N00164.AR.000514
NSWC CRANE
5090.3a

DEPARTMENT OF THE NAVY
CRANE DIVISION
NAVAL SURFACE WARFARE CENTER
300 HIGHWAY 361
CRANE, INDIANA 47522-5000

IN REPLY REFER TO:

5090
Ser 095/0065

29 MAR 2000

U.S. Environmental Protection Agency, Region V
Waste, Pesticides, & Toxics Division
Waste Management Branch
Illinois, Indiana, and Michigan Section
Attn: Mr. Peter Ramanauskas (DW-8J)
77 West Jackson Blvd.
Chicago, IL 60604

Dear Mr. Ramanauskas:

Crane Division, Naval Surface Warfare Center (NAVSURFWARCENDIV Crane) submits, for your review and approval, the March 2000 Quarterly Interim Progress Reports (IPR) for September 1 through December 31, 1999 as enclosure (1). This report, as can be seen by the dates, covers more than one quarterly reporting period to return to the agreed upon quarterly schedule in January 2000. Regretfully, there was a miscommunication during the contract turn over that led to this confusion. Enclosure (2) is the required certification statement.

NAVSURFWARCENDIV Crane point of contact is
Ms. Christine D. Freeman, Code 09511, telephone 812-854-4423.

Sincerely,

James M. Hunsicker

JAMES M. HUNSICKER
Director Environmental Protection
Department
By direction
of the Commander

Encls:
(1) IPR SEPT - DEC 1999
(2) Certification Statement

Copy to:
Administrative Record
IDEM (D. Griffin)
SOUTHNAVFACENGCOM (Code 1864)
SOUTHNAVFACENGCOM ROICC (w/o encls)
TOLTEST Crane (w/o encls)

Naval Facilities Engineering Command
Naval Surface Warfare Center
Crane, Indiana

Full-Scale Operations
Bioremediation of Explosives-Contaminated Soil

Quarterly Interim Progress Report
September 1 – December 31, 1999
NSWC Crane
Crane, Indiana

March 2000

TOLTEST, INC.

QUARTERLY INTERIM PROGRESS REPORT
SEPTEMBER 1, 1999 – DECEMBER 31, 1999

FULL-SCALE OPERATIONS
BIOREMEDIATION OF EXPLOSIVES-CONTAMINATED SOIL
NAVAL SURFACE WARFARE CENTER CRANE, INDIANA

ENVIRONMENTAL JOB ORDER CONTRACT
CONTRACT NO. N68950-96-D-0052
TOLTEST PROJECT NUMBER 37324.01

Submitted to:

OFFICER IN CHARGE OF NAVFAC CONTRACTS
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

Submitted by:

TOLTEST, INC.
1915 NORTH 12TH STREET
P.O. BOX 2186
TOLEDO, OHIO 43603
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MARCH 2000

James M Parsons
TOLTEST INC.
PROJECT MANAGER

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EXECUTIVE SUMMARY

This interim progress report has been prepared by TolTest, Inc. (TolTest) for Southern Division, Naval Facilities Engineering Command. This report documents the progress at the Bioremediation Facility for treatment of explosives-contaminated soil at the Naval Surface Warfare Center (NSWC) Crane, Indiana. On March 27, 1999, TolTest assumed responsibility for the excavation and treatment of contaminated soil at the Bioremediation Facility (Biofacility). This report summarizes the work actions performed from September 1 through December 31, 1999 pursuant to the requirements of the approved *Full-Scale Operational Plan* and the *Quality Assurance Project Plan*. Full-scale bioremediation operations started in April 1998. All interim measures work actions have been performed in accordance with approved plans.

The scope of work includes initial site characterization by sampling and analysis, excavation and screening of explosives-contaminated soil, transportation of screened soil for treatment to the Biofacility, process monitoring and confirmatory sampling of the compost windrows, and disposal of treated soil.

All initial characterization sampling at Mine Fill "A" (MFA) is complete. Initial characterization sampling at Mine Fill "B" (MFB) continues to indicate the presence of explosives contamination in the soil. In-process field screening is ongoing and post-excavation sampling for grids in MFB indicate that clean-up goals have been achieved in most grids. Contamination has been left in-place in some grids due to the presence of rock, utilities, or buildings.

A total of 11,768.36 tons of screened soil from Mine Fill B was transported to the Biofacility during this reporting period. A total of 28 new windrows were constructed during this reporting period, from windrow 107 to windrow 134. Thirty windrows achieved Day Last status during this period: windrows 101 to 131. A total of 6697 tons of contaminated soil was treated to residential or industrial clean up levels during this reporting period.

1.0 INTRODUCTION

This interim progress report has been prepared by TolTest for the Southern Division, Naval Facilities Engineering Command. This is the sixth quarterly report (second by TolTest) that has been prepared to document the progress of the full-scale bioremediation operation of explosives-contaminated soil at Naval Surface Warfare Center (NSWC) Crane, Crane, Indiana. It summarizes the work actions performed by TolTest during the period September 1 through December 31, 1999 pursuant to the requirements of the approved *Full-Scale Operational Plan* [MK, 1998a] and the *Quality Assurance Project Plan* [MK, 1998b]. Full-scale bioremediation operations started in April 1998. TolTest, Inc., assumed responsibility on March 27,1999 from Morrison Knudsen Corp. after the completion of their contract.

NSWC Crane, located in southwestern Indiana, provides support for equipment shipboard weapons systems, and ordnance. This site also supports Crane Army Ammunition Activity (CAAA), which includes production and renovation, storage, shipment, and demilitarization and disposal of conventional ammunition. Explosive-compounds contaminated soils resulting from the above operations have been identified at four solid waste management units (SWMUs): Ammunition Burning Ground (ABG) (SWMU-03/10); Rockeye Munitions Facility (SWMU-10/15); Mine Fill "A" (MFA) – (SWMU-12/14); and Mine Fill "B" (MFB) – (SWMU-13/14).

On-site bioremediation of the high-explosives contaminated soil utilizing a windrow composting process has been selected as the preferred treatment alternative for the Interim Measures (IM) at these four SWMUs.

The scope of work includes initial site characterization by sampling and analysis, excavation and screening of explosives-contaminated soil, transportation of screened soil for treatment at the Biofacility, process monitoring, confirmatory sampling, disposal of treated soil, and site restoration.

2.0 EXCAVATION

During this reporting period field activities were conducted at MFA and MFB. Work activities at the excavation site included: in-process sampling, post-excavation sampling, soil excavation, soil screening, and vegetation establishment. Specifics for each SWMU are discussed below. All fieldwork activities were performed in accordance with procedures included in the *Full-Scale Operational Plan* [MK, 1998a] and the *Quality Assurance Project Plan (QAPP)* [MK, 1998b]. Final drawings showing grid locations, post-excavation sample locations, and extent of excavation will be included in the Interim Measures Report for Bioremediation.

2.1 Pre-Excavation Sampling

Pre-excavation sampling was performed to provide initial site characterization and delineate the extent of contamination. Pre-excavation samples were analyzed for SWMU-specific compounds by an off-site analytical laboratory.

A minimum of three soil samples are normally obtained from each grid for characterization of the soil prior to excavation. Explosive compounds and metals analyses were completed on composite samples obtained from zero to 12-inches in depth and 24 to 36-inches in depth. On occasion, the presence of rock or other obstacles prohibited obtaining the deeper composite sample. Volatile organic compounds (VOCs) analysis were completed on grab samples obtained at 12-inches.

The horizontal boundaries of explosive constituents have been delineated by buildings, roads, railroad tracks, and grids with either no detectable levels of the respective constituent or levels that are below the cleanup goals. To date, no metals or VOCs have been detected above clean-up action levels in any sample.

2.1.1 Mine Fill "A"

Pre-excavation soil sampling at MFA is complete.

2.1.2 Mine Fill "B"

Pre-excavation sampling was completed in 78 grids in this reporting period. Explosives compounds were detected as follows: HMX ranged from non-detect to 925 ppm; RDX ranged from non-detect to 2300 ppm; and TNT ranged from non-detect to 2800 ppm.

Pre-excavation sampling was completed in 31 grids at Building No. 166. Explosives compounds were detected as follows: HMX ranged from non-detect to 925 ppm; RDX ranged from non-detect to 2300 ppm; and TNT ranged from non-detect to 2800 ppm.

Pre-excavation sampling was completed in 6 grids at Building No. 168. Explosives compounds were detected as follows: HMX ranged from non-detect to 7 ppm; RDX ranged from non-detect to 11 ppm; and TNT ranged from non-detect to 2 ppm.

Pre-excavation sampling was completed in 12 grids at Building No. 171. Explosives compounds were detected as follows: HMX ranged from non-detect to 57 ppm; RDX ranged from non-detect to 160 ppm; and TNT ranged from non-detect to 61 ppm.

Pre-excavation sampling was completed in 8 grids at Building No. 173. Explosives compounds were detected as follows: HMX ranged from non-detect to 36 ppm; RDX ranged from non-detect to 108 ppm; and TNT ranged from non-detect to 1 ppm.

Pre-excavation sampling was completed in 21 grids at Building No. 2501. Explosives compounds were detected as follows: HMX ranged from non-detect to 393 ppm; RDX ranged from non-detect to 1740 ppm; and TNT ranged from non-detect to 1 ppm.

2.2 In-Process Excavation Soil Sampling

In-process excavation soil sampling is performed to assist the field crew in planning excavation activities. Field screening test kits are used for testing RDX levels in the in-process soil samples to provide quick analytical results.

All grids from which post-excavation samples were obtained (discussed in section 2.3 below) were first sampled and screened for RDX. When RDX screening indicates that remaining contamination is below industrial levels, then post-excavation samples are obtained.

2.3 Post-Excavation Soil Sampling

Post-excavation soil sampling (i.e., confirmation samples) is performed to provide confirmation that the excavation meets established industrial cleanup goals. Confirmation samples are analyzed for SWMU-specific compounds by an off-site analytical laboratory. Post-excavation samples were only obtained at Mine Fill B this reporting period.

Building 168
Post-excavation samples were obtained from grids 25 – 32, and 35 - 38. Analytical results indicated that remaining soil contamination in these grids is less than industrial cleanup goals. Contamination remains in the sidewall sample from grid 38/39 with RDX at 27 ppm.. No further excavation will be attempted since this area is adjacent to a water line.

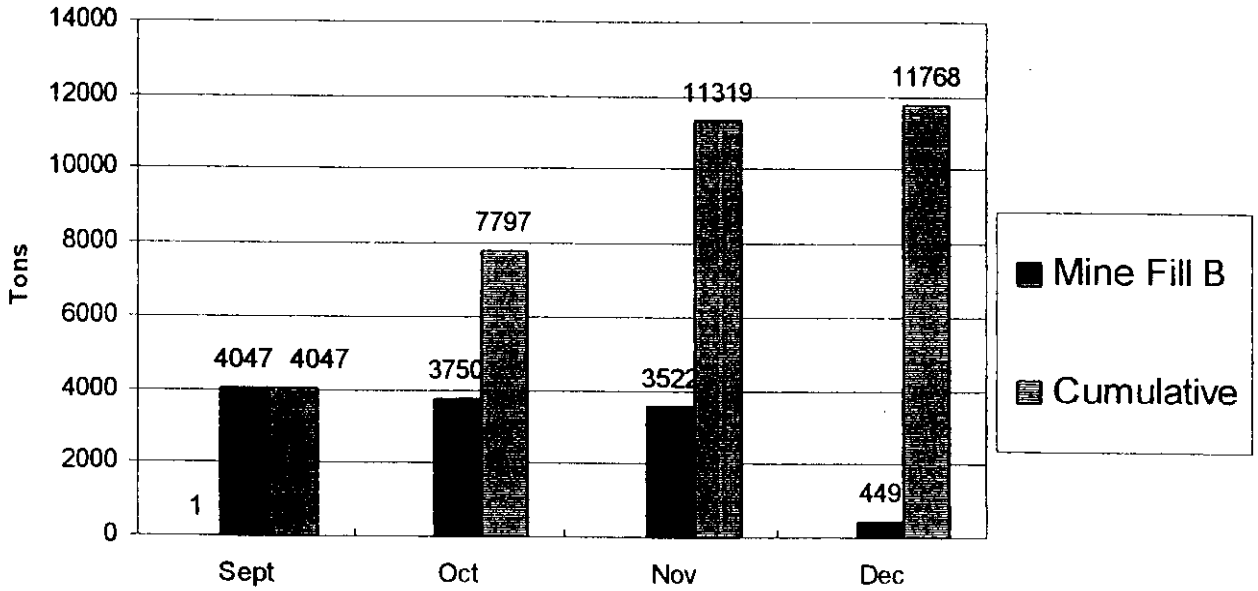
Building 173
Post-excavation samples were obtained from grids 79 - 83, 93, 142, 143, 153, 163 – 167, 170, 187 – 191, and 199. Analytical results indicated that remaining soil contamination in these grids is less than industrial cleanup levels. Contamination remains in grid 186 with RDX at 21 ppm. No further excavation will be attempted in this grid since rock has been encountered.

Building 2501
Post-excavation samples were obtained from grids 54 – 61, 63 – 65, 67, 139, 141, 145, 146, 154, 168, 171, 172, 192, 193, 200, 204, 207, 210, 211, 236, 237, 249, 251, and 262. Analytical results indicated that remaining soil contamination in these grids is less than industrial cleanup levels. Contamination remains in grid 66 with RDX at 32 ppm. No further excavation will be attempted in this grid since rock has been encountered. Contamination remains in the sidewall sample from grid 141/147 with RDX at 26 ppm. No further excavation will be attempted in this area since a water line was encountered.

2.4 Soil Excavation and Screening

Soil excavation continued at Mine Fill B around buildings 173, 2501, 168, and 166. During this reporting period, 11,768 tons of soil have been excavated and screened. The actual quantities of screened soil are listed in Table 1.0 and are shown in Graph 1.0.

GRAPH 1.0
NSWC CRANE
SOIL EXCAVATION AND SCREENING VOLUMES



3.0 COMPOSTING OPERATIONS

Treatment of high-explosives contaminated soil by composting involves microbial degradation of the explosives by optimizing the availability of organic material, temperature, moisture content, pH, and oxygen. The composting operation process description is provided in Section 5.0 of the approved *Full-Scale Operational Plan* [MK, 1998a].

3.1 Amendments

The compost mix used in full-scale operations consists of 25% soil, 15% chicken manure, and 60% straw by volume. Straw deliveries have been received by the project satisfying all of the bulk straw order. A large stockpile of straw is available to satisfy composting needs through the winter. Chicken manure continues to be trucked to the Biofacility on an as-needed basis in quantities sufficient to support operations.

