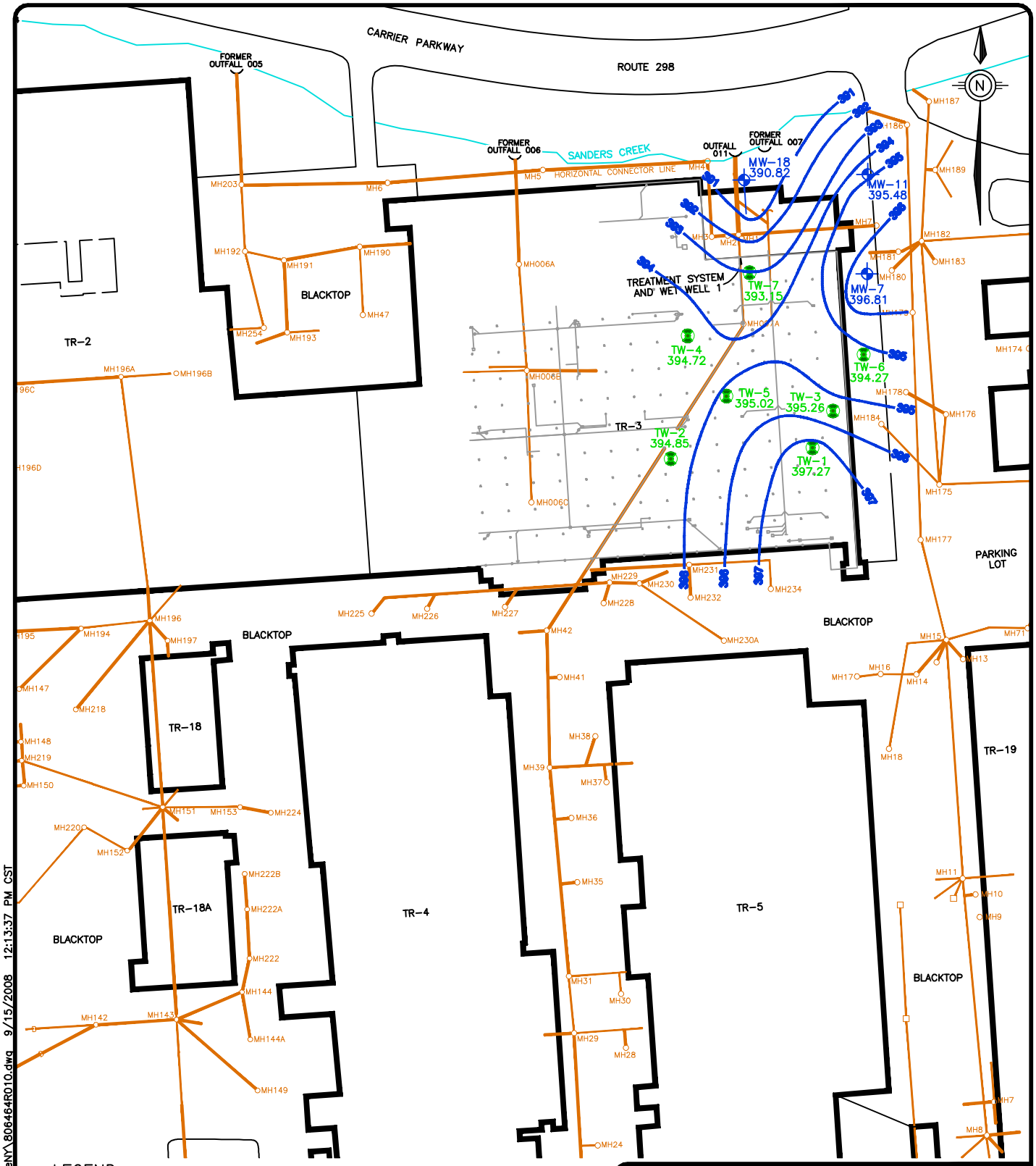
  In late 2002, an interim corrective measure was initiated at the facility to facilitate the CMS process. Two barrier walls and groundwater recovery wells (RW-01 and RW-02) were installed, one each at Outfall 010 and Outfall 011, to reduce potential for contaminated groundwater to discharge to Sanders Creek. The recovery system was put into operation in November 2007. A detailed description of this system can be found in the *Corrective Measures Study Report*, May 2003, previously submitted to NYSDEC.

