CONESTOGA-ROVERS & ASSOCIATES

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www.CRAworld.com

June 3, 2013

Reference No. 074702-60

Ms. Erin Endsley
Wisconsin Department of Natural Resources
1701 N 4th Street
Superior, Wisconsin 54880

Dear Ms. Endsley:

Re: Building on Abandoned Landfill Application
Holtz Krause Landfill

This letter and supporting attachments represent the second submittal for Development at Historic Fill Site or Licensed Landfill Exemption Application which covers the proposed concession/restroom building and championship field light towers.

This Exemption Application is intended to allow the construction of a concession/restroom facility on the Holtz Krause landfill and is included as Attachment A. The light towers are included as the foundation will penetrate the cap.

The attached Figure 1 shows the location of the potential concession/restroom building and proposed championship field lights.

EXISTING SITE CONDITIONS AND WASTE TYPES

The Holtz Krause Landfill is a 57-acre site that operated between 1957 and 1980 and received approximately 2.0 million cubic yards of waste, including municipal solid waste, noncombustible waste, demolition material, and wood waste. In February 1979, a landfill abandonment plan was completed and initial landfill cover construction, consisting of a 2-foot thick soil cover, was completed in 1982.

In 1994, an additional cover system was installed over the existing soil cover and now consists of (from the ground surface):

- A vegetative layer of 6 inches of topsoil and 2.5 feet of rooting zone soil
- A primary barrier layer of 40 mil flexible membrane liner (FML)
- A secondary barrier layer of 2 feet of clay
- The 1982 existing soil cover (0 to 2 feet thick)

The site currently has a landfill gas extraction and treatment system consisting of a blower and flare to combust the collected methane gas. Additionally, the site has a groundwater monitoring system that is sampled and analyzed on a semi-annual basis. The final work to develop the site into an athletic complex started in early May in accordance with the Final Engineering Report reviewed and approved by Wisconsin Department of Natural Resources (WDNR).

POTENTIAL FOR IMPACTS

The historical impacts from the landfill included the potential migration of landfill gas and groundwater contamination. However, these impacts have been remediated through the WDNR-approved remedy completed in 1994/1995.

EVALUATION OF EXISTING IMPACTS

In 2011 the WDNR approved Monitored Natural Attenuation (MNA) as the final groundwater remedy. The decision to approve MNA was based on monitoring data from approximately 38 monitoring wells which have developed a data base covering the 16 year post-remediation period. The approval was issued because studies have shown that the groundwater contamination plume is stable or decreasing and aquifer chemistry is favorable for anaerobic biodegradation of the contaminants of concern.

Gas migration has been addressed by implementation of the active gas collection and treatment system. This landfill remedy was constructed in 1994 and included an active venting system that has operated for 16 years. Currently, the amount of landfill gas production is approximately 170 to 200 cubic feet per minute (CFM), averaging 191 CFM, which is much less than the 375 CFM measured in 1994 when the landfill gas system was installed. The existing active gas collection system has served its intended purpose to prevent off site gas migration and reduce VOCs in the waste. The future plan for the athletic complex is to modify the active gas collection system for odor control. All of the access points to gas wells will be outside the soccer fields and at grade. The surface feature will look like a manhole cover. The horizontal gas collection and piping network will continue to be located below the liner system. A new blower and flare will be installed and will be smaller than the existing system in order to balance the blower size with the lower rate of landfill gas production.

PROPOSED DEVELOPMENT SUMMARY

The proposed development is the construction of a concession building with restrooms to enhance the development of a proposed soccer complex and four championship field lights on the Holtz Krause Landfill.

SCOPE OF WORK

CONCESSION/RESTROOM BUILDING

The concession/restroom building will be a 28-foot by 40-foot split block building. Twelve H Piles will be driven to bedrock and the building will be supported on the H Piles and grade beams. A passive venting system will be installed along with a vapor barrier.

Attachment B provides the drawings which show the building supports, vapor barrier and passive venting system for the building. Attachment C provides a memo describing the design and specifications and manufacturer's installation procedures for the passive venting system.

CHAMPIONSHIP FIELD LIGHTS

Each championship field light will be supported by four H Piles. The boot design which seals the liner to the H Pile was shown on the final for construction drawings. Attachment D provides the drawings showing the foundation support.

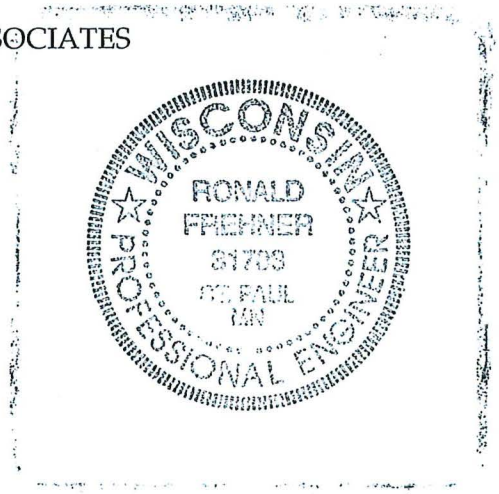
CONESTOGA-ROVERS
& ASSOCIATES

June 3, 2013 Reference No. 074702-60

AUTHORITY

All of Which is Respectfully Submitted,

CONESTOGA-ROVERS & ASSOCIATES



Ron Frehner, P.E.
Wisconsin P.E. No. 31708
(Expiration July 31, 2014)

RF/sb/10
Encl.

cc:

Dave Eisenreich, Holtz Krause Group
Mark Thimke, Foley and Lardner
Bill Evans, WDNR
Bob Grefe, WDNR
Eric Syfteftad, WDNR
Loren Brumberg, WDNR

LEGEND

- PROPOSED LIGHT STANDARD
- PROPOSED FIELD
- PROPOSED ROAD/PARKING/TRAIL
- PROPOSED BLEACHERS (FUTURE)
- PROPOSED CONCESSIONS/RESTROOMS
- PROPOSED PLAYGROUND AREA
- CURLING CLUB

figure 1

FIELD LAYOUT
HOLTZ KRAUSE LANDFILL
Wausau, Wisconsin

074702-60(ENDSLEY010)GIS-SP001 JUN 03/2013

ATTACHMENT A

EXEMPTION APPLICATION

State of Wisconsin
Department of Natural Resources

Development at Historic Fill Site or Licensed Landfill Exemption Application

Form 4400-226 (R 12/05)

Notice: Use of this form is required by the DNR for any application to develop at a historic fill site or licensed landfill pursuant to secs. NR 506.085 and NR 500.08(4), Wis. Adm. Code. The Department will not consider your application unless you provide complete information requested. Personally identifiable information collected will be used to process your application and will also be accessible by request under Wisconsin's Open Records law [ss.19.31 - 19.39, Wis. Stats.]

Instructions: See *Development at Historic Fill Sites and Licensed Landfills: What you need to know* (PUB-RR-683, April 2002) for detailed instructions.

- All Exemption Application materials should be sent to the region where the site is located, as listed on page 6.
- Include $500 fee payment with this application unless a fee was already paid for the review of the remedial design report under the NR 700 process.
- Determine the appropriate exemption type for the site and check appropriate box below.
- Provide complete information requested for each type of exemption. Include the following attachments:
  Required: Summary of Existing and Potential Impacts described in Section V as an attachment, under the seal of a professional engineer or geologist registered to practice in Wisconsin.
  Optional: Site Visit Summary Comments (Section IX) including any photos, sketches or site visit notes.

Exemption Type

[X] **Remediation and Redevelopment Program NR 700 Rule Series Process Exemption:** Site with remedial actions conducted in accordance with NR 700 series
Required: Sections I - VI ***Optional:*** Sections VII - X

[ ] **Case-by-Case Evaluation:** Sites with anticipated environmental impacts or wastes of special concerns
Required: Sections I - VI ***Optional:*** Sections VII - X

[ ] **Expedited Exemption:** Site with no expected environmental impact
Required: Sections I - VI and Form 4400-256A Expedited Exemption Application ***Optional:*** Sections VII - X

I. Applicant Information

Owner - Last Name	First	MI	Telephone Number
Holtz Krause PRP Group			

Contact Name (if different): Dave Eisenreich

Street Address	City	State	ZIP Code
5208 DJ Lane	Weston	WI	54476

Developer - Last Name	First	MI	Telephone Number
Holtz Krause PRP Group			

Street Address	City	State	ZIP Code
5208 DJ Lane	Weston	WI	55476

II. Site Name and Location

Site Name	Location / Address
Holtz Krause Landfill	602 East Kent Street

Is the site known by another name(s)? [ ] Yes [X] No [ ] Unknown — If yes, provide name.