3.2 Windrow Construction and Treatment

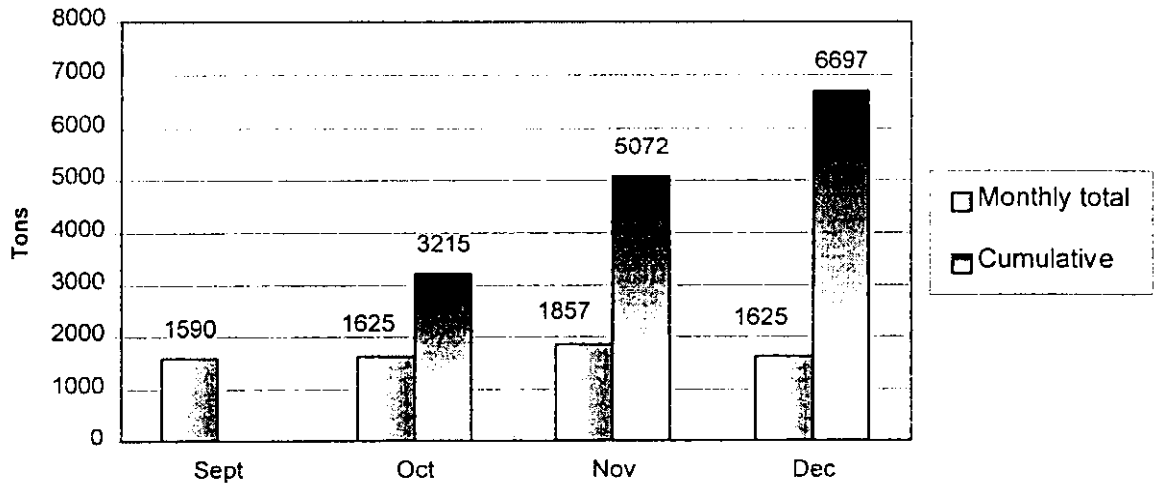
Field screening has been performed at least weekly to monitor RDX levels within each windrow. Field screening of treated compost (generated with soil from MFA and MFB) for TNT is not completed since RDX is a better indicator of contaminant degradation than TNT. Final compost samples are collected once the field test kits indicated RDX levels are below industrial clean-up goals. The day that final compost samples are collected for off-site laboratory confirmation analysis is referred to as Day Last.

Thirty windrows (101 through 130) achieved Day Last status during this reporting period (i.e. analytical results were received before the end of this period). Windrows 131 through 134 were constructed in this period but Day Last status was not achieved in this period. All windrows reported in this period achieved residential or industrial cleanup levels for explosive compounds. Analytical data regarding windrows that achieved Day Last status during this period are discussed in Section 3.4. All windrows up through windrow 101 were composed with soil from Mine Fill A. Windrow N-102 contained 14 loads of Mine Fill A soil and 3 loads of Mine Fill B soil. Windrow S-103 was the first windrow to contain all Mine Fill B soil.

Actual performance of remediation continues to be significantly ahead of the originally planned schedule. This is primarily due to the relatively short bio-degradation period. The average number of days between Day Zero and Day Last for this period was 9.4 days. The details of the progress of windrows are included as Table 2.0.

The total amount of soil processed in windrows 101 through 130 was 6697 tons (based on 232 tons of soil in a full size windrow). Graph 2.0 charts the progress of composting operations.

GRAPH 2.0
NSWC CRANE BIOFACILITY SOIL PROCESSED VOLUMES



3.3 Analytical Data Interpretation and Validation

Table 3.0 provides this quarter's laboratory analytical results for HMX, RDX, and TNT. All windrow results represent an average of 15 individual data points (five cross sections, three sample locations per cross section). Day Zero results (through windrow 115) and Day Last results are given for each windrow, demonstrating the effectiveness of the bio-degradation process.

All data associated with windrow monitoring was verified, and at least 10% of the samples were validated and compared with field and laboratory quality control (QC) sample data to assess the data's usability for supporting full-scale operations. Data was verified by reviewing chain-of-custody forms, sample preservation records, analytical holding times, requested turnaround times, sample data in comparison to QC data, and reporting requirements. In addition, more than 10% of the data was validated using the validation procedures specified in Section 9.2.2 of the *QAPP*.

Analytical results for the trip blanks, field blanks, equipment rinsates, and field duplicates were evaluated to identify potential sources of error introduced during sampling, transportation and storage. Field QC performed with the monitoring of windrows 101 through 130 have been performed according to the requirements defined in the *QAPP*.

Laboratory QC consists of method blank, sample matrix spike (MS), sample matrix spike duplicate (MSD), surrogate, laboratory control sample (LCS), and laboratory control sample duplicate (LCSD) analyses to evaluate laboratory accuracy and

precision. Laboratory quality control was performed consistent with the requirements of the QAPP. Method blanks, LCS, LCSD, and surrogates were acceptable in almost every analytical batch. MS and MSD data was generally acceptable. In some of the Day Zero data, consistent elevated MS and MSD recoveries of RDX and HMX are often seen in the analytical data because of the high levels of these compounds initially present in the sample. The Day Zero samples often require dilutions to bring the concentration of RDX and HMX to a quantifiable level. This dilution which occurs after spiking of the sample, dilutes the concentration of the spiking solution to a low level which cannot often be distinguished from the variability of the sample itself. Day Last data did not show similar interferences because initial concentrations were low in comparison to the concentration of spiking solution added to the sample. Other MS and MSD recoveries, which did not meet the established criteria in the *QAPP*, include recoveries for tetryl. This compound often suffers from degradation, which results in low recovery of the compound in the MS and MSD. However, based upon the undetectable levels of tetryl found in these samples and the relation of the analytical reporting limits to the industrial and residential clean-up levels, the data is determined to be acceptable to show that clean-up goals have been successfully met.

Based on technical review of the field and laboratory QC data, analyses were performed within acceptable accuracy and precision requirements specified in the *QAPP*. The confirmation data meets the project's data quality objectives and are therefore considered usable to support full-scale operations. Table 4.0 provides the average explosive compound levels for Day Zero and Day Last for the laboratory results received this reporting period. Table 5.0 lists the clean up goals for HMX, RDX and TNT. All windrows to date have met the project objective industrial clean-up goals and 15 of the windrows processed this period have meet residential clean-up objectives.

4.0 DISPOSITION OF TREATED SOIL AND SITE RESTORATION

Treated soil (compost) has been transported back to the SWMU of origination (Mine Fill A and B) either to the temporary staging area or used as backfill. Disposal activity to date is shown in Table 2.0. Field-generated drawings showing backfill placement of treated compost are included as Figures. Windrows 92, 93, 98, 101, and 102 are currently staged at Mine Fill A awaiting final disposition. One load of decontaminated rocks (rejected from the soil screening operation) was placed in grid 96 at Bldg. 157 in the bottom of the excavation. Site restoration (seeding, mulching, and watering) has been or will be implemented at all areas where TolTest has backfilled treated soil. Extensive re-vegetation of areas previously backfilled by Morrison Knudsen has been completed.

5.0 STATUS OF VARIOUS REPORTS

A. Toxicity Report

The report concludes that treated compost is suitable for use as a top dressing for general land application and does not contain leachable contaminants. The Microtox® and earthworm toxicity results conclude that bioremediated explosive compounds-contaminated soil is no more toxic than non-contaminated soil, which has been subjected to similar windrow composting activities. This report is currently being reviewed by the USEPA Region V.

B. Full-Scale QAPP Revision No. 3

This revision incorporates the standard operating procedures of the next proposed off-site laboratory. This document has been approved by the USEPA.

C. Rockeye Soil Excavation Plan

This plan, which is an appendix to the Full Scale Operations Plan for the Soils Bioremediation Facility, describes sampling and excavation activities for the Rockeye site. This plan has been approved by the USEPA Region V.

6.0 QUALITY CONTROL

Quality control inspections included excavation site operations, composting operations, sampling activities, field test kit analyses, and facility maintenance. Quality control checks were performed at required intervals using the field inspection checklists provided in Appendix F of the approved *Full-Scale Operational Plan* [MK, 1998a]. Copies of all inspection records are maintained at the Biofacility office.

During this period, 1946 individual items were verified and no deficiencies were identified. Immediate actions were taken to correct any minor findings observed. Hairline cracks in process building floor and a water line leak below the asphalt in the process area; reported as deficiencies in the previous quarterly report, have been repaired.

7.0 SAFETY AND INDUSTRIAL HYGIENE

7.1 General Safety

During this period 12,148.3 man-hours were expended by TolTest. There were no OSHA recordable injuries. The project has a cumulative total of 173,938.2 man-hours.

Twenty-two formal safety inspections were performed during this quarter. No significant findings of an imminent or serious nature were found. Immediate actions were taken to correct any minor findings observed. Daily informal walk-around safety inspections reinforced and improved the worker safety performance.

7.2 Industrial Hygiene Sampling

During this period total dust, airborne explosive compounds, and ammonia monitoring were performed. Ammonia samples were taken at the Biofacility by colorimetric methods. Sampling indicated ammonia levels greater than the occupational exposure limits of 50 ppm permissible exposure limit (PEL) and 25 ppm (TLV). Sampling commenced on Day 2 of the windrow life cycle and continued until the levels were below 25 ppm (TLV). The chicken manure amendment was the primary contributor to ammonia concentrations. Full-face air purifying respirators with ammonia cartridges were worn during windrow formation and during composting activities when ammonia levels were above 25 ppm (TLV). Ammonia was localized near each pile and was significantly affected by natural ventilation of the building, moisture in the windrow, and turning of the windrow. The maximum ammonia level detected was 75 ppm. The average maximum ammonia concentration during construction on Day 2 was 12 ppm; Day 3 was 37 ppm; Day 4 was 42 ppm; Day 5 was 75 ppm, and Day 6 was 7 ppm.

Ammonia samples were also collected by Passive Dosimeter Tubes. These tubes were placed on individuals and concentrations were calculated according to the amount of time worn. The highest concentration recorded was 16 ppm/hr. The average was 7.0 ppm/hr.

Airborne dust sampling for explosive compounds was also performed at the Biofacility. Six area samples and eight personnel samples were collected over a period of four hours. The explosives compound RDX was detected in five of the samples at an average of 6.28 ppb, HMX was detected in one sample at 2.8 ppb, and TNT in one sample at 1.06 ppb. All samples were below the 1.5 mg/m^3 8 hour time weighted average exposure limit.

Nuisance dust measurements were obtained using a laser dust monitor during activities that had the greatest potential to generate dust. During these activities, water is used to prevent and suppress any dust that could be generated. The average dust level

detected was 0.12 mg/m^3. The maximum dust level detected was 0.5 mg/m^3. All dust samples were below the 10 mg/m^3 non-respirable limit and the 3 mg/m^3 respirable limit.

Noise monitoring was performed using an Audio Dosimeter. The highest time-weighted average level of exposure was 86.6 decibels (dBa), the average was 83.1 dBa. The highest one-second average sound level recorded was 119.2 dBa, the average was 108.6 dBa. Associates are required to wear hearing protection when noise levels exceed 85 dBa during a weighted network steady state, or 140 dBa impulse, regardless of the duration of exposure.

In summary, monitoring during this period indicates no airborne explosive compounds hazard were present and adequate dust control measures are in place. Ammonia monitoring indicates respiratory protection is warranted during the first three to five days of the windrow life cycle. Noise monitoring indicates a requirement for noise protection.

8.0 FACILITY MAINTENANCE AND REPAIRS

- A fire hydrant was damaged when a bulldozer slid into it during backfill operations. The bulldozer was not damaged and the fire hydrant was replaced by TolTest.
- A tire on a trailer was punctured when a bulldozer struck it during backfill operations. The tire was replaced.
- Minor damage was caused to a step on a dump truck when it struck a steam line concrete pole support. The step was repaired.
- A turn signal lens was broken on a semi-truck when the truck struck a deer. The replacement lens is on-order.
- An associate's personally owned vehicle was struck from behind while on company business. The minor damage caused by the accident was repaired.
- An associate attempted to move a dump truck with the bed of the truck raised and came into contact with overhead power lines. Damage was sustained by the power lines and a utility pole which were repaired. The dump truck suffered no damage and the driver was unharmed. TolTest assumed all cost for repair.

9.0 REFERENCES

MK, 1998a. *Full-Scale Operational Plan for Soils Bioremediation Facility, NSWC Crane, Crane, Indiana.* Delivery Order Number 0009, Contract Number N62467-93-D-1106. Prepared by Morrison Knudsen Corporation, Environmental Services Group. Revision 2, March 12, 1998.

MK, 1998b. *Quality Assurance Project Plan for Full-Scale Operations, Soils Bioremediation Facility, NSWC Crane, Crane, Indiana.* Delivery Order Number 0009, Contract Number N62467-93-D-1106. Prepared by Morrison Knudsen Corporation, Environmental Services Group. Revision 2, March 12, 1998.

TABLES

TABLE 1.0
FULL-SCALE OPERATIONS SOIL EXCAVATION QUANTITIES
September through December 1999
Quantity (Tons)

Period	Mine Fill A	Mine Fill B	Rockeye	Cumulative
Previously reported	20,239.11	2,766.81	0.00	23,005.92
September	0.00	4,047.27	0.00	27,053.19
October	0.00	3,749.60	0.00	30,802.79
November	0.00	3,522.45	0.00	34,325.24
December	0.00	449.04	0.00	**34,774.28**
Reporting Period Total	0.00	11,768.36	0.00	11,768.36
Site Total	20,239.11	14,535.17	0.00	

TABLE 2.0
WINDROW SCHEDULE

Windrow #	Start Date	Day Zero	Day Last	Lab Results Received	Complete Unload	Tons Processed	Soil Processed, Cumulative	Processed to Residential or Industrial	Compost Disposal Location
S-101	8/18/99	8/18/99	8/27/99	9/3/99	9/3/99	232.1	9755.318	Industrial	Staging area
N-102	8/19/99	8/19/99	9/2/99	9/8/99	9/8/99	98.648	9853.966	Industrial	Staging area
S-103	8/23/99	8/23/99	9/7/99	9/13/99	9/13/99	232.1	10086.066	Industrial	2501 flat area
M-104	8/25/99	8/25/99	9/13/99	9/18/99	9/20/99	232.1	10318.166	Industrial	2501 flat area
N-105	8/27/99	8/27/99	9/2/99	9/8/99	9/8/99	98.648	10416.814	Industrial	W & NE side of 2501
M-106	8/30/99	8/30/99	9/8/99	9/14/99	9/14/99	232.1	10648.914	Industrial	NW side 173
S-107	9/3/99	9/3/99	9/10/99	9/16/99	9/16/99	232.1	10881.014	Industrial	2501 flat area
S-108	9/14/99	9/14/99	9/21/99	9/27/99	9/27/99	232.1	11113.114	Residential	NW side 173
M-109	9/16/99	9/16/99	9/27/99	10/2/99	10/4/99	232.1	11345.214	Residential	2501 flat area
S-110	9/18/99	9/18/99	9/28/99	10/4/99	10/4/99	232.1	11577.314	Residential	2501 flat area
M-111	9/20/99	9/20/99	9/29/99	10/5/99	10/5/99	232.1	11809.414	Residential	W & NE side 2501
S-112	9/27/99	9/28/99	10/7/99	10/19/99	10/19/99	232.1	12041.514	Residential	2501 flat area
M-113	10/4/99	10/4/99	10/13/99	10/18/99	10/18/99	232.1	12273.614	Residential	2501 flat area
S-114	10/5/99	10/5/99	10/15/99	10/21/99	10/20/99	232.1	12505.714	Residential	W side 2501
S-115	10/6/99	10/6/99	10/14/99	10/20/99	10/21/99	232.1	12737.814	Industrial	W side 2501
M-116	10/19/99	10/19/99	10/25/99	11/1/99	11/1/99	232.1	12969.914	Residential	W side 2501
S-117	10/20/99	10/20/99	10/27/99	11/2/99	11/3/99	232.1	13202.014	Industrial	W side 173
S-118	10/21/99	10/22/99	11/1/99	11/7/99	11/8/99	232.1	13434.114	Residential	W side 173 & 2501 flat area
M-119	10/22/99	10/23/99	11/1/99	11/7/99	11/8/99	232.1	13666.214	Residential	NE side 2501
M-120	11/1/99	11/1/99	11/8/99	11/14/99	11/15/99	232.1	13898.314	Residential	NE side 168
S-121	11/3/99	11/4/99	11/18/99	11/24/99	11/29/99	232.1	14130.414	Residential	NE side 168 & 2501 flat area
S-122	11/8/99	11/9/99	11/16/99	11/22/99	11/23/99	232.1	14362.514	Industrial	SW side 168
M-123	11/9/99	11/10/99	11/19/99	11/24/99	11/26/99	232.1	14594.614	Industrial	NE side 168