  Since the system has been operational, Carrier has not conducted a site-wide monitoring event. The next such event will in conjunction with the site-wide monitoring event that will be conducted after the installation of the new wells onsite. At that time, groundwater from the recovery wells and MW-17 and MW-18 (both installed in the bedding material of Outfalls 010 and 011) will be sampled and analyzed for select contaminants as part of Carrier's site-wide groundwater monitoring program.

  If the data show continued effective performance of the system, the actions taken at these Outfalls will be considered final actions, and no further evaluation of remedial alternatives will be necessary. So long as the system operates as designed, this remedial alternative will be protective of human health and the environment, and, specifically, will reduce the off-site migration of contaminants to Sanders Creek.

- **MW-18 Investigation (May 2007)**

  A groundwater investigation was performed in May 2007 to evaluate a potential release to groundwater in the area of a degreaser formerly operated within TR-3. This investigation was initiated based on the VOCs detected in MW-18, located at the downgradient end of TR-3. Groundwater samples were collected from seven temporary wells installed inside Building TR-3 (Figure 1-2), wells MW-7 and MW-11 which are in the general vicinity of well MW-18 and Well MW-18.



LEGEND

- MW — EXISTING FACILITY MONITORING WELL
- TEMPORARY WELL LOCATION
- MH — MANHOLE
- ROOF LEADER TO STORM LINE
- STORM LINE LOCATION

0 160 320

SCALE IN FEET

FIGURE 1-2
MW-18 INVESTIGATION
POTENTIOMETRIC SURFACE MAP
CARRIER CORPORATION
SYRACUSE, NEW YORK

REQUESTED BY:	M.H.
DRAWN BY:	E.R.
DWG DATE:	15SEPT08
DWG NO:	806464R010

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I:\Projects-BST\806464 UTC SyracuseNY\806464R010.dwg 9/15/2008 12:13:37 PM CST

Physical and chemical quality data indicate a release to groundwater occurred near the former location of the degreaser in Building TR-3. According to Carrier personnel, the degreaser was approximately 30 feet southwest of the TW-1 location. The sample collected from TW-1 contained the highest concentrations of VOCs among the sampling points. Compounds detected are chlorinated solvents used in the former manufacturing processes and degreasing process in TR-3. The sample collected from TW-5, a point installed closest to the storm line, displayed the second-highest concentrations of VOCs. Concentrations of VOCs at this location are likely due to TW-5's proximity to the storm line and because of the groundwater flow direction in this vicinity. The sampling program indicated that the release is limited to the TR-3 area and is controlled by the storm water collection system.

Based on these findings and those of previous studies, the interim action currently in place — groundwater containment, recovery, and treatment using air stripping — appears to be the most effective corrective measure option for this SWMU. A description of the existing system is described below.

2.0 PURPOSE OF THE CORRECTIVE MEASURES STUDY

Typically, a CMS is intended to identify, screen, develop, evaluate, and compare remedial action alternatives for a given site. Due to the unique circumstances surrounding investigation and remediation activities already underway and/or in-place at Carrier, this focused CMS will identify, evaluate, and discuss the existing remedial system that is currently containing shallow contaminated groundwater that has resulted from past use of a degreaser at Building TR-3.

The report is organized as follows:

- Section 3, Proposed Cleanup Objectives, details the objectives of the remedy.
- Section 4, SWMU Site Description, identifies the area being addressed in this report, with a brief description of the status at the site.
- Section 5, Identification, Evaluation, and Discussion (ranking of remedy against relevant criteria), presents a detailed analysis of the alternative.
- Section 6, Public Involvement Plan, describes the activities that will be carried out as part of a community involvement program.

3.0 CORRECTIVE MEASURES OBJECTIVES

The long-term or final objective of the remedy at Building TR-3 is to prevent the offsite migration of VOC-contaminated groundwater. The corrective measure selected for contaminated shallow groundwater has been chosen based on information from the current RFI, interim action reports, other files or support documents, and professional experience.

This long-term objective for TR-3 is consistent with the requirements in the order for other groundwater measures: the corrective measures addressing contaminated groundwater and the corrective measures addressing contaminated storm sewer bedding.