[X] City [ ] Town [ ] Village of Wausau

ZIP Code: 54403 State: WI

Does the site have a license number? [X] Yes [ ] No [ ] Unknown — If yes, License Number: #0674

County: Marathon

A. Attach a map with site location and limits of fill/waste disposal area.

B. Global Positioning System Coordinates

Latitude:	DEG	MIN	SEC		Longitude:	DEG	MIN	SEC	
	44	56	15	N		89	36	30	W

Describe method for collecting GPS Coordinates: Google Earth

Program Lead, Fee Status and Regulatory ID Numbers *(This area for DNR use only)*

[ ] **Waste Management Bureau**

[ ] **Remediation and Redevelopment Bureau - Exemption is part of remedy under NR 700 program**
- [ ] Fee already paid for review of remedial design report.
- [ ] Review of remedial design report not requested and payment is attached.

[ ] Payment Attached
Amount: $

Hazardous Waste Facility License ID No. (5 digits)	DNR FID No. (9 digits)	USEPA ID No. (used for both RCRA and CERCLIS #s) (WI+Alpha+9 digits)

Region	Project Manager	Telephone Number

III. Site Ownership History

Previous Owner - Last Name	First	MI	Telephone Number
Holtz Krause Inc.			

Street Address	City	State	ZIP Code
602 East Kent St	Wausau	WI	54403

Responsible Municipal / Private Operator - Last Name (if applicable)	First	MI	Telephone Number
N/A			

Street Address	City	State	ZIP Code

IV. Evaluation of Existing and Potential Impacts. **See Development at Historic Fill Sites and Licensed Landfill: Guidance for Investigation and Development at Historic Fill Sites and Licensed Landfill: Potential Problems and Considerations.**

A. Analytical data for the following media have been collected and/or examined before completing this application:

1. Groundwater:	x ☒ Yes	☐ No
2. Soil:	x ☒ Yes	☐ No
3. Surface water / sediment:	x ☒ Yes	☐ No
4. Air:	x ☒ Yes	☐ No
5. Methane or other explosive gases:	x ☒ Yes	☐ No

B. Based on known or suspected sources and wastes, their physical characteristics, containment and geologic environment, do you suspect a release of pollutants to the environment?

☐ Yes: ☐ Groundwater ☐ Soil ☐ Surface Water / Sediment ☐ Methane or Other Explosive Gases
x ☒ No

If yes, an expedited exemption is not appropriate unless further investigation shows that a release of pollutants is not likely.

C. If there is NOT a likelihood of a release of pollutants or evidence of a release, would the impact of the proposed development be likely to cause a release to the environment?

☐ Yes **If yes, be sure to summarize actions to be taken to prevent adverse environmental impacts in V. Part C below.**
x ☒ No

V. Summary of Existing and Potential Impacts. **See Development at Historic Fill Sites and Licensed Landfill: Guidance for Investigation and Development at Historic Fill Sites and Licensed Landfill: Potential Problems and Considerations.**

Describe the following in an attached narrative under the signature of a qualified professional. Organize, label and package as listed below.

A. Existing Site Conditions
   1. existing site conditions including waste types,
   2. potential for impacts, and
   3. evaluation of existing impacts.

B. Proposed Development Summary. Include explanation for overall site decision.

C. Summary of actions to be taken and engineering controls that will prevent or minimize adverse environmental impacts and potential threats to human health and welfare, including worker safety.

VI. Certification of Application Information

I certify that information in this application and all its attachments is true and correct and in conformity with applicable Wis. statutes.

Print / Type Name of Applicant: Ron Frehner, CRA on behalf of the Holtz Krause PRP Group

Applicant Signature	Date Signed
Ron Frehner	June 3, 2013

Sections VII - IX are optional for all Applicants.

VII. Current and Historic Type of Waste Disposal Site (Check all that apply)

- [X] Licensed Landfill
- [ ] Non-approved {See s.289.01(3)}, Wis Stats.
- [ ] Approved
- [ ] One-time Disposal
- [ ] Construction / Demolition
- [ ] Historic Fill Site

Liner

- [X] Unlined
- [ ] Lined
- [ ] Composite Liner
- [ ] Other Liner (Describe): _____
- [ ] Clay Liner
- [ ] Unengineered

Total Landfill Volume

- [ ] < 50,000 yd^3
- [ ] 50,000-500,000 yd
- [X] > 500,000 yd^3

Does the landfill have a closure plan?	[X] Yes	[ ] No	[ ] Unknown
Does the landfill have a groundwater monitoring plan?	[X] Yes	[ ] No	[ ] Unknown
Have groundwater monitoring wells been installed?	[X] Yes	[ ] No	[ ] Unknown

Was a cover installed? [X] Yes [ ] No **If no, go to Past Land Uses.**

- [X] Composite cap
- [ ] Layered soil cap with clay barrier
- [ ] Clay cap
- [ ] Soil cap - not recompacted clay
- [ ] Other cover
- [ ] Unknown

What is the thickness of the cover? [ ] <6 in [ ] 6-12 in [ ] 12-24 in [X] >24 in [ ] Unknown

Past Land Uses. (Check all that apply)

- [ ] Agricultural co-op
- [ ] Brush pile
- [ ] Bulk plant
- [ ] Coal gas manufacturer
- [ ] Deer pit
- [ ] Dry cleaner
- [ ] Electroplater
- [ ] Lagoon
- [ ] Manufacturing Type: _____
- [ ] Old burn pit
- [ ] Pipeline
- [ ] RCRA generator
- [ ] Salvage yard
- [ ] Service Station
- [ ] Tannery
- [ ] Unknown
- [ ] Other: _____

Date(s) of Site Operation		No. of Years	
From: 1957	To: 1980	23	[ ] Unknown

VIII. Waste Information & Geologic Environment. **See Development at Historic Fill Sites and Licensed Landfills: Guidance for Investigation**

A. Known or Suspected Sources/Wastes. (Check all that apply)

- [ ] Abandoned containers
- [ ] Above ground pipeline or tank
- [ ] Animal carcasses
- [ ] Buried drums
- [ ] Burning of materials
- [ ] Foundry sand
- [ ] Industrial accident
- [ ] Known or suspected hazardous materials
- [X] Municipal waste
- [ ] Paper mill sludge
- [ ] Transformer
- [ ] Trees/brush
- [ ] Surface spills
- [ ] Fly ash
- [X] Demolition/construction waste
- [ ] Surface impoundment/lagoons
- [ ] Underground pipeline or tank
- [ ] Exempted fill {NR 500.08(1) and (2)}
- [ ] Unknown
- [ ] Other: _____

B. Physical Characteristics of Sources/Wastes

[ ] Liquid [X] Solid [ ] Liquid & Solid [ ] Unknown

VIII. Waste Information & Geologic Environment *(continued)*

C. Waste Containment ☐ Liner ☐ Unknown ☒ Not applicable

☒ Engineered cover
☒ Maintained ☐ Not maintained
☐ Functioning leachate collection & removal system
☐ Functioning & maintained run-off management system
☐ Functioning groundwater monitoring system

D. Soil Type: Estimate distances or determinations based on regional or site specific information.

☐ Regional ☐ Site specific

Clay, silt or other fine grained soils present? (lacustrine, tills, etc.) ☐ Yes ☒ No

At surface? ☐ Yes ☒ No At depth? ☐ Yes ☒ No _____ feet

Sand & gravel, coarse grained soils present? ☐ Yes ☐ No

At surface? ☒ Yes ☐ No At depth? ☒ Yes ☐ No 0 to 50 feet

E. Depth to Groundwater

☐ Regional ☒ Site specific 0 to 10 feet

F. Direction of Groundwater Flow

☐ Regional ☒ Site specific SW direction

G. Depth to Bedrock

☐ Regional ☒ Site specific >50 ft direction

H. Bedrock Type

☒ Regional ☐ Site specific ☐ Sandstone ☐ Limestone/Dolomite ☒ Metamorphic/Igneous

IX. Site Visit

Conduct a site visit to complete site screening and determine general site conditions, on-site activities and adjacent land use encroachment issues. As appropriate to document the site, take photos, sketch the site and prepare a Site Visit Report.

On-site visit conducted? ☒ Yes ☐ No

General site conditions: Document any observed releases and note whether or not you were able to walk the site. Examples of things to be aware of include the following:

- leachate seeps or evidence of seeps such as stained soil/vegetation
- stressed vegetation as a sign of gas migration to the surface or of leachate seeps;
- quality and coverage of vegetation on the cap;
- odors which may indicate gas migration to the atmosphere;
- erosion of the cap;
- maintenance of positive drainage over the capped area;
- visual desiccation cracks in the cap.