TABLE 2.0 (Continued)
WINDROW SCHEDULE

Windrow #	Start Date	Day Zero	Day Last	Lab Results Received	Complete Unload	Tons Processed	Soil Processed, Cumulative	Processed to Residential or Industrial	Compost Disposal Location
M-124	11/15/99	11/16/99	11/27/99	12/5/99	12/6/99	232.1	14826.714	Residential	SW side 168
S-125	11/23/99	11/23/99	12/2/99	12/8/99	12/8/99	232.1	15058.814	Industrial	NE side 2501
M-126	11/26/99	11/26/99	12/3/99	12/9/99	12/9/99	232.1	15290.914	Industrial	NE side 168
S-127	11/29/99	11/30/99	12/7/99	12/13/99	12/14/99	232.1	15523.014	Industrial	Staging area
M-128	12/6/99	12/7/99	12/16/99	12/22/99	12/22/99	232.1	15755.114	Residential	NE side 2501
S-129	12/8/99	12/9/99	12/20/99	12/28/99	12/28/99	232.1	15987.214	Residential	Storage area
M-130	12/9/99	12/10/99	12/20/99	12/28/99	12/29/99	232.1	16219.314	Industrial	Staging area

TABLE 3.0
EXPLOSIVE COMPOUNDS ANALYTICAL DATA (ppm)

	Windrow No. 101		Windrow No. 102		Windrow No. 103		Windrow No. 104	
	Day 0	Day 9	Day 0	Day 6	Day 0	Day 15	Day 0	Day 19
HMX	9	2.6	24	2.8	72	3.1	113	2.2
RDX	36	6.4	190	15.5	591	3.9	827	4.9
TNT	5	0.8	18	0.9	30	1	56	1

	Windrow No. 105		Windrow No. 106		Windrow No. 107		Windrow No. 108	
	Day 0	Day 6	Day 0	Day 9	Day 0	Day 7	Day 0	Day 7
HMX	24	3.7	49	1.6	9	1.6	13	1.9
RDX	101	4.9	131	5.7	41	6.4	73	0.9
TNT	2	1.9	1	1	1	0.9	0.3	0.2

	Windrow No. 109		Windrow No. 110		Windrow No. 111		Windrow No. 112	
	Day 0	Day 11	Day 0	Day 10	Day 0	Day 9	Day 0	Day 15
HMX	41	2.2	6	2.2	8	2.1	32	2.6
RDX	256	0.9	37	1.1	42	1	201	2.7
TNT	0.4	0.3	1.3	0.2	1.3	0.2	1.2	0.3

	Windrow No. 113		Windrow No. 114		Windrow No. 115		Windrow No. 116	
	Day 0	Day 9	Day 0	Day 10	Day 0	Day 8	Day 0	Day 6
HMX	38	2.7	43	2.9	14	3.2	**	2.5
RDX	166	2.6	606	3.1	138	5.1	**	1.6
TNT	122	1.6	56	0.6	197	1.2	**	0.2

	Windrow No. 117		Windrow No. 118		Windrow No. 119		Windrow No. 120	
	Day 0	Day 7	Day 0	Day 10	Day 0	Day 9	Day 0	Day 7
HMX	**	1.8	**	2.3	**	2.2	**	2
RDX	**	4.1	**	2.1	**	1.6	**	1.9
TNT	**	0.8	**	0.3	**	0.3	**	0.4

	Windrow No. 121		Windrow No. 122		Windrow No. 123		Windrow No. 124	
	Day 0	Day 14	Day 0	Day 7	Day 0	Day 9	Day 0	Day 11
HMX	**	3.2	**	2.6	**	3.3	**	2
RDX	**	2.2	**	4.6	**	11.1	**	2.2
TNT	**	0.9	**	5.2	**	2.9	**	0.3

TABLE 3.0 (Continued)
EXPLOSIVE COMPOUNDS ANALYTICAL DATA (ppm)

	Windrow No. 125		Windrow No. 126		Windrow No. 127		Windrow No. 128	
	Day 0	Day 9	Day 0	Day 7	Day 0	Day 7	Day 0	Day 9
HMX	**	2.6	**	2.5	**	2.9	**	2
RDX	**	6.1	**	6.7	**	8.6	**	3.7
TNT	**	0.9	**	8.7	**	1.9	**	2.7

	Windrow No. 129		Windrow No. 130	
	Day 0	Day 11	Day 0	Day 10
HMX	**	2.1	**	2.7
RDX	**	3.9	**	5.9
TNT	**	4.5	**	2.1

TABLE 4.0
AVERAGE EXPLOSIVE COMPOUNDS LEVELS

	Day 0	Day Last
HMX	29	2.4
RDX	208	4.3
TNT	50	1.4

(All results in ppm)

TABLE 5.0
EXPLOSIVE COMPOUNDS CLEAN-UP LEVELS

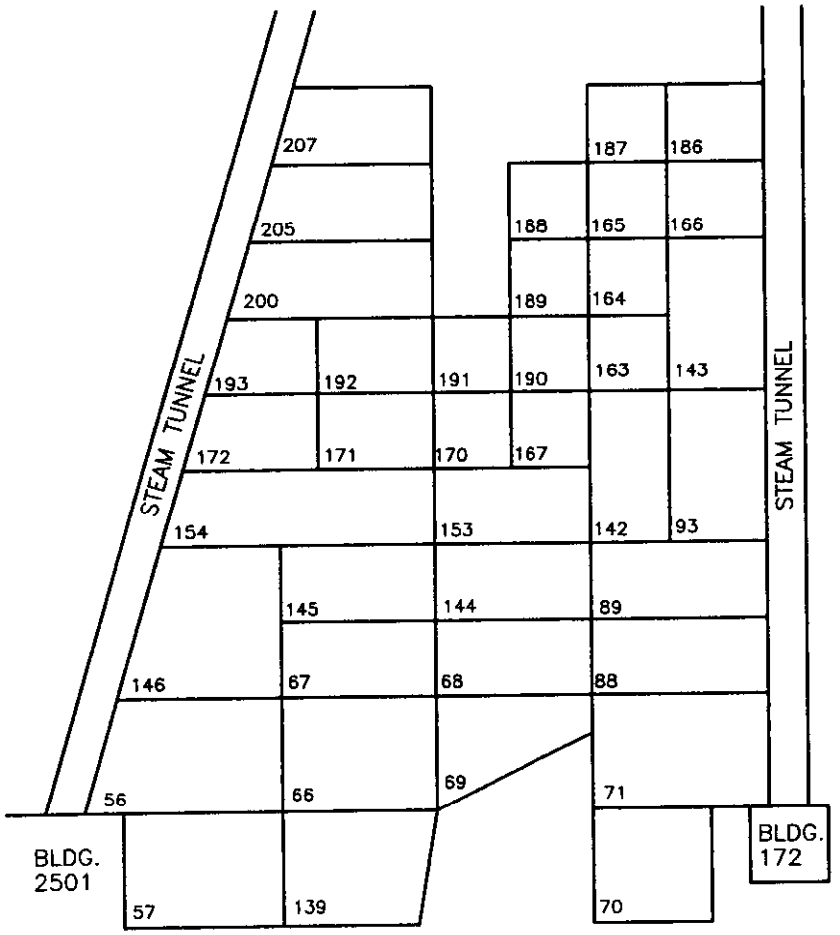
	Clean-Up Goals (ppm)	
	Residential	Industrial
HMX	3,300	34,000
RDX	4	17
TNT	15	64

FIGURES

WINDROW PLACEMENT SITE MAPS

MINE FILL A & B

BUILDING 2501/BUILDING 172



MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

N

WINDROW LOCATION MAP

BACKFILL OPERATIONS

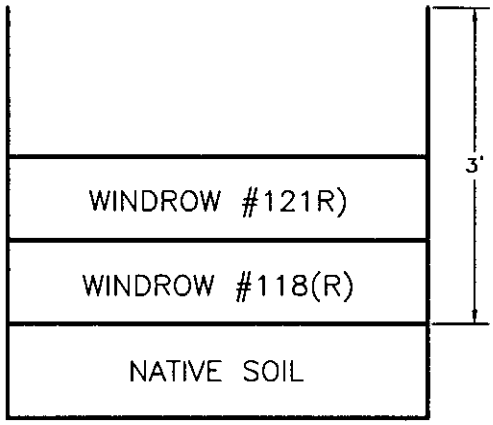
GRIDS: #56, 57, 66, 67, 68, 69, 70, 71, 88, 89, 93, 139, 142, 143, 144, 145, 146, 153, 154, 163, 164, 165, 166, 167, 170, 171, 172, 186, 187, 188, 189, 190, 191, 192, 193, 200, 205, 207
WINDROWS: #103(I), 104(I), 107(I), 109(R), 110(R), 112(R), 113(R), 118(R), 121(R)
NAVAL SURFACE WARFARE CENTER, BUILDING 2501/BUILDING 172, MINE FILL B
CRANE, INDIANA

PREPARED FOR

NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-08-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 1 of 11	

FLAT AREA IN BETWEEN BLDG. 2501 & BLDG. 172



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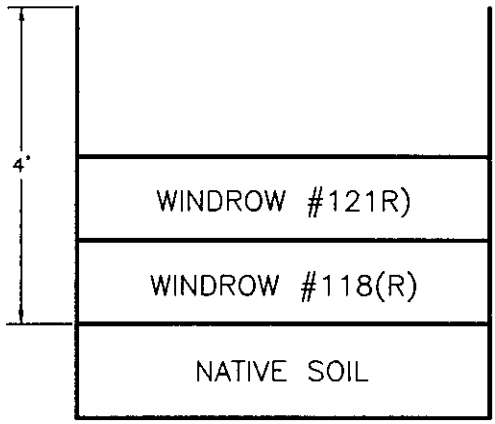

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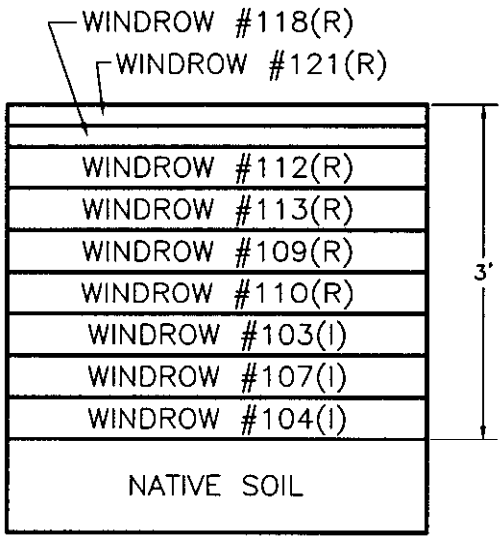

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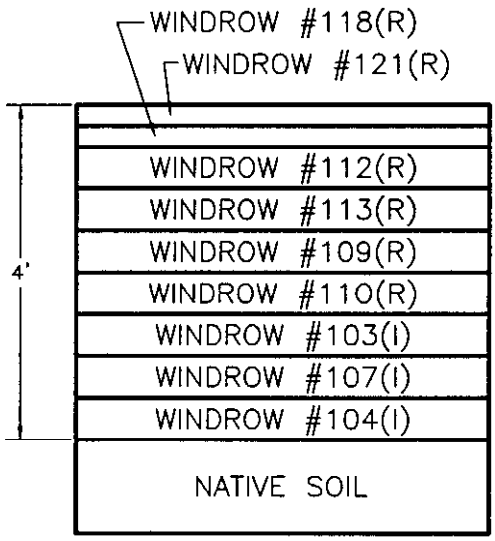


GRID #67

MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

REFERENCE: (R) = RESIDENTIAL SOIL
(I) = INDUSTRIAL SOIL

N

SIDE VIEW

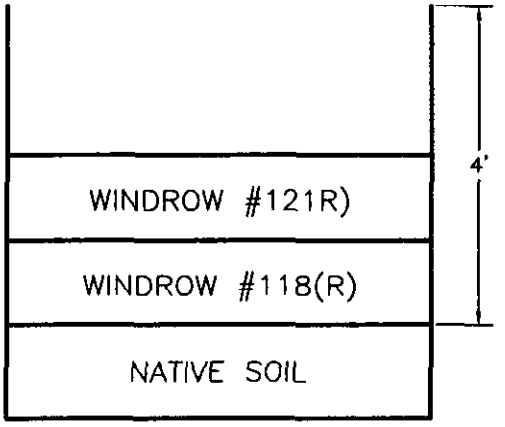
BACKFILL OPERATIONS
GRIDS: #56, 57, 66, 67
WINDROWS: #104(I), 107(I), 103(I), 110(R), 109(R), 113(R), 112(R), 118(R), 121(R)
NAVAL SURFACE WARFARE CENTER
FLAT AREA IN BETWEEN BLDG. 2501 & BLDG. 172, MINE FILL B
CRANE, INDIANA

PREPARED FOR

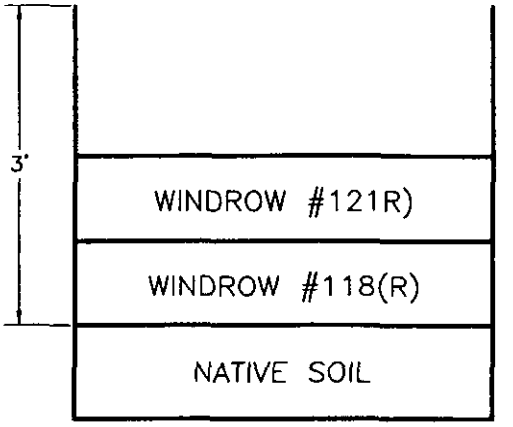
NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-08-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 2 of 11	

FLAT AREA IN BETWEEN BLDG. 2501 & BLDG. 172



GRID #68



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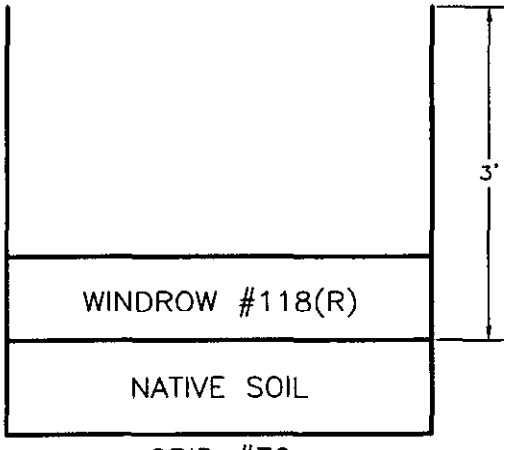

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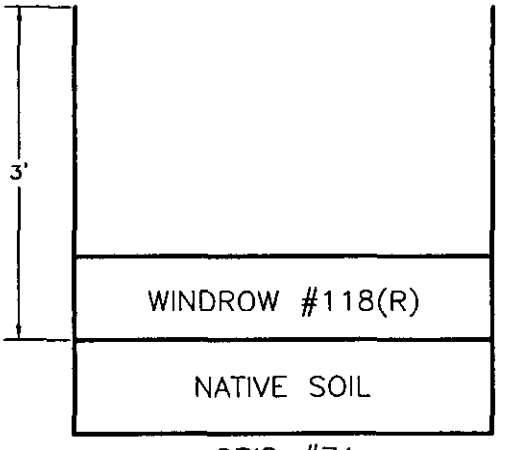