4.0 SWMU SITE DESCRIPTION

Building TR-3 was built in 1952, with additions built in 1959, 1970, 1995 and 1998. It is approximately 250,000 square feet and is located on the northern end of the Carrier campus. The building was primarily used for manufacturing compressors and also included offices, a lobby, an auditorium, and classrooms. The northeast corner of the building houses the facility's two air stripping towers that are used to treat VOC-contaminated groundwater that infiltrates the storm sewer lines across the site. Except for the portion utilizing the storm water and groundwater treatment equipment, the building is vacant and no longer in use. The portions that are not utilized are planned for demolition and the area is planned for use as a parking lot.

The compressor core manufacturing process was comprised of core manufacturing/assembly, which were then cleaned in TCE degreaser baths, followed by a painting process. The degreaser area was investigated in the previously described MW-18 groundwater investigation.

5.0 IDENTIFICATION, EVALUATION, AND DESCRIPTION OF REMEDY

Generally, engineering practice and experience are used to identify the corrective action technologies that appear most suited to a SWMU. The initial step in assessing a remedy is a review of the RFI results and corrective action objectives, followed by identification of technologies applicable to corrective measures for the SWMU. The selection of the corrective measures technology is based on site-, waste- and technology-specific characteristics using current literature, vendor information, USEPA's treatability databases, technology databases, guidance documents and handbooks, and experience in developing remedies for similar sites and releases.

As mentioned earlier, an interim corrective measure has already been implemented at Building TR-3 and has been in operation since November 2007. A summary of the corrective measure is described below.

5.1 Groundwater Containment, Recovery, and Treatment

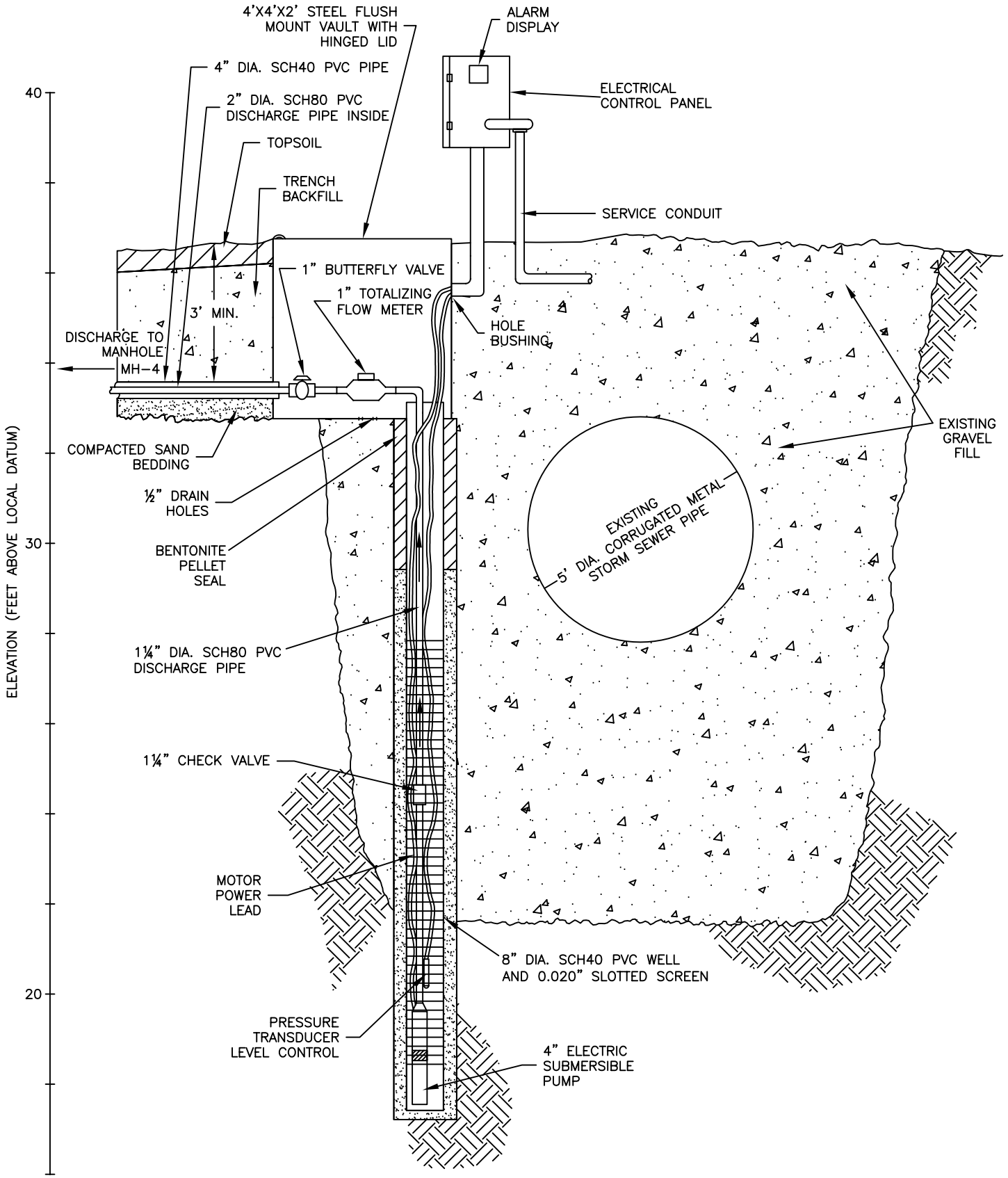
The corrective measure at Outfall 001 incorporates a hydraulic barrier wall combined with a large diameter extraction well. The barrier wall inhibits trench water from entering the creek and minimizes the potential for creek water to be drawn into the trench during pumping. The extraction well has been placed in the outfall trench upstream from the barrier wall to dewater the trench bedding material. Figures 5-1 and 5-2 show, diagrammatically, the plan view and cross-section of the existing outfall and recovery well layout.