Attach the following to your application:

☐ Photographs, regular or digital ☐ Site sketch ☒ Sit Visit Report

Name(s) of Person(s) Conducting Site Visit	Date of Site Visit
WDNR and Holtz Krause Site Visit	3/7/2012

IX. Site Visit *(continued)*

A. Adjacent Land Uses. Indicate all directions. (Check all that apply)

	N	S	E	W	NE	NW	SE	SW
☐ Agricultural	☐	☐	☐	☐	☐	☐	☐	☐
☐ Industrial	☐	☐	☐	☐	☐	☐	☐	☐
☐ Recreational	☐	☐	☐	☐	☐	☐	☐	☐
☐ Residential	☐	☐	☐	☐	☐	☐	☐	☐
☒ Undeveloped	☐	☒	☐	☒	☐	☐	☐	☐
☒ Commercial	☒	☐	☐	☐	☐	☐	☐	☐
☒ Other: Railroad	☐	☐	☒	☐	☐	☐	☐	☐

B. Potential Groundwater Receptors. Estimate distances. (1 mile = 5,280 ft)

Distance to and direction of nearest municipal well: _____ feet ☒ > ½ mile from the waste SW direction

Distance to and direction of nearest other-than-municipal well: _____ feet ☒ > ½ mile from the waste SW direction

Distance to and direction of nearest non-community well: _____ feet ☒ > ½ mile from the waste SW direction

Distance to and direction of nearest private well: _____ feet ☒ > ½ mile from the waste SW direction

Distance to and direction of nearest residence: _____ feet ☒ > ½ mile from the waste SW direction

C. Potential For Gas Migration

1 No. of homes within 300 feet of waste (gas migration potential)

20* No. of homes between 300 & 1,000 ft to waste (gas migration potential)

Distance to and direction of nearest building: 200 feet ☐ > ½ mile from the waste W direction

Type of building: ☐ On-site building ☐ Municipal ☒ Residential ☐ Commercial ☐ Industrial ☐ Unknown

D. Potential Surface Water Receptors. Estimate distances.

☒ Creek: 0(E) and 600 (W) feet ☐ Drainage ditch: _____ feet ☐ Intermittent stream _____ feet

☐ River: _____ feet ☐ Lake: _____ feet ☒ Wetland: 0 (S) feet

E. Based on the site visit, did you visually observe…

1. a release to a surface water body?	☐ Yes	☒ No	☐ Unknown
2. a leachate seep?	☐ Yes	☒ No	☐ Unknown
3. a release to soils?	☐ Yes	☒ No	☐ Unknown

X. Comments: Use this section to provide comments on any aspect of the site visit. Attach any information or explanations labeled with the appropriate section number to which the material applies.

*Note: Residential houses located east of the east side creek and west of Cemetery Slough are not included because the creeks provide a barrier to gas migration. The estimated 20 residential home are located NE of the landfill.

Region Map

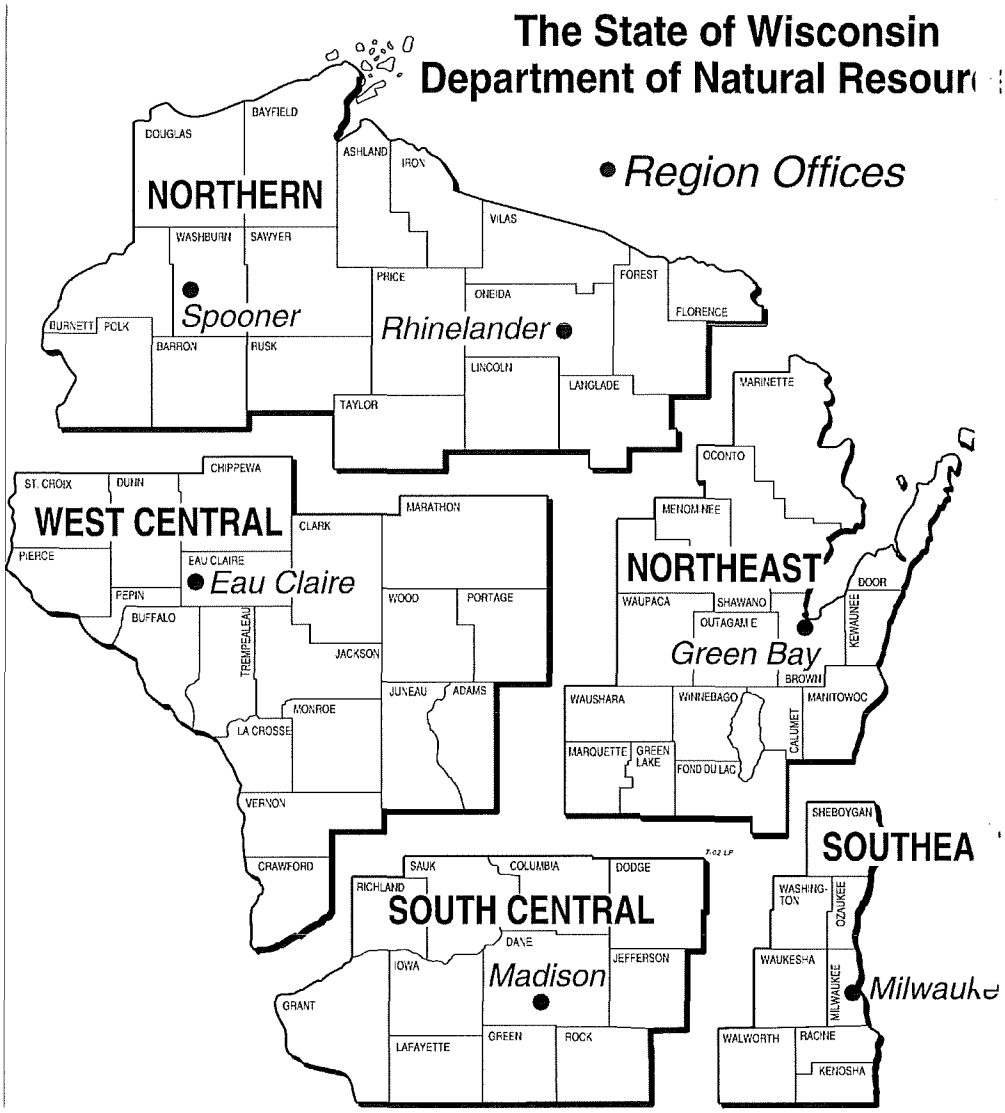
NORTHERN REGION
Remediation & Redevelopment
Team Supervisor
Department of Natural Resources
107 Sutliff Avenue
Rhinelander, WI 54501
(715) 365-8976
OR
Regional Waste Program Manager
Department of Natural Resources
107 Sutliff Avenue
Rhinelander WI 54501
(715) 365-8946

NORTHEAST REGION
Remediation & Redevelopment
Team Supervisor
Department of Natural Resources
2984 Shawano Avenue
Green Bay, WI 54307-0448
(920) 662-5160
OR
Regional Waste Program Manager
Department of Natural Resources
2984 Shawano Avenue
Green Bay, WI 54307-0448
(920) 662-5120

SOUTHEAST REGION
Remediation & Redevelopment
Team Supervisor
Department of Natural Resources
P.O. Box 12436
Milwaukee, WI 53212-0436
(414) 263-8561 or (414) 263-8714
OR
Regional Waste Program Manager
Department of Natural Resources
P.O. Box 12436
Milwaukee WI 53212-0436
(414) 263-8694 or (414) 263-8697