GRID #71

MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

REFERENCE: (R) = RESIDENTIAL SOIL
(I) = INDUSTRIAL SOIL

N

SIDE VIEW

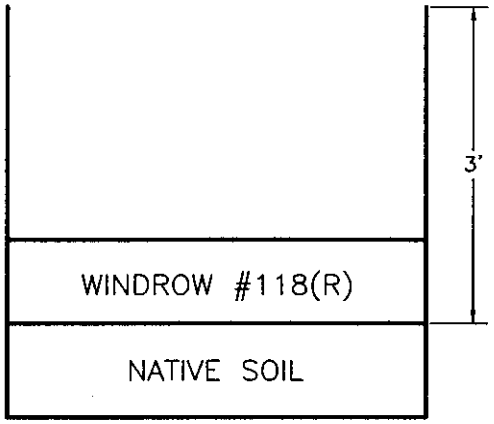
BACKFILL OPERATIONS
GRIDS: #68, 69, 70, 71
WINDROWS: #118(R), 121(R)
NAVAL SURFACE WARFARE CENTER
FLAT AREA IN BETWEEN BLDG. 2501 & BLDG. 172, MINE FILL B
CRANE, INDIANA

PREPARED FOR

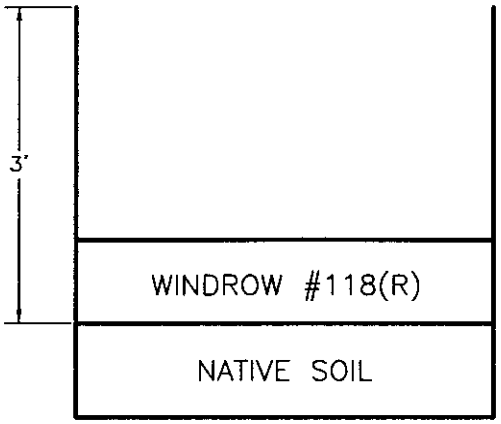
NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-08-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 3 of 11	

FLAT AREA IN BETWEEN BLDG. 2501 & BLDG. 172



GRID #88



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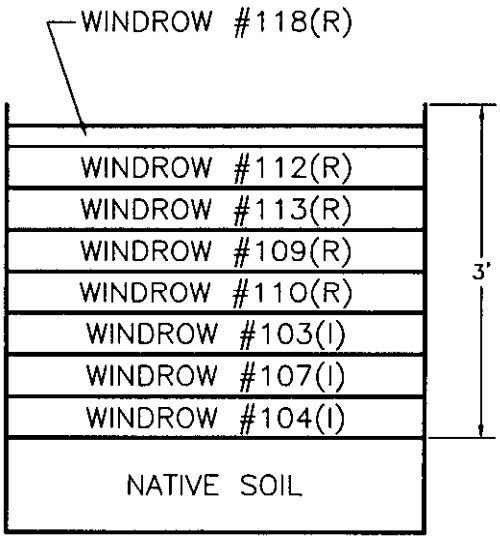

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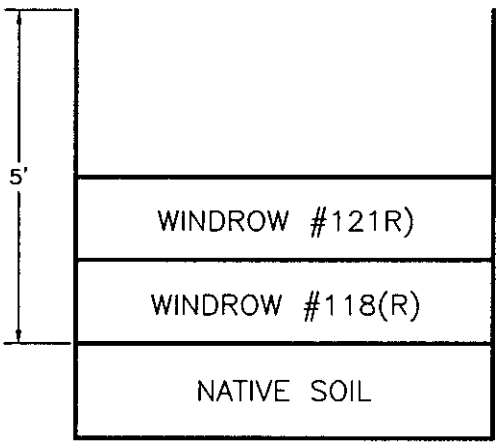


GRID #139

MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

REFERENCE: (R) = RESIDENTIAL SOIL
(I) = INDUSTRIAL SOIL

N

SIDE VIEW

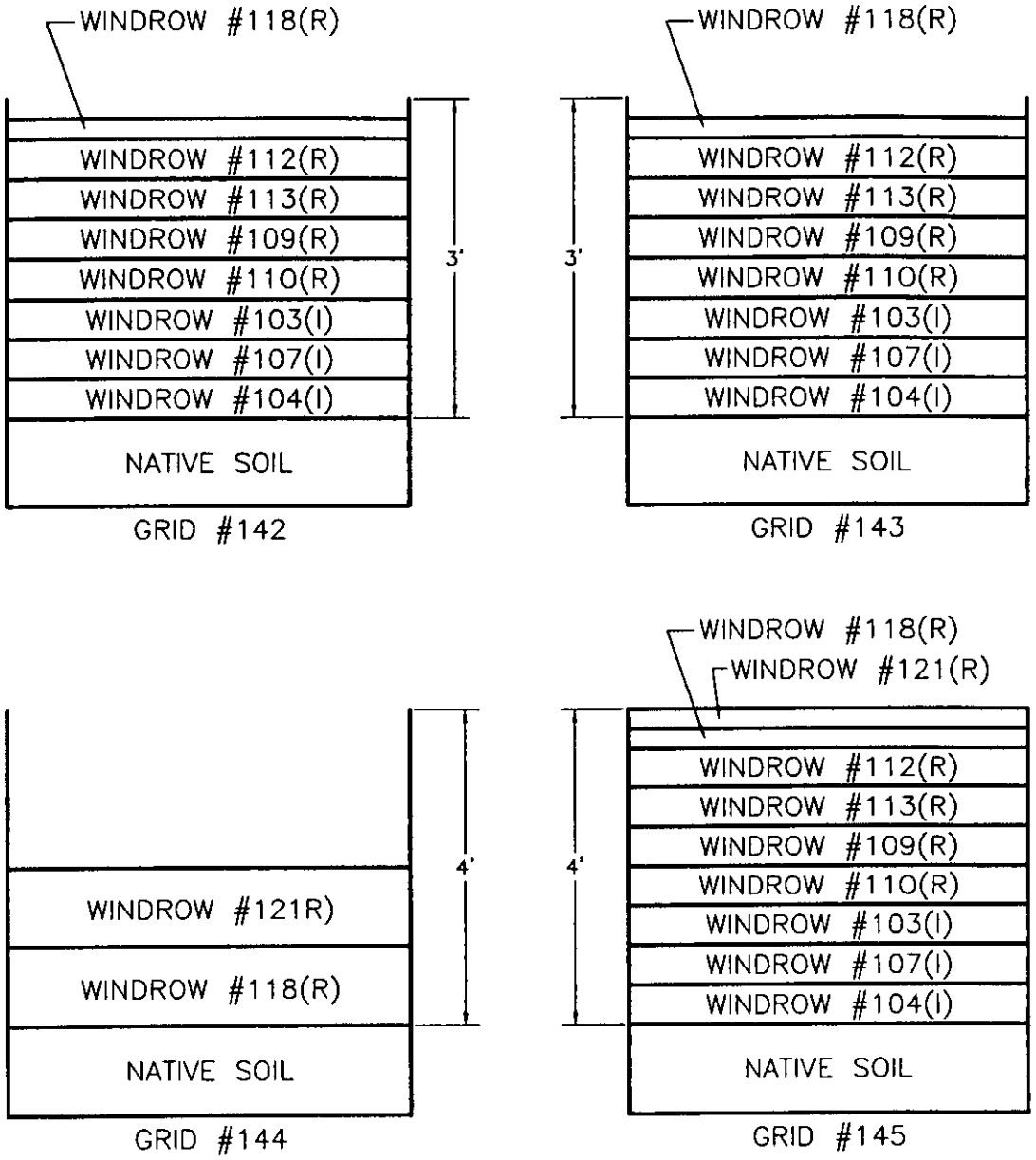
BACKFILL OPERATIONS
GRIDS: #88, 89, 93, 139
WINDROWS: #104(I), 107(I), 103(I), 110(R), 109(R), 113(R), 112(R), 118(R), 121(R)
NAVAL SURFACE WARFARE CENTER
FLAT AREA IN BETWEEN BLDG. 2501 & BLDG. 172, MINE FILL B
CRANE, INDIANA

PREPARED FOR

NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-08-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 4 of 11	

FLAT AREA IN BETWEEN BLDG. 2501 & BLDG. 172



MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

REFERENCE: (R) = RESIDENTIAL SOIL
(I) = INDUSTRIAL SOIL

N

SIDE VIEW

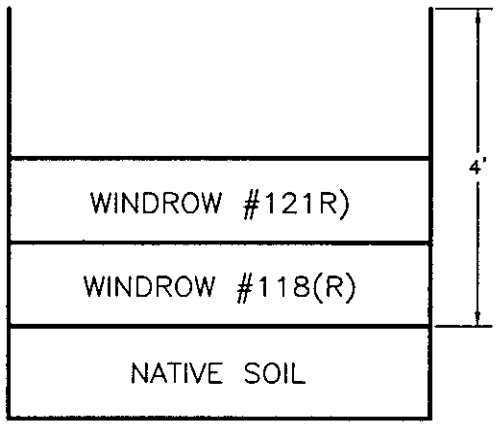
BACKFILL OPERATIONS
GRIDS: #142, 143, 144, 145
WINDROWS: #104(I), 107(I), 103(I), 110(R), 109(R), 113(R), 112(R), 118(R), 121(R)
NAVAL SURFACE WARFARE CENTER
FLAT AREA IN BETWEEN BLDG. 2501 & BLDG. 172, MINE FILL B
CRANE, INDIANA

PREPARED FOR

NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-08-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 5 of 11	

FLAT AREA IN BETWEEN BLDG. 2501 & BLDG. 172



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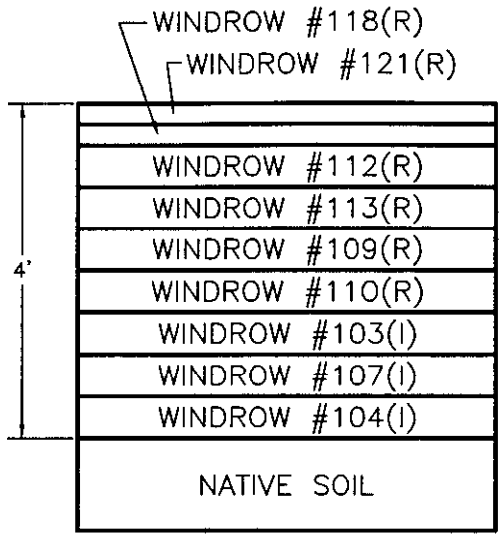

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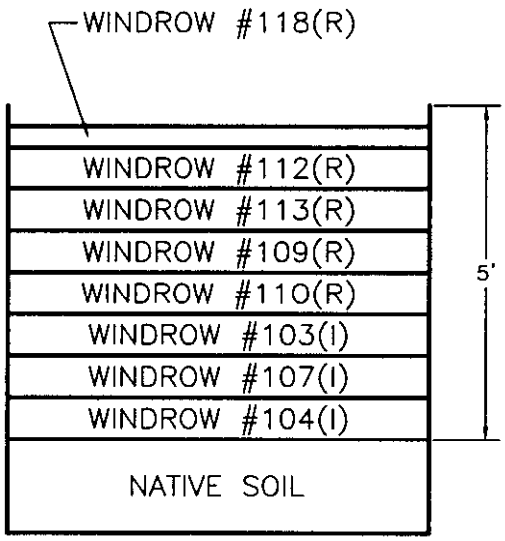
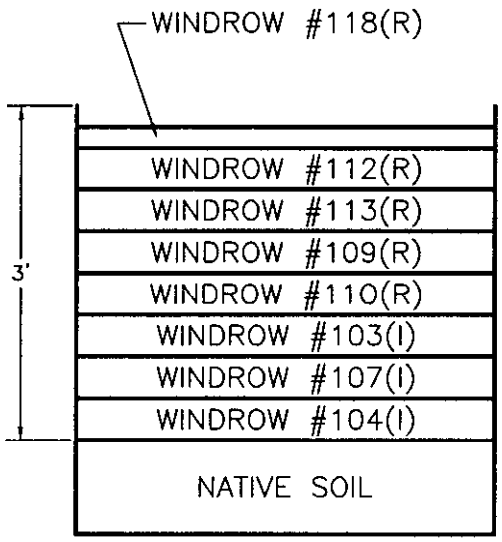


GRID #154



GRID #163

MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

REFERENCE: (R) = RESIDENTIAL SOIL
(I) = INDUSTRIAL SOIL

N

SIDE VIEW

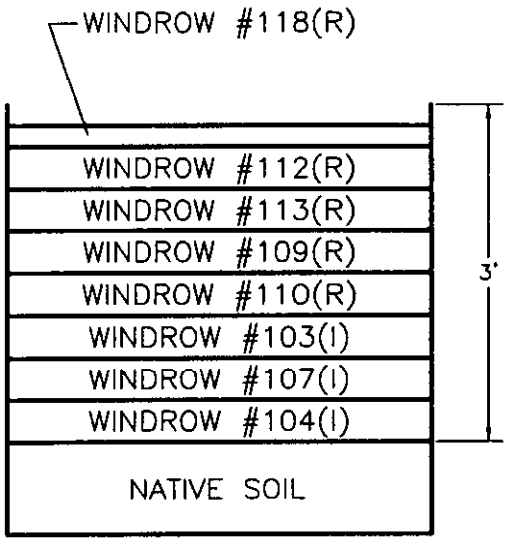
BACKFILL OPERATIONS
GRIDS: #146, 153, 154, 163
WINDROWS: #104(I), 107(I), 103(I), 110(R), 109(R), 113(R), 112(R), 118(R), 121(R)
NAVAL SURFACE WARFARE CENTER
FLAT AREA IN BETWEEN BLDG. 2501 & BLDG. 172, MINE FILL B
CRANE, INDIANA

PREPARED FOR

NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-08-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 6 of 11	

FLAT AREA IN BETWEEN BLDG. 2501 & BLDG. 172



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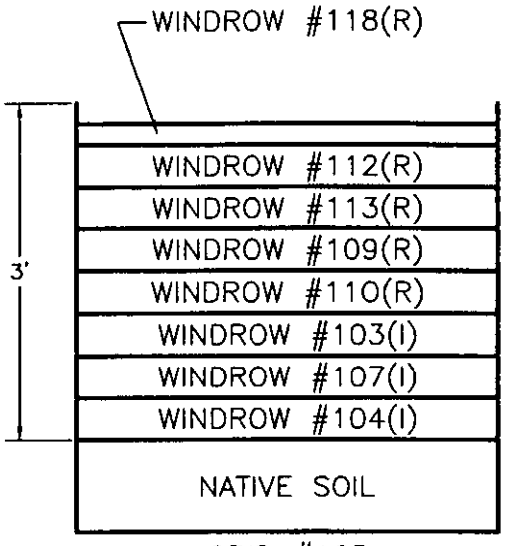

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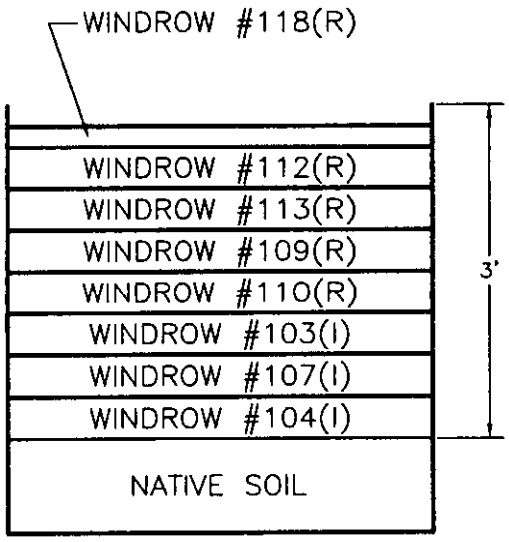