Barrier Wall Construction

The barrier wall was constructed by placing a series of 1-inch diameter steel injection tubes into the granular bedding material. A polyurethane grout was then injected into the bedding material through the tubes. The polyurethane grout reacts with water and forms a rigid foam, which fills the void spaces of the bedding material. Based on porosity and the volume and expansion of the foam, the finished barrier wall is estimated to be approximately 1- to 2-feet thick.

Recovery Well Construction

An extraction well (RW-02) was placed upgradient of the barrier wall and the existing trench monitoring well (MW-18). The recovery well is constructed of 8-inch diameter PVC screen and riser. It was installed within the trench backfill material and as close as possible to the outfall culvert using conventional hollow-stem augering techniques.



CONCEPTUAL SCHEMATIC

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FIGURE A-5
RW-02 CONSTRUCTION DETAILS
CARRIER CORPORATION
SYRACUSE, NEW YORK

DWG DATE: 17APR03 | NAME: 3133049R011

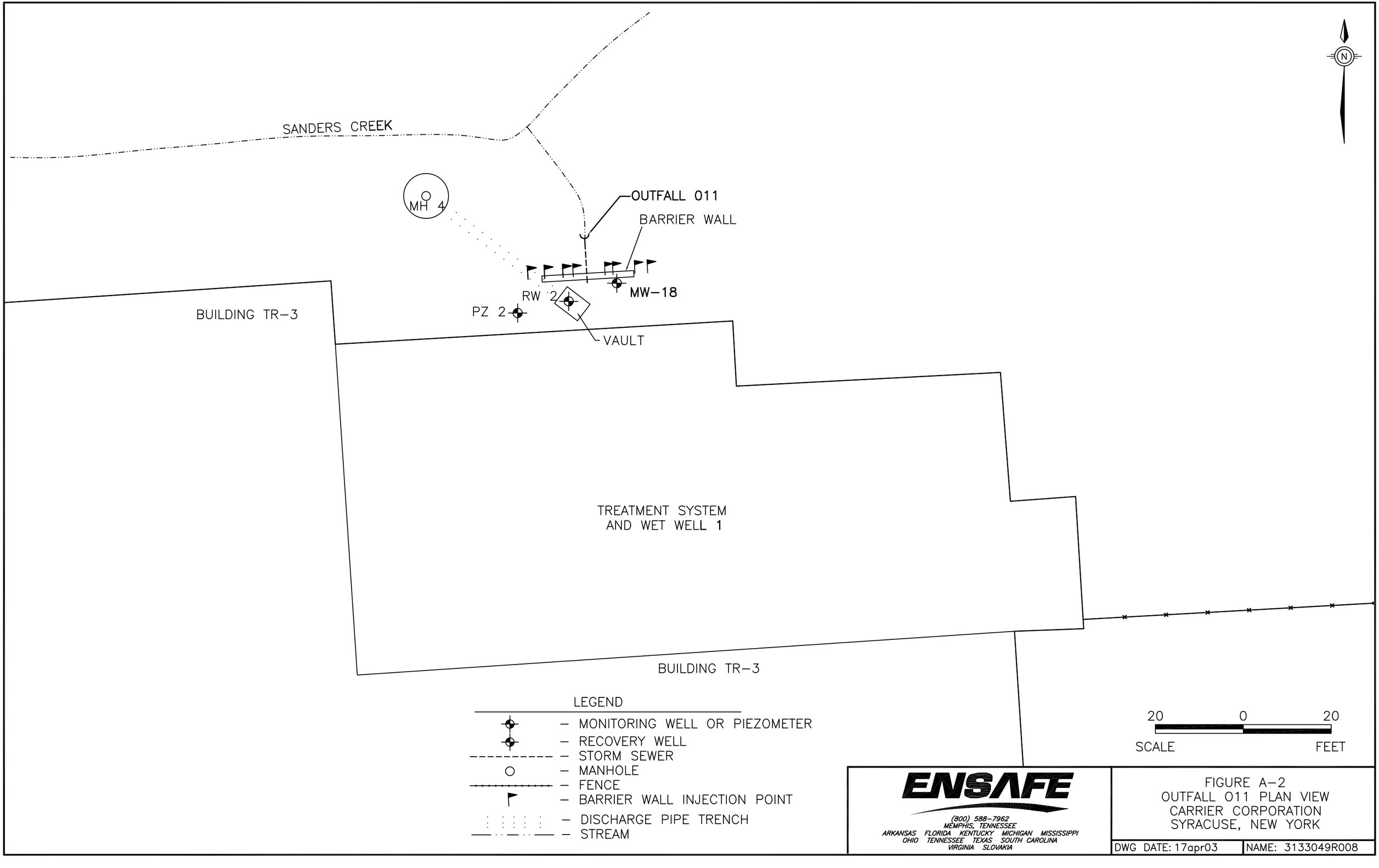

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FIGURE A-2
OUTFALL 011 PLAN VIEW
CARRIER CORPORATION
SYRACUSE, NEW YORK

DWG DATE: 17apr03 | NAME: 3133049R008

Final well depth and screen length determinations were made based on outfall construction information and well logs from the lithologic boreholes and existing wells. To ensure complete dewatering of the gravel backfill trench, the recovery well was extended a few feet below the trench bottom. RW-02 is screened from 9 to 19 feet bgs and extends approximately 4 feet below the trench at Outfall 011.

Pumps

The recovery well is dewatered with an automated pumping system consisting of an electric submersible pump, level sensing pressure transducer, and a power-regulating control panel. The pump is suspended within a few inches of the recovery well bottom to allow for the greatest drawdown potential. The pressure transducer placed near the top of the pump monitors water levels in the well for the pump's control system. The control system varies the pump's power supply (frequency in hertz) to control its discharge rate. This allows the discharge rate to be adjusted to equal the well's recharge rate. With this system, the pump will run continuously, remove all water entering the well, and maintain a water level within a few inches of the pressure transducer.

Groundwater extracted from the recovery well has been routed to the nearest storm sewer manhole (MH-8) that is upstream from the existing onsite treatment system. The recovered groundwater combines with existing storm water and groundwater flows in the storm sewer system is ultimately pumped to Carriers existing air stripper treatment system.

Additional information on the recovery system can be found in the *Corrective Measures Study Report, EnSafe 2003*, and the *Operations and Maintenance Plan, EnSafe 2007*.