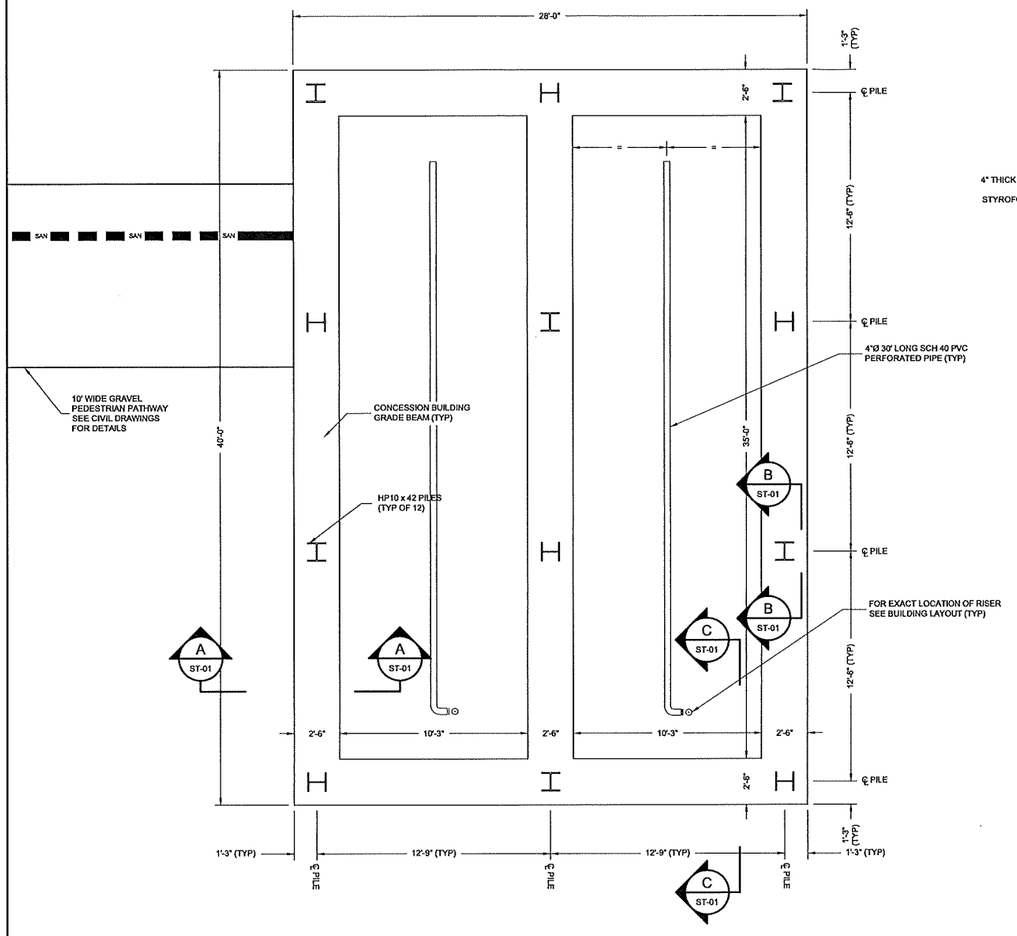
WEST CENTRAL REGION
Remediation & Redevelopment
Team Supervisor
Department of Natural Resources
1300 Clairemont Avenue
Eau Claire, WI 54701
(715) 839-3710
OR
Regional Waste Program Manager
Department of Natural Resources
1300 Clairemont Avenue
Eau Claire WI 54701
(715) 839-3708

SOUTH CENTRAL REGION
Remediation & Redevelopment
Team Supervisor
Department of Natural Resources
3911 Fish Hatchery Rd.
Fitchburg, WI 53711
(608) 275-3241
OR
Regional Waste Program Manager
Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg WI 53711
(608) 275-3466



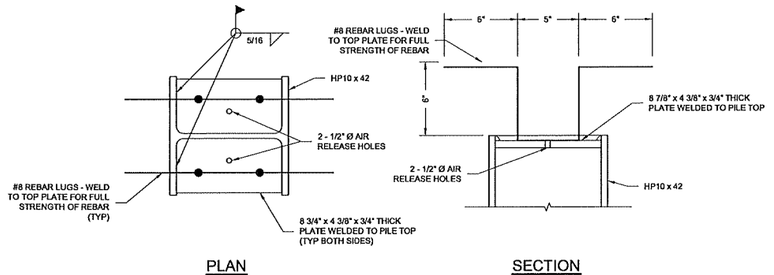
ATTACHMENT B

DRAWINGS



FOUNDATION PLAN - CONCESSION BUILDING

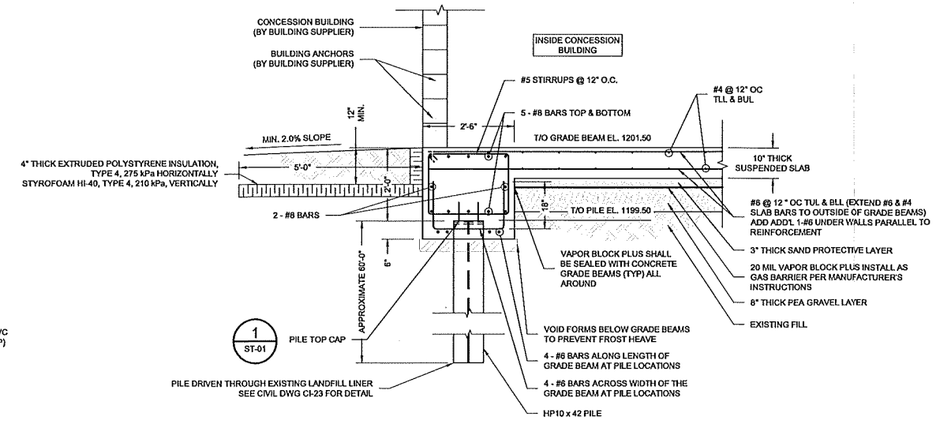
1/4" = 1'-0"



PLAN SECTION

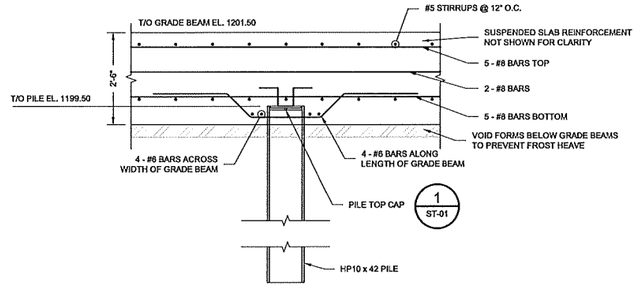
DETAIL 1 ST-01 PILE TOP PLATE

N.T.S.



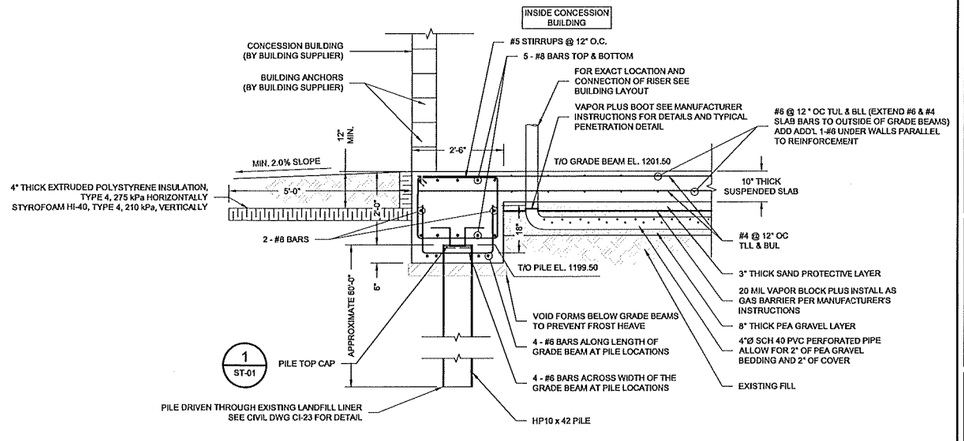
SECTION A ST-01 GRADE BEAM & PILE-TRANSVERSE

1/2" = 1'-0"



SECTION B ST-01 GRADE BEAM & PILE-LONGITUDINAL

1/2" = 1'-0"



SECTION C ST-01 GRADE BEAM & PILE-TRANSVERSE

1/2" = 1'-0"

NO	Revision	Date	Initial

N

0 2 4ft

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR CONSTRUCTION	24-APR-13	S.M.
ISSUED FOR BID	21-JAN-13	S.M.
ISSUED FOR AGENCY REVIEW	07-DEC-12	S.M.
ISSUED FOR CLIENT REVIEW	19-NOV-12	S.M.
Status	Date	Initial

HOLTZ KRAUSE LANDFILL
MARATHON COUNTY, WISCONSIN

ATHLETIC FIELD AND MODIFICATIONS TO LANDFILL

PLAN, SECTIONS & DETAIL
CONCESSION BUILDING FOUNDATION

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
REI SURVEY RECEIVED MARCH 2012

Project Manager:	Reviewed By:	Date:	
S. MOCKENHAUPT	R. FREHNER	APRIL 2013	
Scale: AS SHOWN	Project Nº: 74702-50	Report Nº: 009	Drawing Nº: ST-01

74702-50(009)ST-WA001 MAY 21/2013

ATTACHMENT C

MEMO DESCRIBING THE DESIGN AND SPECIFICATIONS

CONESTOGA-ROVERS & ASSOCIATES

1801 Old Highway 8 NW, Suite #114
St. Paul, Minnesota 55112
Telephone: (651) 639-0913 Fax: (651) 639-0923
www.CRAworld.com

MEMORANDUM

DRAFT

TO:	Ron Frehner, CRA	REF. NO.:	074702-60
FROM:	Nathan Estrem/ma/9	DATE:	May 31, 2013
RE:	**Sub Slab Vapor Barrier and Passive Venting System Holtz-Krause Athletic Complex**		

This memo provides a summary of the proposed sub-slab vapor barrier and passive venting system for the Holtz Krause Athletic Complex (HKA Complex) concession stand/restroom.