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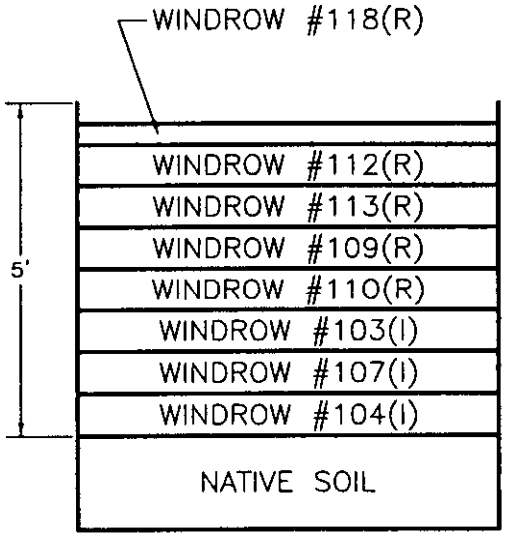


GRID #167

MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

REFERENCE: (R) = RESIDENTIAL SOIL
(I) = INDUSTRIAL SOIL

N

SIDE VIEW

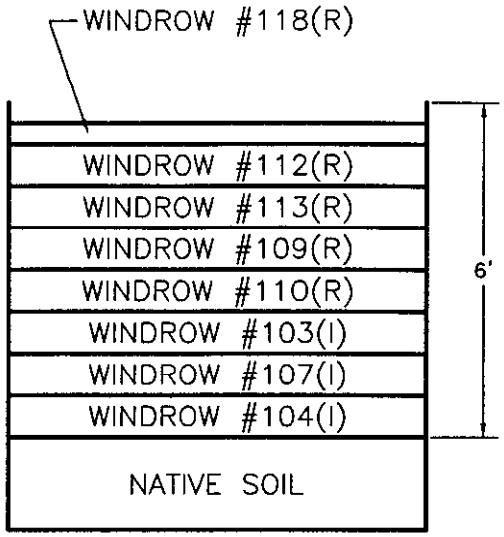
BACKFILL OPERATIONS
GRIDS: #164, 165, 166, 167
WINDROWS: #104(I), 107(I), 103(I), 110(R), 109(R), 113(R), 112(R), 118(R), 121(R)
NAVAL SURFACE WARFARE CENTER
FLAT AREA IN BETWEEN BLDG. 2501 & BLDG. 172, MINE FILL B
CRANE, INDIANA

PREPARED FOR

NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-08-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 7 of 11	

FLAT AREA IN BETWEEN BLDG. 2501 & BLDG. 172



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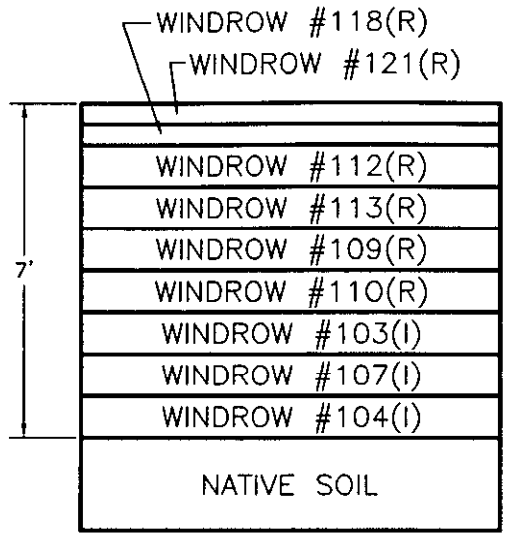

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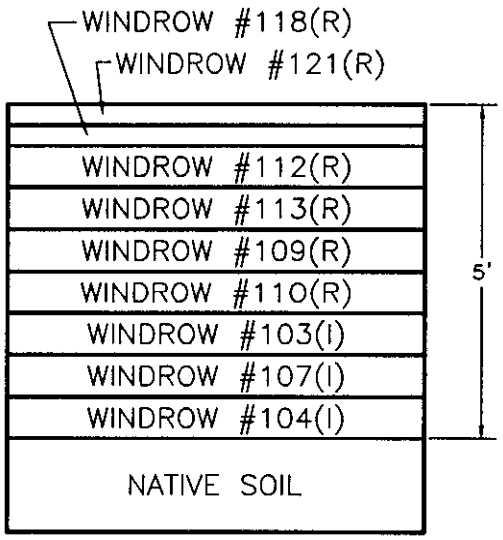

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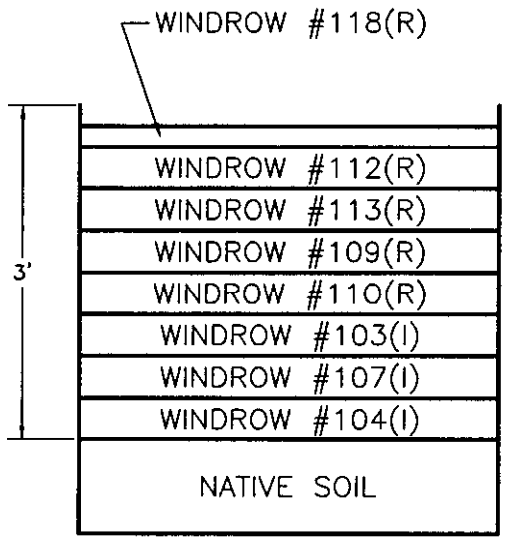


GRID #186

MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

REFERENCE: (R) = RESIDENTIAL SOIL
(I) = INDUSTRIAL SOIL

N

SIDE VIEW

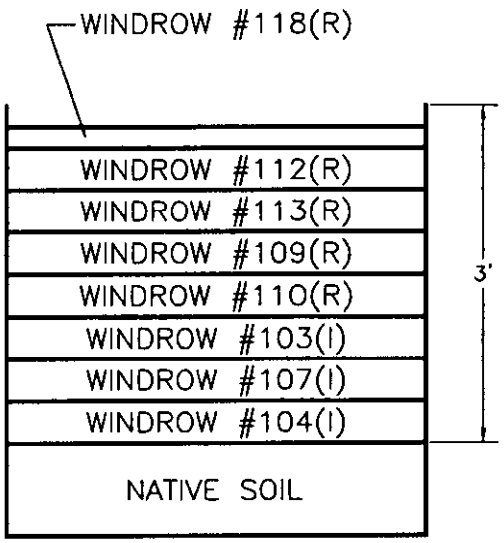
BACKFILL OPERATIONS
GRIDS: #170, 171, 172, 186
WINDROWS: #104(I), 107(I), 103(I), 110(R), 109(R), 113(R), 112(R), 118(R), 121(R)
NAVAL SURFACE WARFARE CENTER
FLAT AREA IN BETWEEN BLDG. 2501 & BLDG. 172, MINE FILL B
CRANE, INDIANA

PREPARED FOR

NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-08-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 8 of 11	

FLAT AREA IN BETWEEN BLDG. 2501 & BLDG. 172



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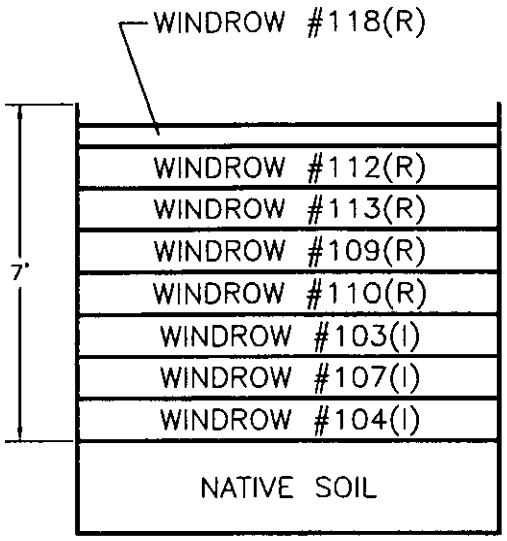

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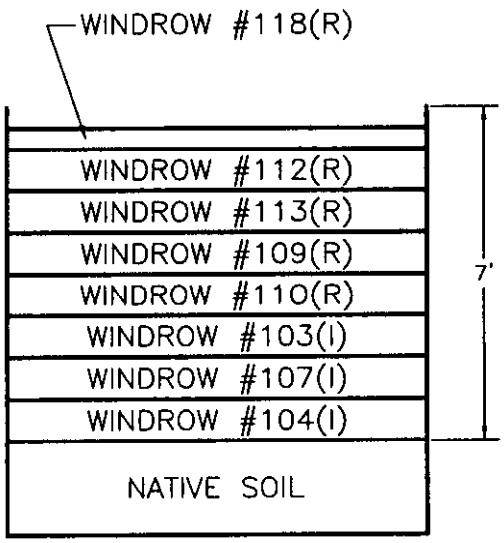

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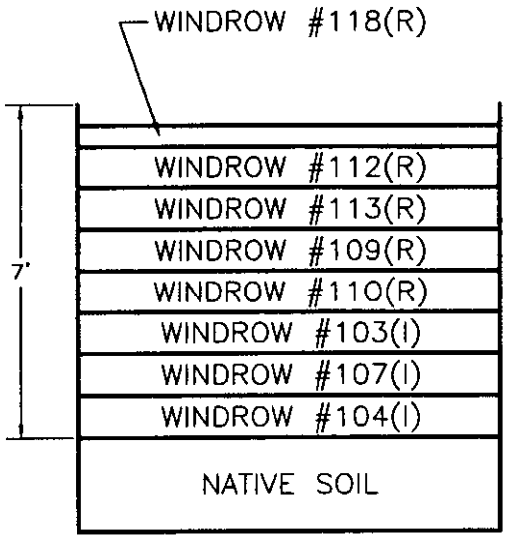


GRID #190

MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

REFERENCE: (R) = RESIDENTIAL SOIL
(I) = INDUSTRIAL SOIL

N

SIDE VIEW

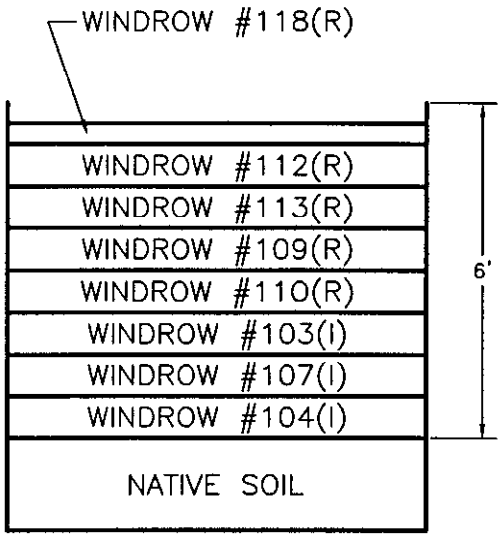
BACKFILL OPERATIONS
GRIDS: #187, 188, 189, 190
WINDROWS: #104(I), 107(I), 103(I), 110(R), 109(R), 113(R), 112(R), 118(R)
NAVAL SURFACE WARFARE CENTER
FLAT AREA IN BETWEEN BLDG. 2501 & BLDG. 172, MINE FILL B
CRANE, INDIANA

PREPARED FOR

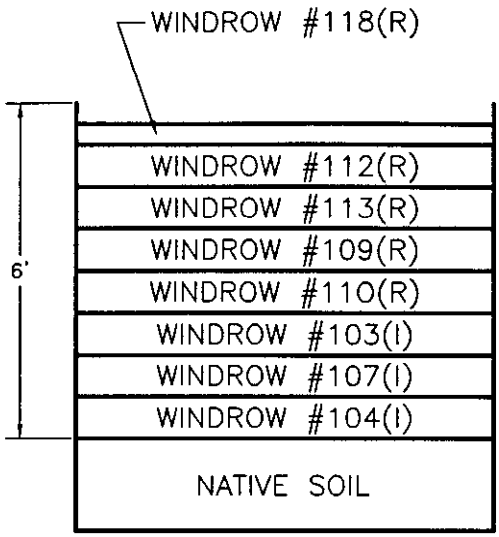
NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-08-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 9 of 11	

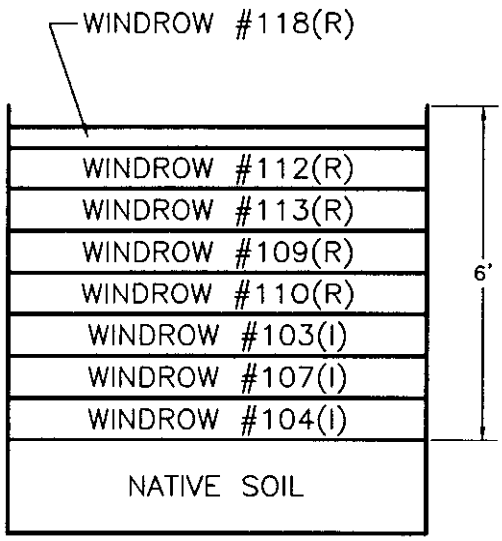
FLAT AREA IN BETWEEN BLDG. 2501 & BLDG. 172



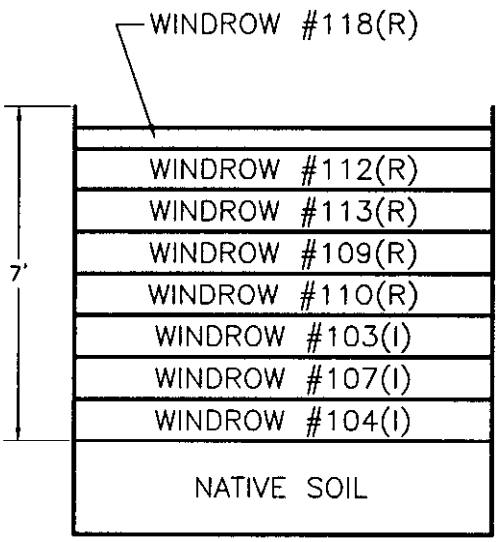
GRID #191



GRID #192



GRID #193



GRID #200

MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

REFERENCE: (R) = RESIDENTIAL SOIL
(I) = INDUSTRIAL SOIL

N

SIDE VIEW

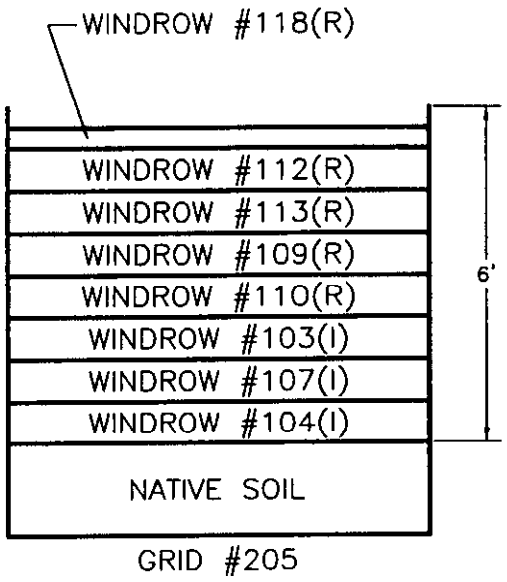
BACKFILL OPERATIONS
GRIDS: #191, 192, 193, 200
WINDROWS: #104(I), 107(I), 103(I), 110(R), 109(R), 113(R), 112(R), 118(R)
NAVAL SURFACE WARFARE CENTER
FLAT AREA IN BETWEEN BLDG. 2501 & BLDG. 172, MINE FILL B
CRANE, INDIANA