Table 5-1
Evaluation of Groundwater Recovery and Treatment Against CMS Criteria

Primary Criterion	Description and Evaluation
(1) Protection of human health and the environment	• Engineering controls via groundwater recovery and treatment on bedding material groundwater minimize risks to human health and the environment.
(2) Attainment of cleanup standards	• NY Ambient Water Quality Standards and Guidance Levels are met outside of the active industrial facility. Groundwater monitoring assures that this will continue to be documented.
(3) Source control	• This alternative provides for containment of the most contaminated groundwater at the SWMU, and to some extent mass removal. • Engineering controls via gw recovery and treatment combined with the natural degradation processes for TCE and daughter compounds make this alternative an effective treatment.
(4) Compliance with applicable waste management standards	• Compliance can be maintained. Permits and/or state approval were obtained for wells installation, discharge to existing storm water sewer system, air stripping tower treatment, and extraction system air emissions.
Secondary Criterion	**Description and Evaluation**
(1) Long-term reliability and effectiveness	• Groundwater recovery and treatment could offer additional protection from potential offsite migration, primarily by containing the most contaminated groundwater, but also through extraction and treatment.
(2) Reduction in waste toxicity, mobility, or volume	• Waste in groundwater is contained through engineering controls, and natural degradation. Measurable extraction would result from implementation of this alternative.
(3) Short-term effectiveness	• Adverse impacts to the surrounding environment are not anticipated during groundwater recovery system construction. Discharge approval or permit modification would be obtained before implementation. • Field personnel contact with site contaminants would be minimal during construction (pump installation and sewer connections). Workers could be protected by wearing appropriate PPE. • System performance and mass removal can be evaluated by effluent monitoring.
(4) Implementability	• Generally, groundwater recovery and treatment is a proven alternative for groundwater containment and is easily implemented.
(5) Cost	• Overall, this is a cost effective option because capital costs are not high, extraction costs are moderate, and treatment costs are marginal operational costs associated with the onsite air strippers.

5.2 Groundwater Recovery and Treatment Estimated Costs

With the exception of the operations and maintenance, the costs associated with the groundwater recovery and treatment corrective action have already been incurred by Carrier. The system planning and design began in 2002, with pilot testing and pump installation occurring in 2003 and system start-up occurring in 2007, after a review process of the air emissions modeling data by NYSDEC.

The operations and maintenance costs associated with the system include the following elements:

- Annual (in November) sampling an annual reporting on RW02 and MW-18 (or on some other specified interval determined by the site-wide groundwater monitoring program)

- Annual inspection and maintenance of the recovery and pumping system

The estimated annual cost of operations and maintenance for the groundwater and recovery system used to treat groundwater contained in bedding material of Outfall 011 ranges from $10K to $20K per year, depending on the level of maintenance that may be required. The estimate does not include the cost of replacing larger system components. Inspections and maintenance of the treatment components (air strippers) is not included in this estimate, as the air strippers operations and maintenance are included as part of Carriers site-wide O&M plan.

Based on the findings of previous studies, the interim action currently in place — groundwater containment, recovery, and treatment using air stripping — appears to be the most effective corrective measure option for this SWMU. If the data show continued effective performance of the system, the actions taken at this outfall will be considered final actions, and no further evaluation of remedial alternatives will be necessary. So long as the system operates as designed, this remedial alternative will be protective of human health and the environment, and, specifically, will reduce the off-site migration of contaminants to Sanders Creek.

6.0 PUBLIC INVOLVEMENT PLAN

The following Public Involvement Plan (PIP) is included as part of this report in accordance with the EPA's guidance on RCRA CMS. Under RCRA, no interaction is required with the community during the CMS process. It is assumed that the same requirements hold for this focused CMS. Public input is required to be solicited only at the beginning of the permitting process, or during certain permit modifications.

Statement of Basis Public Involvement Plan

Upon completion of the focused CMS, when the preferred alternative has been proposed, the following activities are required if a modification to the RCRA permit is required. Since a permit modification is not necessary, Carrier may choose to implement all, some, or none of the following actions, depending on the level of public interest or concern:

- A Statement of Basis will be prepared, explaining the proposed remedy and the method by which it was chosen. The Statement of Basis acts as a summary of the focused CMS.

- A 45-day comment period will be provided to allow community members the opportunity to review and comment on the proposed alternative. The comment period may be as short as 30 days in cases where no permit modification is necessary, but a public comment period is warranted.

- Availability of the comment period and Statement of Basis will be announced in a public notice.

- The community will be provided an update on the proposed remedy through the informal and publicized meetings.

7.0 REFERENCES

EnSafe Inc. *Corrective Measures Study Report. May* 2003.

EnSafe Inc. *Operations and Maintenance Plan. September* 2007.

EnSafe Inc. *Release Assessment Report.* January 2001.

EnSafe Inc. *Interim Action Report.* May 2003.

EnSafe Inc. *MW-18 Investigation.* May 2007.