BACKGROUND

The HKA Complex concession stand/restroom is to be constructed over a closed landfill. Due to the planned location of the concession stand, a sub-slab vapor barrier and passive venting system will be installed to prevent the potential for migration of soil gases into the building. The concession stand foundation will consist of a 30" x 30" reinforced concrete grade beam system supported by twelve (12) HP 10 X 42 Steel Piles driven to bedrock. The concrete slab will be a 10" thick suspended slab tied into the grade-beam system with steel reinforcement.

The landfill cover system below the foundation of the planned concession stand incorporates 4 separate layers of cover above the placed waste (listed from bottom to top):

1. Up to 2' soil cover placed directly above the waste
2. 2' thick of compacted clay placed above fill
3. 40 mil Very Low Density Polyethylene Liner in place over the compacted clay
4. 2.5' of compacted fill over the liner system with 6" of top-soil

There are currently three barriers to in place to prevent vapor intrusion which consist of:

1. Active landfill gas collection
2. The 2 foot clay layer
3. The 40 mil liner

ADDITIONAL LEVELS OF PROTECTION

CRA has designed two additional barriers to prevent vapor intrusion into the concession building/restroom as follows:

1. Passive venting system
2. Vapor block liner beneath the concrete floor

In the unlikely event that the first 3 measure all fail, the vapor barrier will prevent the intrusion of soil vapor into the buidling and the passive venting will direct soil gas from under the building to vents above the roof line preventing it from entering the building.

The attached drawings show the layout, cross-section and elevation, respectively, of the vapor barrier and sub-slab passive venting system. The drawings are presented in Attachment A.

Manufacturer's product data is presented in Attachment B.

INSTALLATION

The installation of the passive venting system and vapor barrier will follow the installation of the first portion of the concrete grade beam and floor system. A bed of 8" of pea gravel will be installed over the existing compacted subgrade. 4" perforated PVC piping will be installed the length of the building on each side of the center grade beam such that the pipe is situated in the center of the foot print between the outside and inside grade beam. Each perforated PVC pipe run will be stubbed up with 4" schedule 40 PVC at locations indicated by the building layout to avoid foundation protrusions outside of wall lines. Once piping is installed, pea rock will be placed such that no less than 2" of pea rock cover the top of the perforated PVC. Once the PVC piping is covered, the Vapor Block Plus® will be installed per the attached Manufacturers installation instructions for a gas barrier system. Vapor Boot Plus® will be installed around all pipe penetrations up to 4" in diameter. For those penetrations that are greater than 4" in diameter, pipe boots should be fabricated according to Vapor Block Plus® instructions. Once the vapor barrier installation is complete 3" of sand will be placed over vapor barrier to prevent damage to barrier membrane from future concrete and iron work. Once the building is constructed, the PVC stubs from the passive venting system will be connected to a single 4" PVC pipe above the ceiling and vented through the roof. Vapor Block Plus ® installation instruction manual is presented in Attachment C.

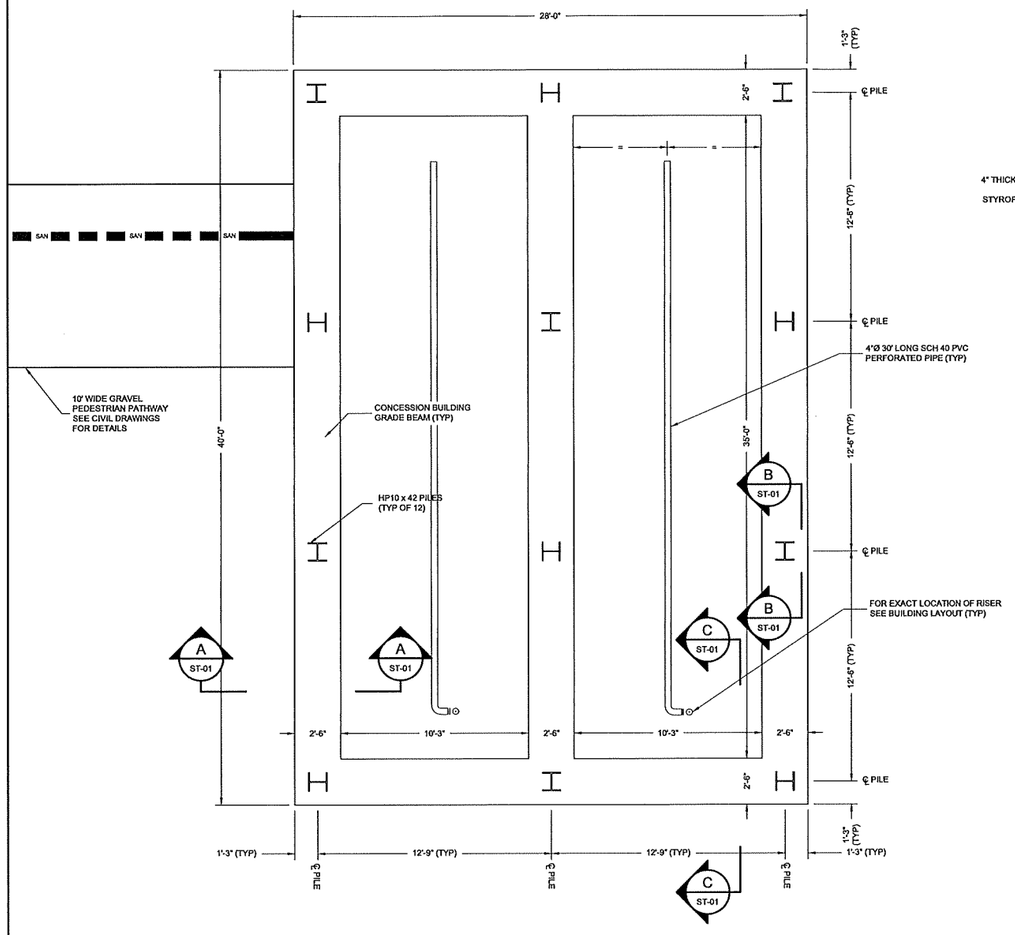
REFERENCES

United States. Environmental Protection Agency. Office of Research and Development. *Indoor Air Vapor Intrusion Mitigation Approaches*. By Ron Mosley and Ray Cody. N.p.: USEPA., 2008 Web.

United States, Environmental Protection Agency. Air and Engineering Research Laboratory. *Radon Reduction Techniques for Existing Detached Houses, 3rd Edition – Technical Guidance for Active Soil Depressurization Systems*. By D. Bruce Henschel. USEPA. Oct, 1993

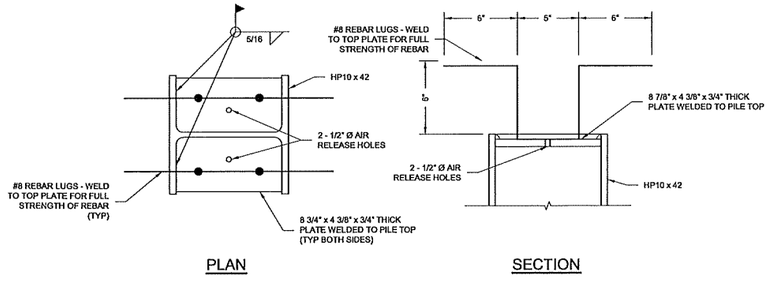
ATTACHMENT A

DRAWINGS



FOUNDATION PLAN - CONCESSION BUILDING

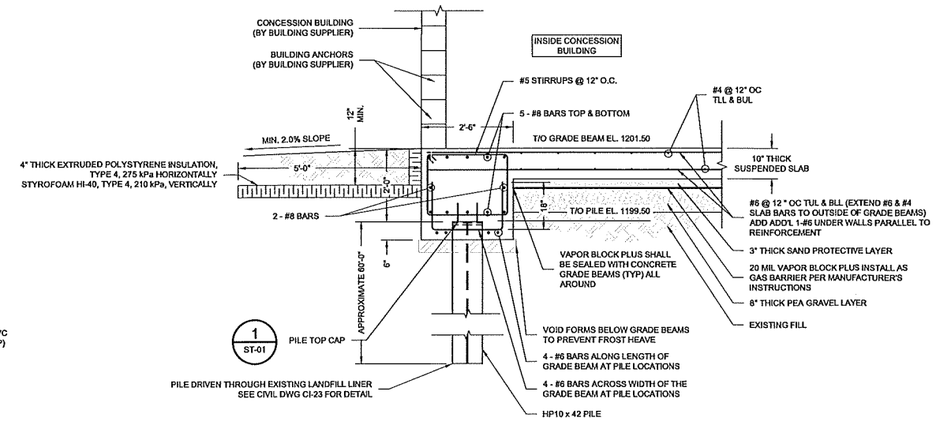
1/4" = 1'-0"



PLAN SECTION

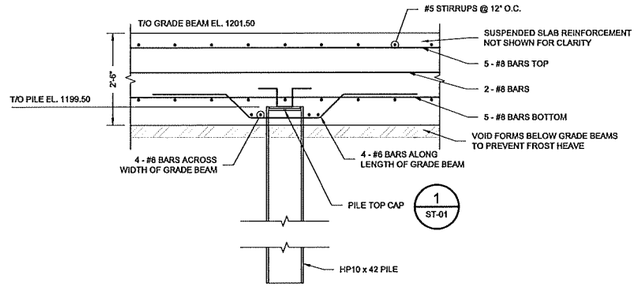
DETAIL 1 ST-01 PILE TOP PLATE

N.T.S.