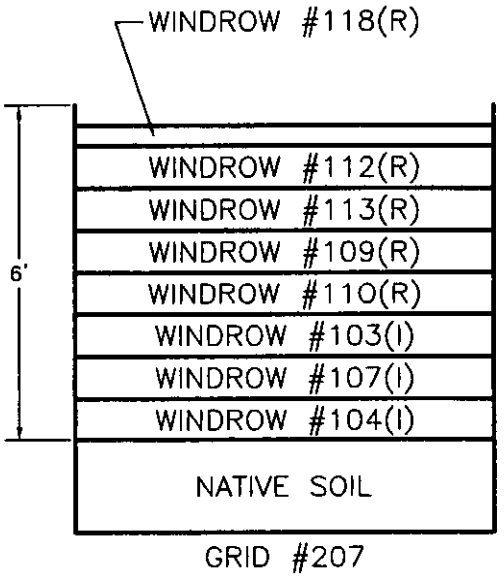
PREPARED FOR

NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-08-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 10 of 11	

FLAT AREA IN BETWEEN BLDG. 2501 & BLDG. 172





MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

REFERENCE: (R) = RESIDENTIAL SOIL
(I) = INDUSTRIAL SOIL

N

SIDE VIEW

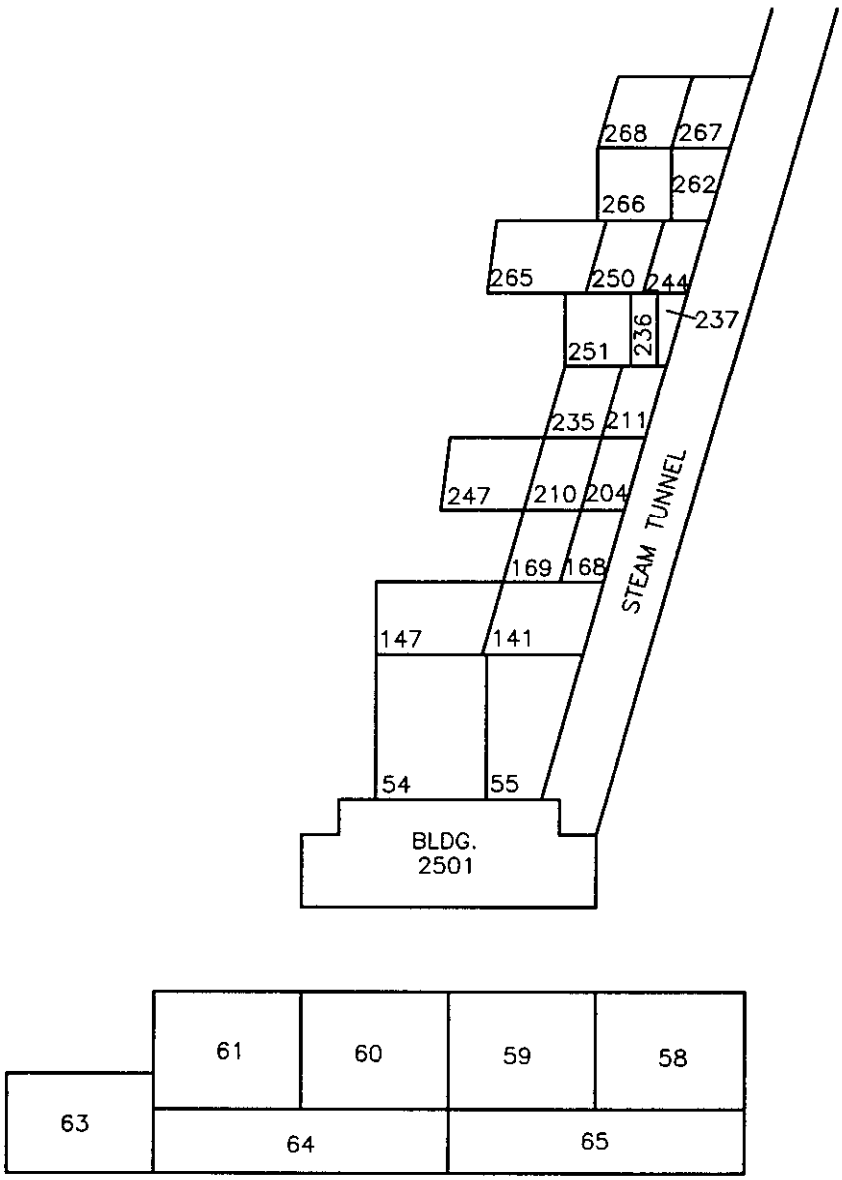
BACKFILL OPERATIONS
GRIDS: #205, 207
WINDROWS: #104(I), 107(I), 103(I), 110(R), 109(R), 113(R), 112(R), 118(R)
NAVAL SURFACE WARFARE CENTER
FLAT AREA IN BETWEEN BLDG. 2501 & BLDG. 172, MINE FILL B
CRANE, INDIANA

PREPARED FOR

NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-08-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 11 of 11	

BUILDING 2501



MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

N

WINDROW LOCATION MAP

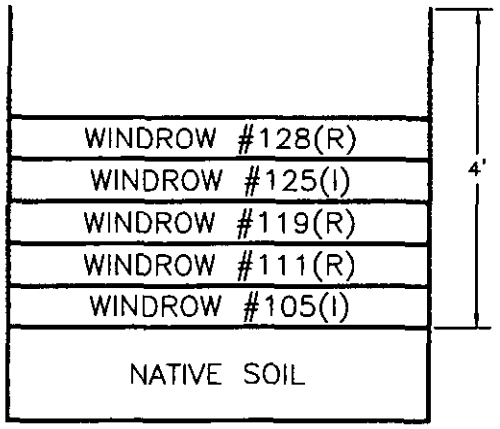
BACKFILL OPERATIONS
GRIDS: #54, 55, 58, 59, 60, 61, 63, 64, 65, 141, 147, 168, 169, 204, 210, 211, 235, 236, 237, 244, 247, 250, 251, 262, 265, 266, 267, 268
WINDROWS: #105(I), 111(R), 119(R), 125(I), 128(R)
NAVAL SURFACE WARFARE CENTER, BUILDING 2501, MINE FILL B
CRANE, INDIANA

PREPARED FOR

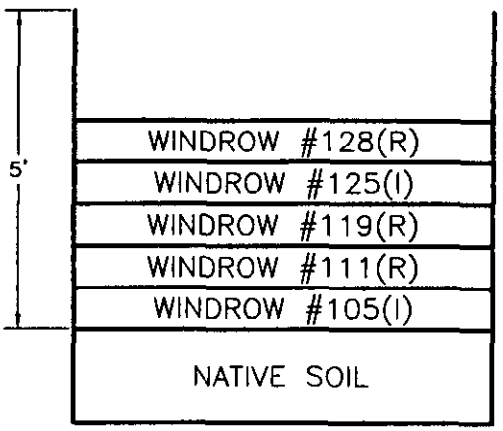
NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-03-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 1 of 7	

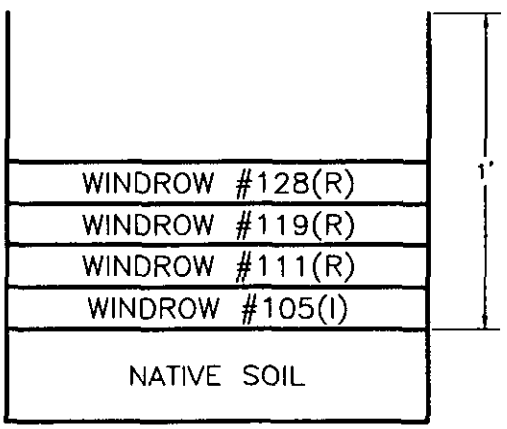
NORTHEAST CORNER OF BUILDING 2501



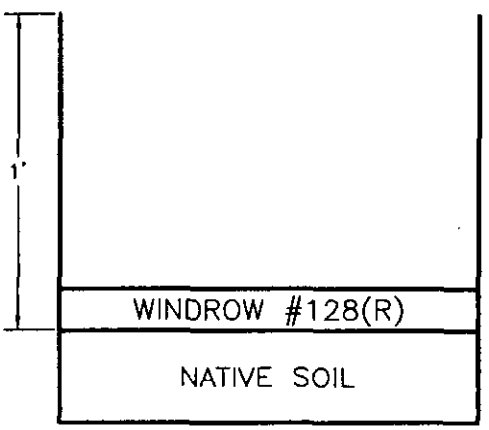
GRID #54



GRID #55



GRID #141



GRID #147

MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

REFERENCE: (R) = RESIDENTIAL SOIL
(I) = INDUSTRIAL SOIL

N

SIDE VIEW

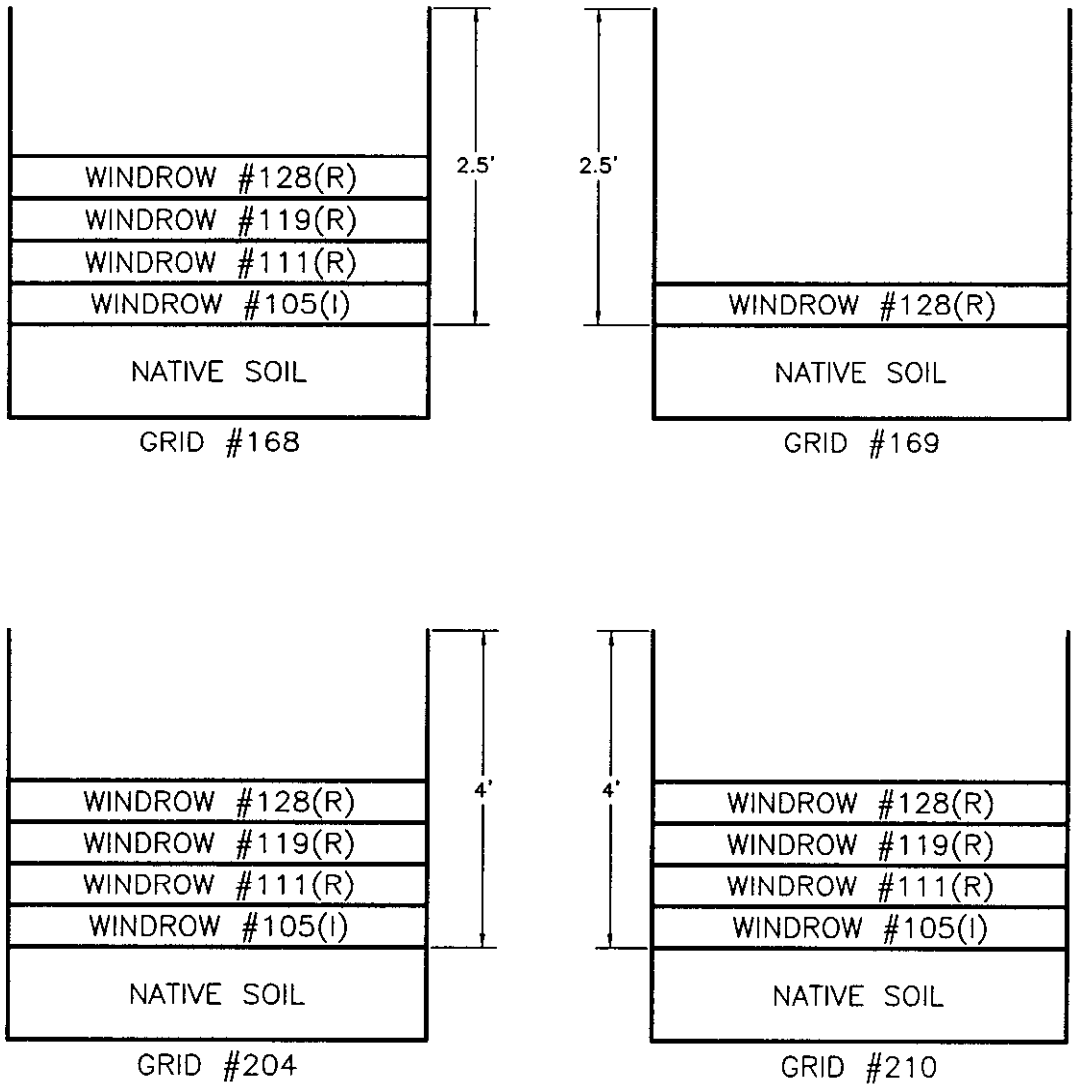
BACKFILL OPERATIONS
GRIDS: #54, 55, 141, 147
WINDROWS: #105(I), 111(R), 119(R), 125(I), 128(R)
NAVAL SURFACE WARFARE CENTER
BUILDING 2501 (NE SIDE), MINE FILL B
CRANE, INDIANA

PREPARED FOR

NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-03-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 2 of 7	

NORTHEAST CORNER OF BUILDING 2501



MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

REFERENCE: (R) = RESIDENTIAL SOIL
(I) = INDUSTRIAL SOIL

N

SIDE VIEW

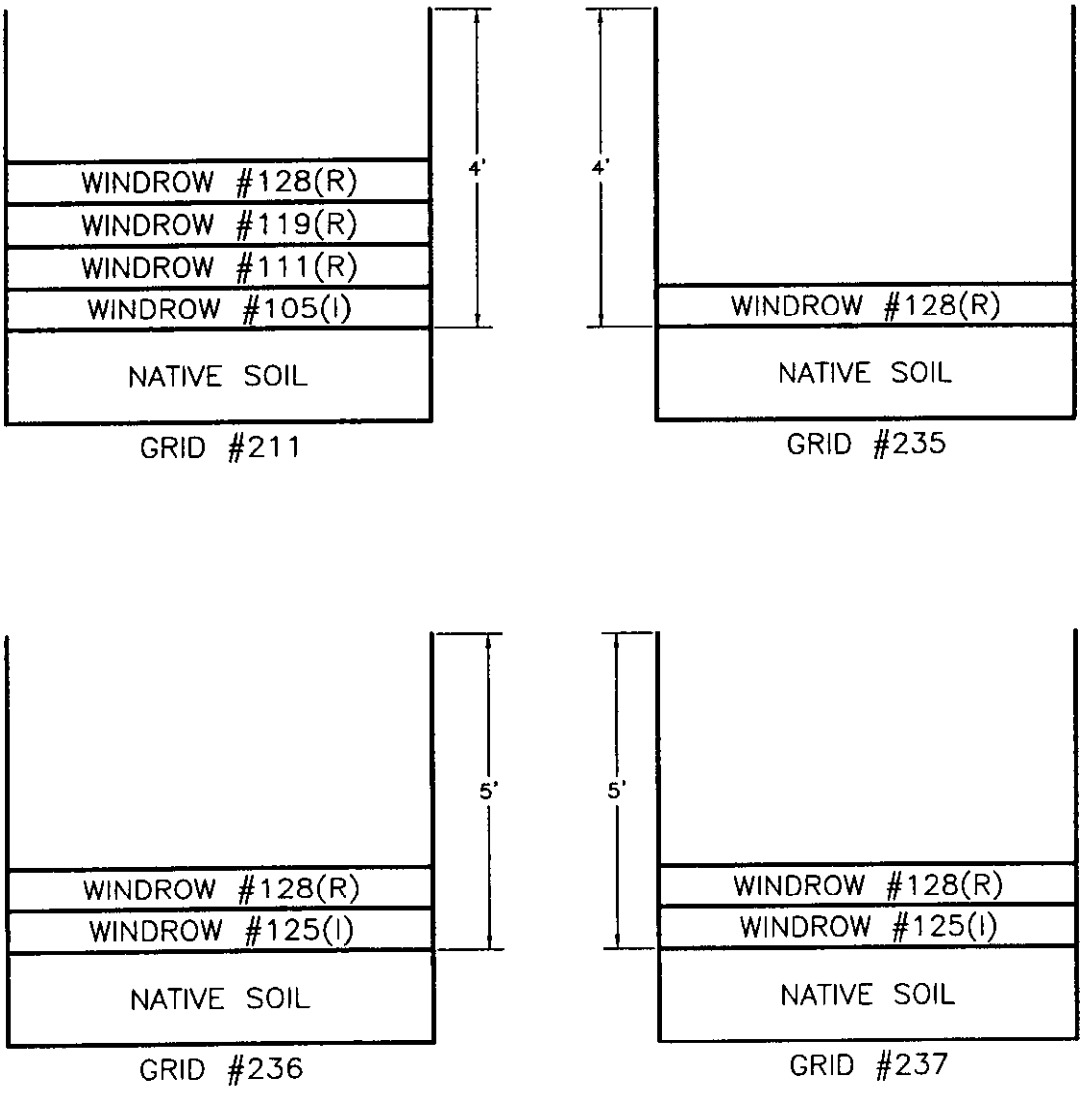
BACKFILL OPERATIONS
GRIDS: #168, 169, 204, 210
WINDROWS: #105(I), 111(R), 119(R), 128(R)
NAVAL SURFACE WARFARE CENTER
BUILDING 2501 (NE SIDE), MINE FILL B
CRANE, INDIANA

PREPARED FOR

NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-03-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 3 of 7	

NORTHEAST CORNER OF BUILDING 2501



MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

REFERENCE: (R) = RESIDENTIAL SOIL
(I) = INDUSTRIAL SOIL

N

SIDE VIEW

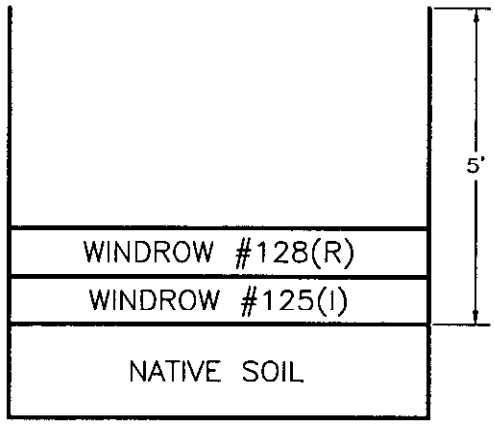
BACKFILL OPERATIONS
GRIDS: #211, 235, 236, 237
WINDROWS: #105(I), 111(R), 119(R), 125(I), 128(R)
NAVAL SURFACE WARFARE CENTER
BUILDING 2501 (NE SIDE), MINE FILL B
CRANE, INDIANA

PREPARED FOR

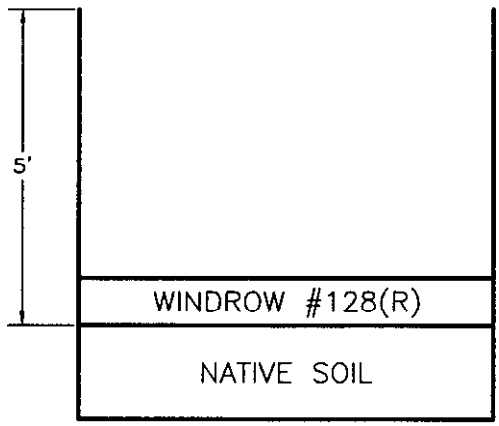
NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-03-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 4 of 7	

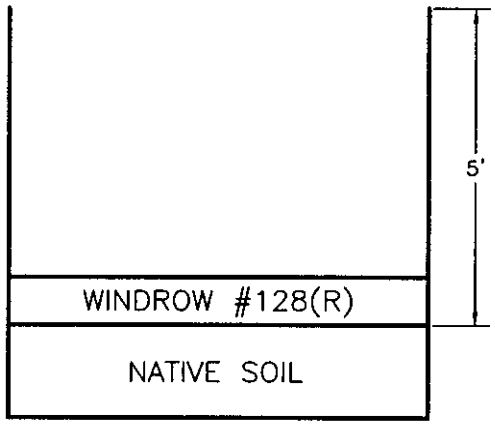
NORTHEAST CORNER OF BUILDING 2501



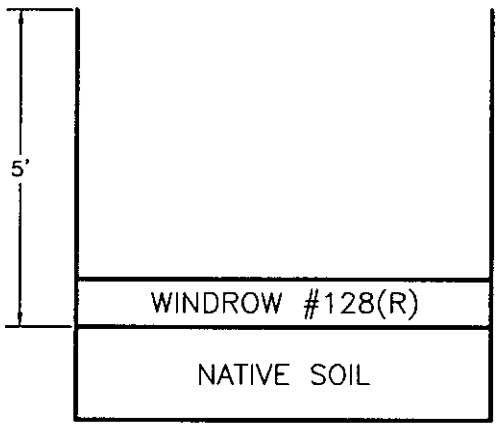
GRID #244



GRID #247



GRID #250



GRID #251

MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

REFERENCE: (R) = RESIDENTIAL SOIL
(I) = INDUSTRIAL SOIL

N

SIDE VIEW

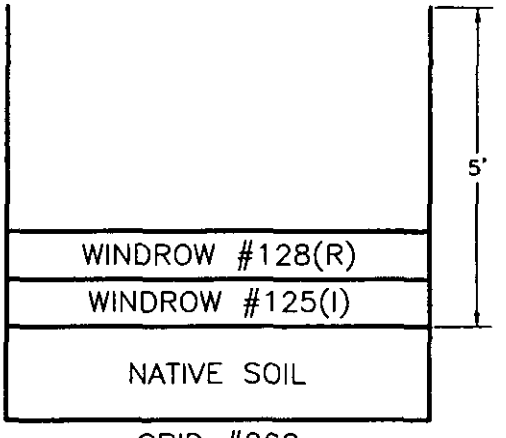
BACKFILL OPERATIONS
GRIDS: #244, 247, 250, 251
WINDROWS: #105(I), 111(R), 119(R), 125(I), 128(R)
NAVAL SURFACE WARFARE CENTER
BUILDING 2501 (NE SIDE), MINE FILL B
CRANE, INDIANA

PREPARED FOR

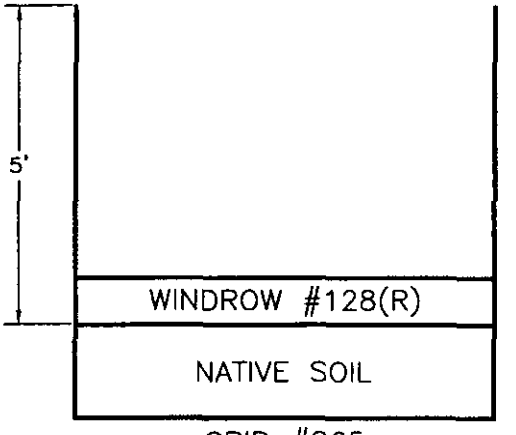
NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-03-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 5 of 7	

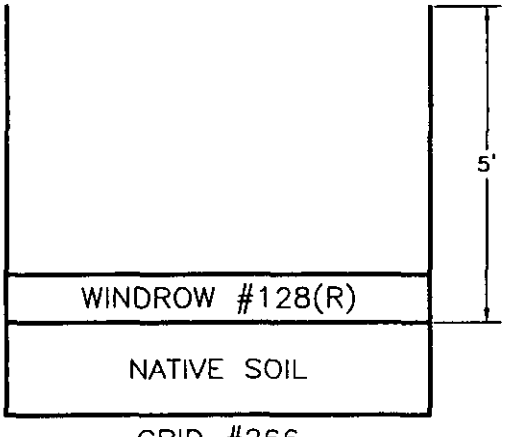
NORTHEAST CORNER OF BUILDING 2501



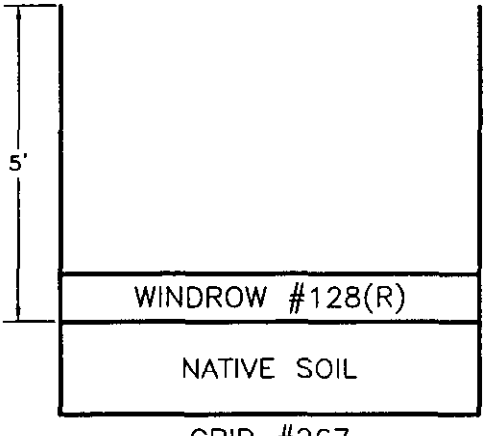
GRID #262



GRID #265



GRID #266



GRID #267

MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

REFERENCE: (R) = RESIDENTIAL SOIL
(I) = INDUSTRIAL SOIL

N

SIDE VIEW

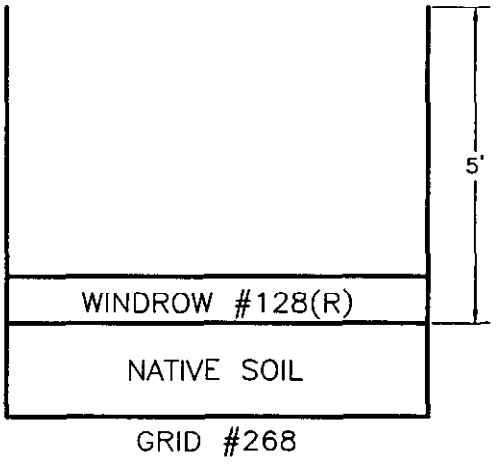
BACKFILL OPERATIONS
GRIDS: #262, 265, 266, 267
WINDROWS: #105(I), 111(R), 119(R), 125(I), 128(R)
NAVAL SURFACE WARFARE CENTER
BUILDING 2501 (NE SIDE), MINE FILL B
CRANE, INDIANA

PREPARED FOR

NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-03-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 6 of 7	

NORTHEAST CORNER OF BUILDING 2501



MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

REFERENCE: (R) = RESIDENTIAL SOIL
(I) = INDUSTRIAL SOIL

N

SIDE VIEW

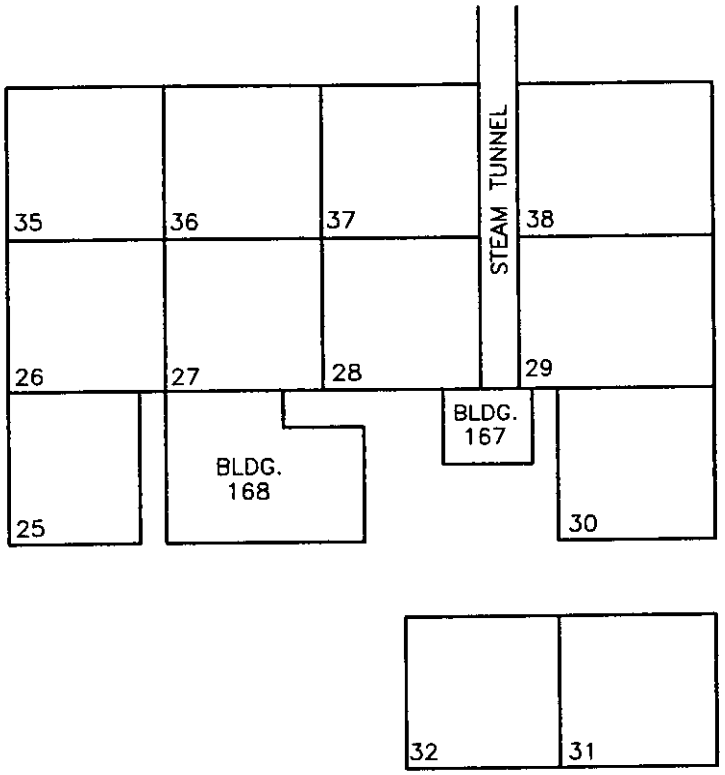
BACKFILL OPERATIONS
GRID: #268
WINDROW: #128(R)
NAVAL SURFACE WARFARE CENTER
BUILDING 2501 (NE SIDE), MINE FILL B
CRANE, INDIANA

PREPARED FOR

NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-03-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 7 of 7	

BUILDING 168



MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

N

WINDROW LOCATION MAP

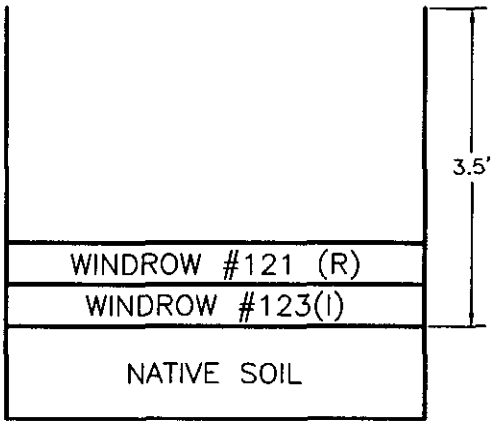
BACKFILL OPERATIONS
GRIDS: #25, 26, 27, 28, 29, 30, 31, 35, 36, 37, 38
WINDROWS: #123(I), 121(R), 122(I), 124(R), 126(I), 120(R)
NAVAL SURFACE WARFARE CENTER
BUILDING 168, MINE FILL B
CRANE, INDIANA

PREPARED FOR

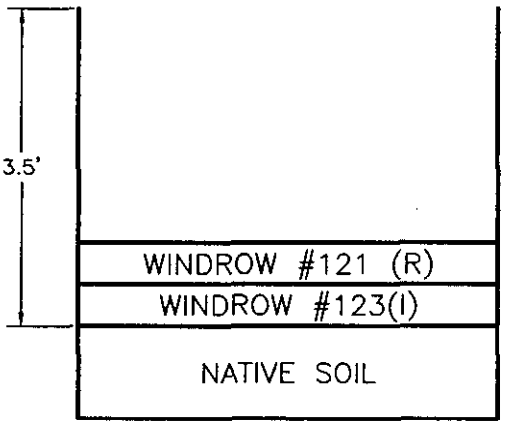
NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-03-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 1 of 5	

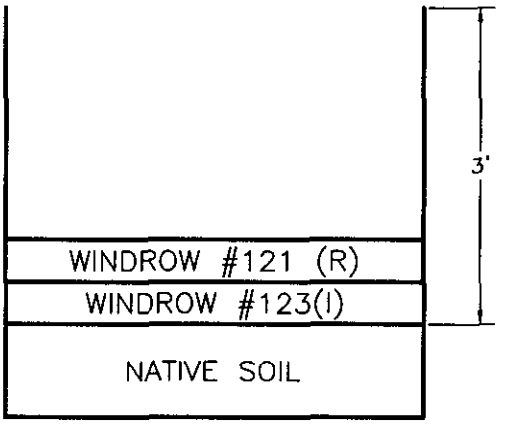
SOUTHEAST CORNER OF BUILDING 168



GRID #29



GRID #30



GRIDS #38

MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

REFERENCE: (R) = RESIDENTIAL SOIL
(I) = INDUSTRIAL SOIL

N

SIDE VIEW

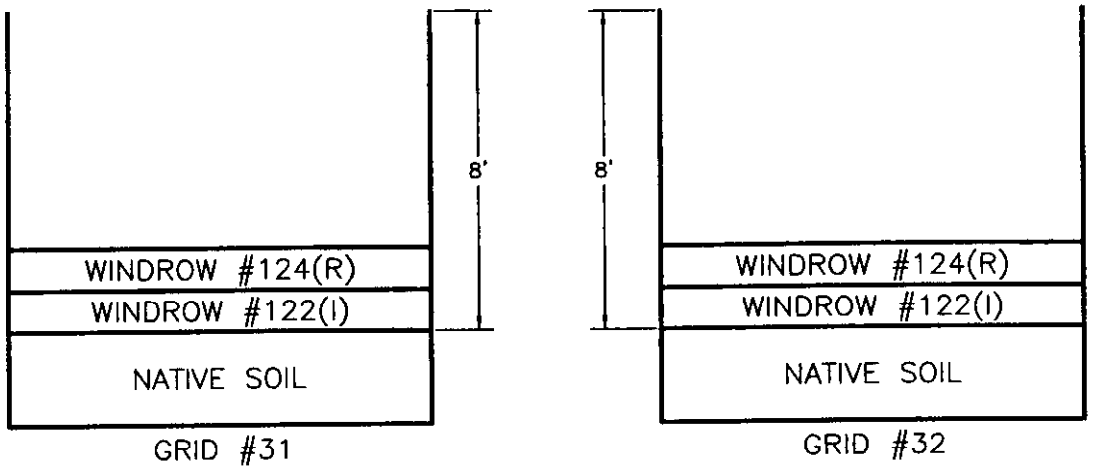
BACKFILL OPERATIONS
GRIDS: #29, 30, 38
WINDROWS: #123(I), 121(R)
NAVAL SURFACE WARFARE CENTER
BUILDING 168 (SE SIDE), MINE FILL B
CRANE, INDIANA