SECTION A ST-01 GRADE BEAM & PILE-TRANSVERSE

1/2" = 1'-0"



SECTION B ST-01 GRADE BEAM & PILE-LONGITUDINAL

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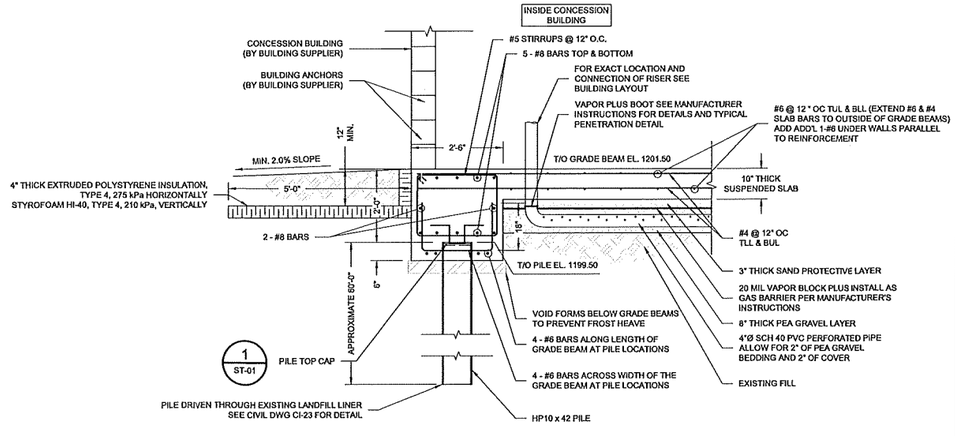
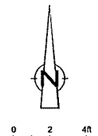


SECTION C ST-01 GRADE BEAM & PILE-TRANSVERSE

1/2" = 1'-0"

NO	Revision	Date	Initial



SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR CONSTRUCTION	24-APR-13	S.M.
ISSUED FOR BID	21-JAN-13	S.M.
ISSUED FOR AGENCY REVIEW	07-DEC-12	S.M.
ISSUED FOR CLIENT REVIEW	19-NOV-12	S.M.
Status	Date	Initial

HOLTZ KRAUSE LANDFILL
MARATHON COUNTY, WISCONSIN

ATHLETIC FIELD AND MODIFICATIONS TO LANDFILL

PLAN, SECTIONS & DETAIL
CONCESSION BUILDING FOUNDATION

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
REI SURVEY RECEIVED MARCH 2012

Project Manager:	Reviewed By:	Date:	
S. MOCKENHAUPT	R. FREHNER	APRIL 2013	
Scale: AS SHOWN	Project №: 74702-50	Report №: 009	Drawing №: ST-01

74702-50(009)ST-WA001 MAY 21/2013

ATTACHMENT B

MANUFACTURER'S PRODUCT DATA

VAPORBLOCK® PLUS™ VBP20

Under-Slab Vapor / Gas Barrier

RAVEN INDUSTRIES

Product Description

VaporBlock® Plus™ 20 is a seven-layer co-extruded barrier made from state-of-the-art polyethylene and EVOH resins to provide unmatched impact strength as well as superior resistance to gas and moisture transmission. VaporBlock® Plus™ 20 is a highly resilient underslab / vertical wall barrier designed to restrict naturally occurring gases such as radon and/or methane from migrating through the ground and concrete slab. VaporBlock® Plus™ 20 is more than 100 times less permeable than typical high-performance polyethylene vapor retarders against Methane, Radon and other harmful VOCs.

VaporBlock® Plus™ 20 is one of the most effective underslab gas barriers in the building industry today far exceeding ASTM E-1745 (Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs) Class A, B and C requirements. Available in a 20 (Class A) mil thicknesses designed to meet the most stringent requirements. VaporBlock® Plus™ 20 is produced within the strict guidelines of our ISO 9001:2008 Certified Management System.

Product Use

VaporBlock® Plus™ 20 resists gas and moisture migration into the building envelop when properly installed to provide protection from toxic/harmful chemicals. It can be installed as part of a passive or active control system extending across the entire building including floors, walls and crawl spaces. When installed as a passive system it is recommended to also include a ventilated system with sump(s) that could be converted to an active control system with properly designed ventilation fans.

VaporBlock® Plus™ 20 works to protect your flooring and other moisture-sensitive furnishings in the building's interior from moisture and water vapor migration, greatly reducing condensation, mold and degradation.

Size & Packaging

VaporBlock® Plus™ 20 is available in 10' x 150' rolls to maximize coverage. All rolls are folded on heavy-duty cores for ease in handling and installation. Other custom sizes with factory welded seams are available based on minimum volume requirements. Installation instructions and ASTM E-1745 classifications accompany each roll.

Under-Slab Vapor/Gas Retarder

Product	Part #
VaporBlock Plus 20	VBP 20

APPLICATIONS

- Radon Barrier
- Methane Barrier
- VOC Barrier
- Under-Slab Vapor Retarder
- Foundation Wall Vapor Retarder

VaporBlock® Plus™
UNDERSLAB VAPOR RETARDER / GAS BARRIER

VAPORBLOCK® PLUS™ VBP20

ISO 9001:2008 CERTIFIED MANAGEMENT SYSTEM

Under-Slab Vapor / Gas Barrier

PROPERTIES	TEST METHOD	VAPORBLOCK PLUS 20 IMPERIAL	VAPORBLOCK PLUS 20 METRIC
APPEARANCE		White/Gold	
THICKNESS, NOMINAL		20 mil	0.51 mm
WEIGHT		102 lbs/MSF	498 g/m²
CLASSIFICATION	ASTM E 1745	CLASS A, B & C	
TENSILE STRENGTH LBF/IN (N/CM) AVERAGE MD & TD (NEW MATERIAL)	ASTM E 154 Section 9 (D-882)	58 lbf	102 N
IMPACT RESISTANCE	ASTM D 1709	2600 g	
MAXIMUM USE TEMPERATURE		180° F	82° C
MINIMUM USE TEMPERATURE		-70° F	-57° C
PERMEANCE (NEW MATERIAL)	ASTM E 154 Section 7 ASTM E 96 Procedure B	0.0098 Perms grains/(ft²·hr·in·Hg)	0.0064 Perms g/(24hr·m²·mm Hg)
(AFTER CONDITIONING) PERMS (SAME MEASUREMENT AS ABOVE PERMEANCE)	ASTM E 154 Section 8, E96 Section 11, E96 Section 12, E96 Section 13, E96	0.0079 0.0079 0.0097 0.0113	0.0052 0.0052 0.0064 0.0074
WVTR	ASTM E 96 Procedure B	0.0040 grains/hr-ft²	0.0028 gm/hr-m²
RADON DIFFUSION COEFFIECIENT	K124/02/95	$< 1.1 \times 10^{-13}$ m²/s	
METHANE PERMEANCE	ASTM D 1434	$< 1.7 \times 10^{-10}$ m²/d• atm 0.32 GTR (Gas Transmission Rate) ml/m²•D•ATM	

VaporBlock® Plus™ Placement

All instructions on architectural or structural drawings should be reviewed and followed.
Detailed installation instructions accompany each roll of VaporBlock® Plus™ and can also be located on our website.
ASTM E-1643 also provides general installation information for vapor retarders.

VaporBlock® Plus™
UNDERSLAB VAPOR RETARDER / GAS BARRIER

VaporBlock® Plus™ is a seven-layer co-extruded barrier made using high quality virgin-grade polyethylene and EVOH resins to provide unmatched impact strength as well as superior resistance to gas and moisture transmission.

RAVEN INDUSTRIES

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www.ravenefd.com

1/11 EFD 1125

Scan QR Code to download current technical data sheets via the Raven website.

ACCESSORIES

Seaming Tapes & Attachment Items for Plastic Sheeting

RAVEN INDUSTRIES

From tie-down fasteners to field seaming tape, Raven Industries has the accessories you need to maximize your film's versatility and minimize installation time on the job.