PREPARED FOR

NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-03-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 2 of 5	

SOUTHWEST CORNER OF BUILDING 168



MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

REFERENCE: (R) = RESIDENTIAL SOIL
(I) = INDUSTRIAL SOIL

N

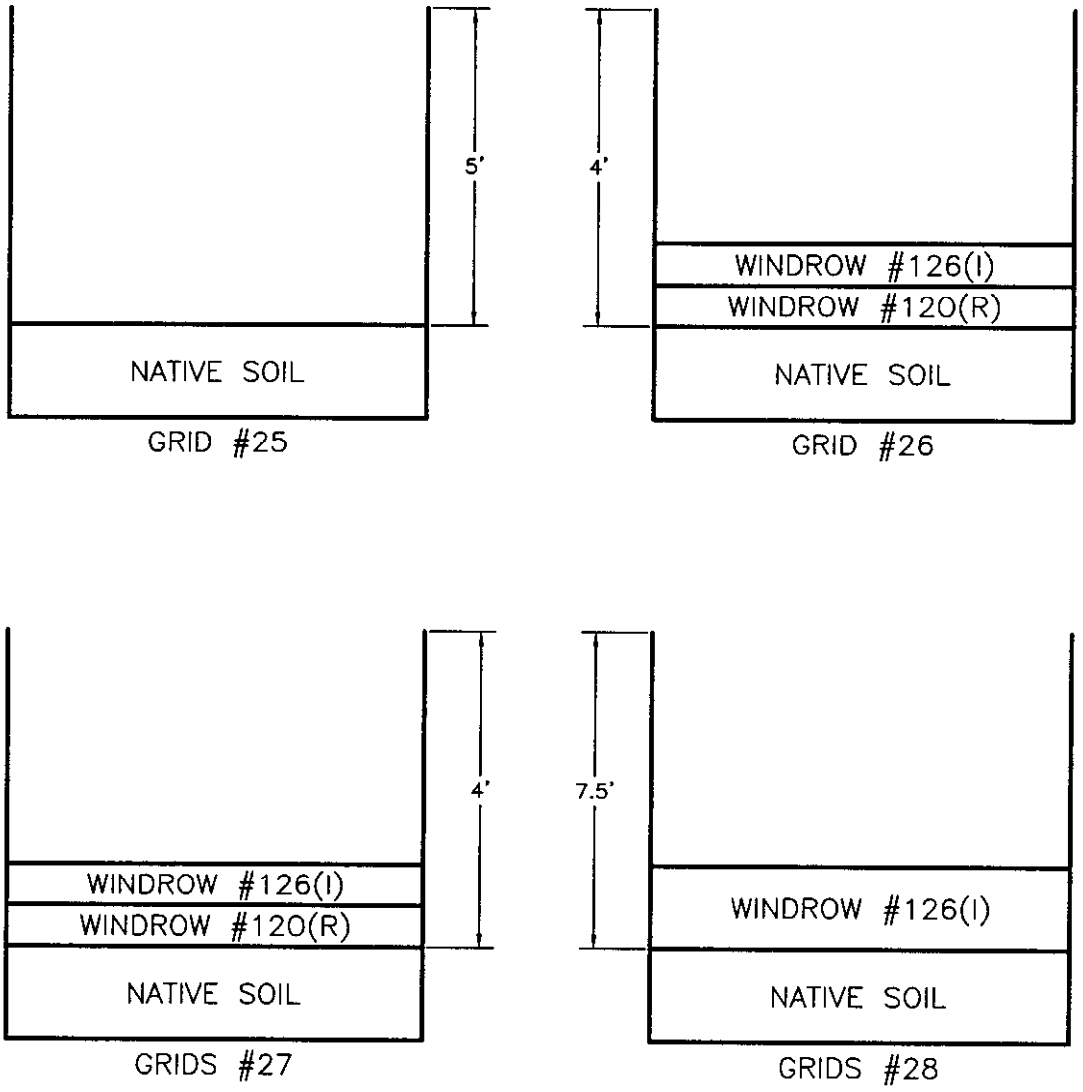
SIDE VIEW
BACKFILL OPERATIONS
GRIDS: #31,32
WINDROWS: #122(I), 124(R)
NAVAL SURFACE WARFARE CENTER
BUILDING 168 (SW SIDE), MINE FILL B
CRANE, INDIANA

PREPARED FOR

NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-03-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 3 of 5	

NORTHEAST CORNER OF BUILDING 168



MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

REFERENCE: (R) = RESIDENTIAL SOIL
(I) = INDUSTRIAL SOIL

N

SIDE VIEW

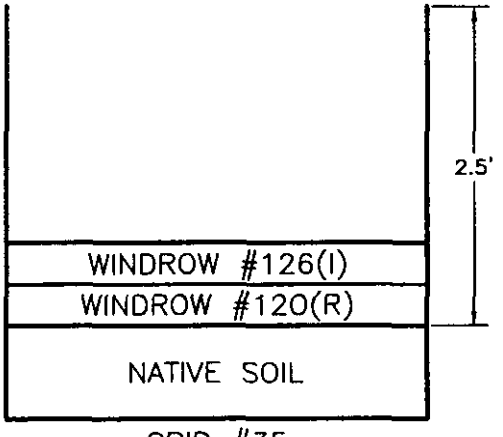
BACKFILL OPERATIONS
GRIDS: #25, 26, 27, 28, 35, 36, 37
WINDROWS: #126(I), 120(R)
NAVAL SURFACE WARFARE CENTER
BUILDING 168 (NE SIDE), MINE FILL B
CRANE, INDIANA

PREPARED FOR

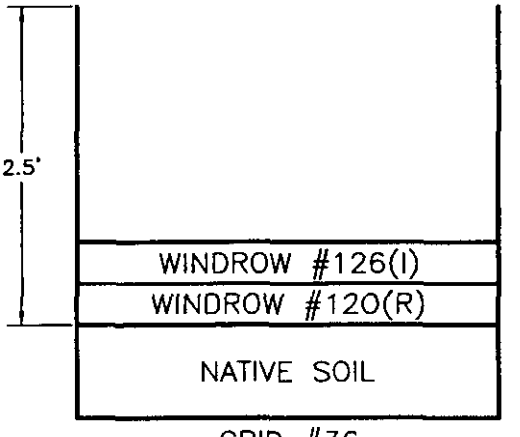
NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-03-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 4 of 5	

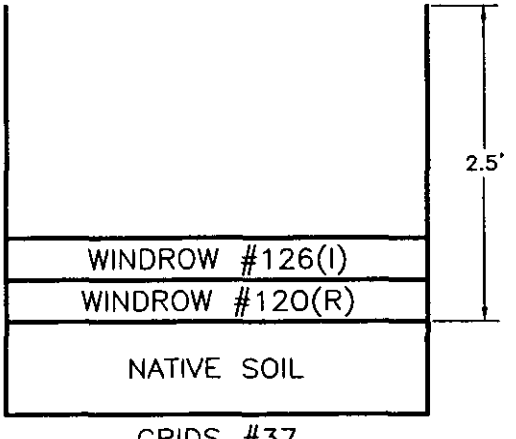
NORTHEAST CORNER OF BUILDING 168



GRID #35



GRID #36



GRIDS #37

MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

REFERENCE: (R) = RESIDENTIAL SOIL
(I) = INDUSTRIAL SOIL

N

SIDE VIEW

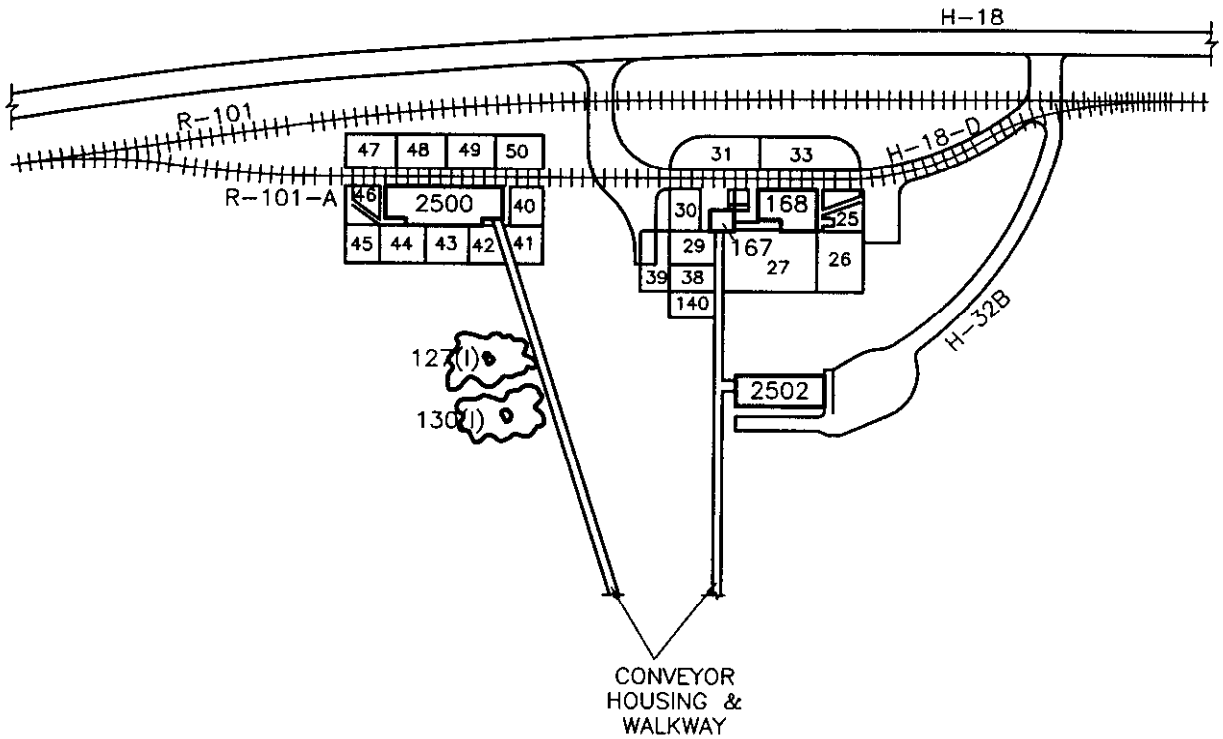
BACKFILL OPERATIONS
GRIDS: #25, 26, 27, 28, 35, 36, 37
WINDROWS: #126(I), 120(R)
NAVAL SURFACE WARFARE CENTER
BUILDING 168 (NE SIDE), MINE FILL B
CRANE, INDIANA

PREPARED FOR

NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-03-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 5 of 5	

MINE FILL B – WINDROW STAGING AREA



MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

N

WINDROW LOCATION MAP

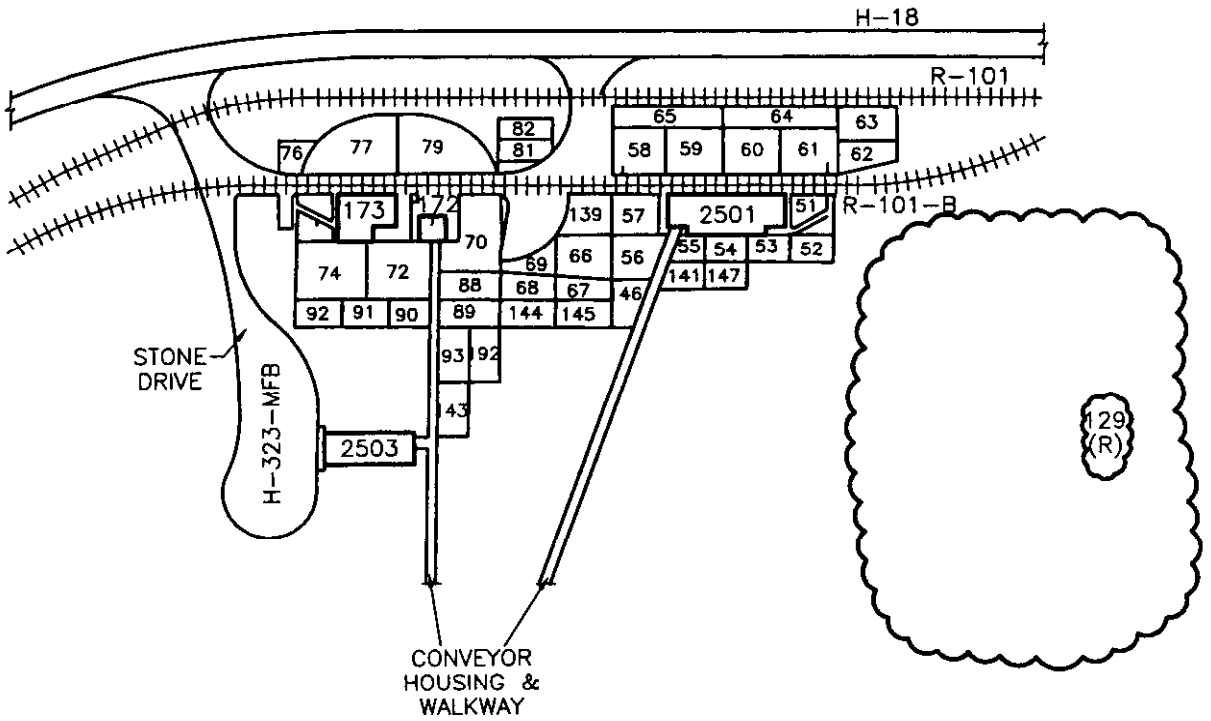
BACKFILL OPERATIONS
WINDROWS: #127(I), 130(I)
NAVAL SURFACE WARFARE CENTER
MINE FILL B – WINDROW STAGING AREA
CRANE, INDIANA

PREPARED FOR

NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-07-00	CHECKED
REVISED	APPROVED
JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 1 of 1	

MINE FILL B – PERMANENT PLACEMENT AREA



MEASUREMENTS ARE APPROXIMATE
NOT TO SCALE

N

WINDROW LOCATION MAP

BACKFILL OPERATIONS
WINDROW: #129(R)
NAVAL SURFACE WARFARE CENTER
MINE FILL B – PERMANENT PLACEMENT AREA
CRANE, INDIANA

PREPARED FOR

NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, IN

DRAWN MRC\02-07-00	CHECKED
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JOB NO.: 37324.01	TOLTEST, INC.
SHEET NUMBER 1 of 1	

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

James M. Hunsicker

SIGNATURE

DIRECTOR, ENVIRONMENTAL PROTECTION DEPARTMENT
BY DIRECTION OF THE COMMANDER

TITLE

3/29/06

DATE