Accessory Tapes

VaporBond Tape (TVB4)

This white single-sided tape combines a heavy-duty, weather-resistant polyethylene backing with an aggressive rubber adhesive. VaporBond Tape offers excellent seaming capabilities for our materials with an "Easy Tear" feature to reduce installation time. TVB4 has a WVTR of 0.18 perms per ASTM D 833. Typical applications include vapor retarders, covers and liners. Available in a 4" x 210' roll.

R25B Tape (R25B)

R25B Tape is a single sided aggressive synthetic elastomeric adhesive that bonds instantly to properly prepared polyethylene and polypropylene. The black polymer backing and adhesive is specially formulated to provide years of performance even in direct sunlight. A poly release liner provides for ease of installation. Available in a 4" x 100' roll.

VaporBond Plus Tape (TVBP4)

VaporBond Plus is a single-sided aluminum foil tape with a release liner for ease of installation. The aluminum foil has very high impermiability to methane and other gases. Acrylic adhesive provides outstanding adhesion to polyethylene over a wide temperature range. Typical uses include joining and sealing gas/moisture barriers. Available in 4" x 150' rolls

Butyl Seal Tape (TP2BR)

Butyl seal is a double-sided reinforced aggressive black butyl rubber tape used to join panels of polyethylene and polypropylene together by overlapping the edges and applying Butyl Seal in between. It is also used to adhere to concrete walls and footings when properly prepared. Butyl Seal is non-hardening and flexible. Available in 2" x 50' roll.

Canvex® Seal Tape (TS4WT)

Canvex Seal Tape is a single-sided white woven tape that contains an acrylic adhesive with a release liner. It has excellent adhesion to polyethylene and the acrylic adhesive provides much longer life than many competitive tapes. It is recommended for taping the seams on in-wall vapor retarders and crawl spaces. Available in a 4" x 100' roll.

VaporBoot Tape (TBOOT)

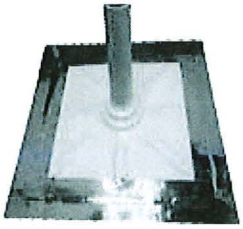
VaporBoot Tape is a single-sided elastomeric butyl tape used to complete pipe boot installations (sealing the boot to the pipe). The 100% stretchable Butyl adhesive features excellent adhesion values and 3-D stretching that can be easily molded to multiple surfaces without any creases and folds. Available in 2" x 10' roll.

Additional Accessories

VaporBoot System (VBOOT)

The VaporBoot System is designed to assist in securing pipe and other penetrations that run vertically through the vapor retarder material. The VaporBoot System offers a quick solution and is delivered to the jobsite in a complete package. VaporBoots are produced from high performance VaporBlock® material. Package Contents:
25 - VaporBoots (18" x 18", w/precut center marker)
2 - rolls of VaporBoot Tape.

VaporBoot Plus Preformed Pipe Boots (VBPBT)



VaporBoot Plus Preformed Pipe Boots are produced from heavy 40 mil co-extruded polyethylene and barrier resins for excellent strength and durability. The preformed boots are stepped to fit 1" to 4" wide pipe penetrations. VaporBoot Plus Preformed Pipe Boots are available in quantities of 12 per box.

ACCESSORIES

ISO 9001:2008 CERTIFIED MANAGEMENT SYSTEM

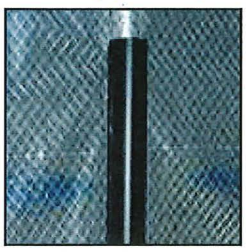
Seaming Tapes & Attachments for Plastic Sheeting

Additional Accessories (continued)

Dura♦Skrim® Reinforced Sandbags

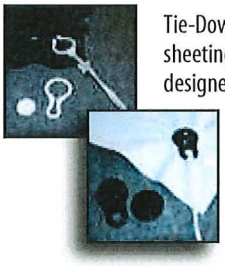
Dura♦Skrim reinforced sandbags are used to secure large covers and liners to prevent wind damage. Made from Dura♦Skrim 8 & 12 mil reinforced polyethylene, they are designed for a minimum life of 2 years in exposed applications. These 15" wide x 24" long bags will hold 35 lbs. Sandbags are available in other Raven reinforced materials with minimum order requirements. 11.8" Cable Ties are also available.

Dura-Clip (CLIP11)



These full size clips are 11" long and fit most commercial scaffolding. Dura-Clips will securely fasten your poly sheeting to scaffolding, reducing wind whip and increasing the life of your enclosure. Clips are normally placed about every 3' onto the enclosure.

Tie-Down Buttons (BUTI) & Tarp Grabbers (BUTEZ)



Tie-Down Buttons & Tarp Grabbers help keep plastic sheeting securely in place. Tie-Down Buttons are designed to eliminate traditional grommets in plastic sheeting up to 10 mil thick and are reusable plastic fittings that are easy to install in any position. Tarp Grabbers are up to 4 times stronger than a brass grommet and are typically used in heavier plastic sheeting from 10 mil to 30 mil thick. Great for equipment covers, large storage covers and truck tarps.

Raven Welding Rod

Raven Welding Rod is used for field seaming, repairs and detail work, such as installing pipe boots. Packaged in 10 lb spools, it is available in 4mm and 5mm sizes to fit most brands of extrusion guns. Raven Welding Rod is made from a thermally UV stabilized LLDPE resin and is available in both black and white to correspond with the color of geomembranes being utilized.

Tape Accessory Properties

	Canvex® Seal Tape (TS4WT)	VaporBond Tape (TVB4)	VaporBond Plus Tape (TVBP4)	VaporBoot Tape (TB00T)	R25B Tape (R25B)	Butyl Seal Tape (TP2BR)
Backing	Woven Co-Polymer	7.5 mil Polyethylene	1.5 mil Aluminum	Coated Release Paper	8 mil Polyethylene	Coated Release Paper
Adhesive	1.75 mil Acrylic Adhesive Pressure-Sensitive	1.5 mil Rubber Based Pressure-Sensitive	2 mil Acrylic Adhesive Pressure-Sensitive	.5 mm Black Butyl Rubber	17 mil +/- 2 mil Synthetic Elastomeric	1 mm Black Butyl Rubber
Color	White	White	Silver	Black	Black	Black
Type	Single Sided	Single Sided	Single Sided	Single Sided	Single Sided	Double Sided
Size	4" x 100'	4" x 210'	4" x 150'	2" x 10'	4" x 100'	2" x 50'
Rolls Per Case	12	12	12	64	6	20
Weight Per Case	16 lbs	45 lbs	32 lbs	45 lbs	33 lbs	55 lbs
Adhesion Values	45 oz./ in. (to steel)	30 oz./ in. (to steel)	64 oz./ in. (to steel)	145 oz./ in. (to steel)	320 oz./ in. (to steel)	107.5 oz./ in. (to steel)
Service Temp.	-40° F to +200° F	-40° F to +180° F	-40° F to +250° F	14° F to +122° F	20° F to +180° F	30° F to +100° F
Minimum Application Temp.	10° F	50° F	10° F	14° F	35° F	35° F
Ideal Storage Temp./Humidity	70° F w/ 40-50%	70° F w/ 40-50%	70° F w/ 40-50%	70° F w/ 70%	70° F w/ 40-50%	70° F w/ 40-50%

RAVEN INDUSTRIES

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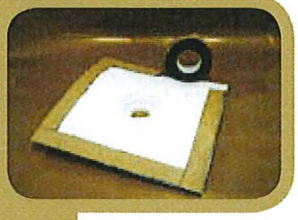
8/11 EFD 1103

Scan QR Code to download current technical data sheets via the Raven website.

ATTACHMENT C

VAPOR BLOCK PLUS ® INSTALLATION INSTRUCTION MANUAL

VaporBoot Plus
Installation Instructions



Package Contents: 12 Each Preformed VaporBoot Plus Boots 18" x 18"

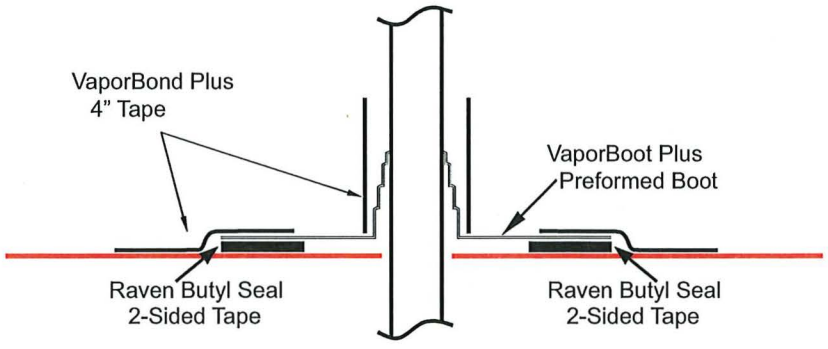
1. Check your pipe size and cut the hole size required in the prefabricated VaporBoot Plus Boot. The formed steps are for 1", 2", 3" and 4" PVC pipe or IPS size. This will allow the pipe to fit tightly in the hole and the VaporBoot Plus to stretch taunt around the pipe.

2. Turn the boot over and apply 2-sided Raven Butyl Seal tape (sold separately) to the perimeter of the bottom side. Once the entire perimeter is taped; remove all the release liner.

3. Force the VaporBoot Plus Boot over the penetration and apply pressure to the taped area around the entire perimeter to secure in place.

4. Peel off the paper release liner and tape the entire perimeter with VaporBond Plus tape (sold separately).

5. To finish boot installation take VaporBond Plus tape and wrap tightly around to seal the boot to the penetration.



VAPORBOOT PLUS INSTALLATION INSTRUCTIONS

RAVEN INDUSTRIES

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ISO 9001:2000 CERTIFIED MANAGEMENT SYSTEM

VaporBlock® Plus™

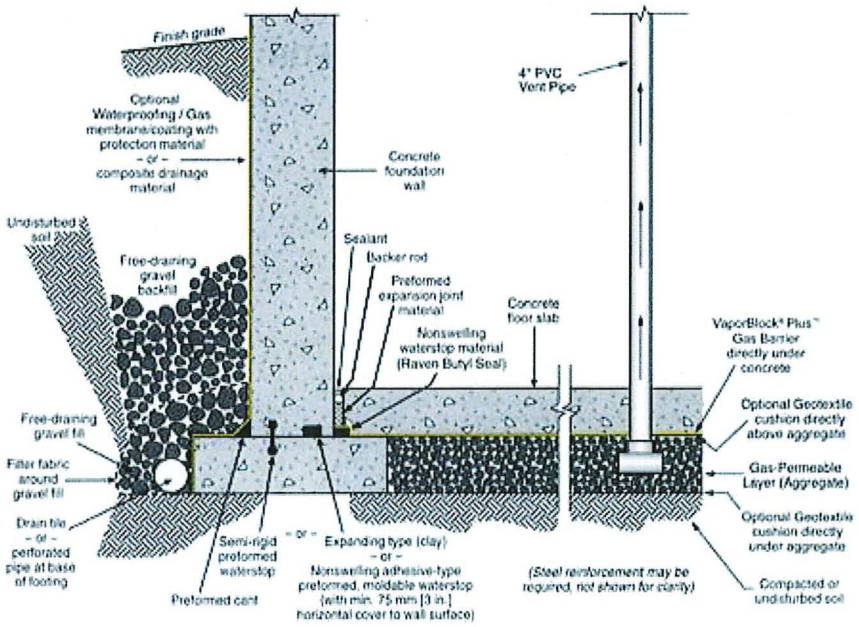
UNDERSLAB VAPOR RETARDER / GAS BARRIER

INSTALLATION GUIDELINES

Please Note: *Read these instructions thoroughly before installation to ensure proper use of* ***VaporBlock® Plus™****. ASTM E 1465, ASTM E 2121 and, ASTM E 1643 also provide valuable information regarding the installation of vapor / gas barriers. When installing this product, contractors shall conform to all applicable local, state and federal regulations and laws pertaining to residential and commercial building construction.*

- **When VaporBlock Plus gas barrier is used as part of an active control system for radon or other gas, a ventilation system will be required.**
- **If designed as a passive system, it is recommended to install a ventilation system that could be converted to an active system if needed.**

Materials List:
VaporBlock® Plus™ Vapor / Gas Barrier
VaporBond Plus 4" Foil Seaming Tape
Butyl Seal 2-Sided Tape
VaporBoot Plus Pipe Boots 12/Box (recommended)
VaporBoot Tape (optional)



Elements of a moisture/gas-resistant floor system. General illustration only.
(Note: This example shows multiple options for waterstop placement.

VAPORBLOCK® PLUS™ PLACEMENT

1.1. Level and tamp or roll granular base as specified. A base for a gas-reduction system may require a 4" to 6" gas permeable layer of clean coarse aggregate as specified by your architectural or structural drawings after installation of the recommended gas collection system. In this situation, a cushion layer consisting of a non-woven geotextile fabric placed directly under **VaporBlock® Plus™** will help protect the barrier from damage due to possible sharp coarse aggregate.

1.2. Unroll **VaporBlock Plus** running the longest dimension parallel with the direction of the pour and pull open all folds to full width. (Fig. 1)

1.3. Lap **VaporBlock Plus** over the footings and seal with Raven Butyl Seal tape at the footing-wall connection. Prime concrete surfaces and assure they are dry and clean prior to applying Raven Butyl Seal Tape. Apply even and firm pressure with a rubber roller. Overlap joints a minimum of 6" and seal overlap with Raven VaporBond Tape. When used as a gas

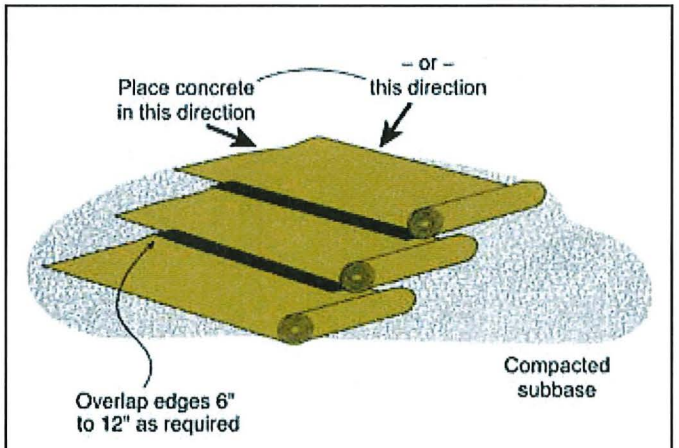


Fig. 1: VaporBlock Plus Overlaping Roll-out Method

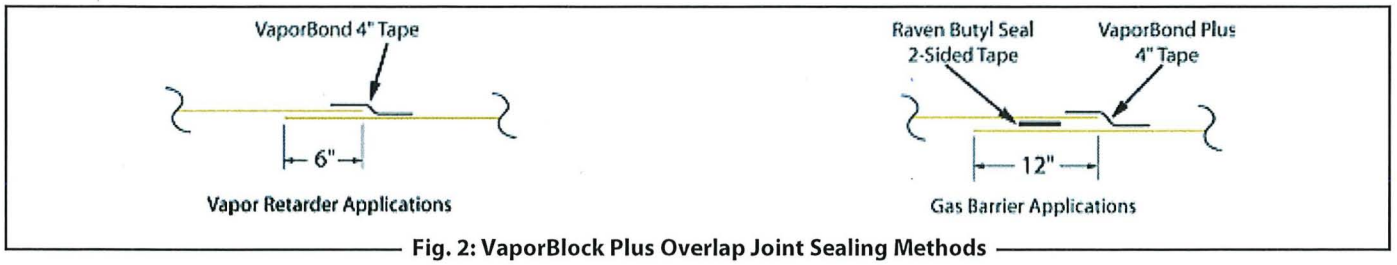


Fig. 2: VaporBlock Plus Overlap Joint Sealing Methods

SINGLE PENETRATION PIPE BOOT INSTALLATION

barrier, overlap joints a minimum of 12" and seal in-between overlap with 2-sided Raven Butyl Seal Tape. Then seal with VaporBond Plus Tape centered on the overlap seam. (Fig. 2)

1.4. Seal around all plumbing, conduit, support columns or other penetrations that come through the **VaporBlock Plus** membrane. Pipes four inches or smaller can be sealed with Raven VaporBoot Plus preformed pipe boots. VaporBoot Plus preformed pipe boots are formed in steps for 1", 2", 3" and 4" PVC pipe or IPS size and are sold in units of 12 per box (Fig. 3 & 5).

Pipe boots may also be fabricated from excess **VaporBlock Plus** membrane (Fig. 4 & 6) and sealed with VaporBoot Tape or VaporBond Plus Tape (sold separately).

Reminder Note: All holes or penetrations through the membrane will need a patch cut to a minimum of 12" from the opening in all directions.

To fabricate pipe boots from **VaporBlock Plus** excess material (see Fig. 4 & 6 for A-F):

A) Cut a square large enough to overlap 12" in all directions.

B) Mark where to cut opening on the center of the square and cut four to eight slices about 3/8" less than the diameter of the pipe.

C) Force the square over the pipe leaving the tightly stretched cut area around the bottom of the pipe with approximately a 1/2" of the boot material running vertically up the pipe. *(no more than a 1/2" of stretched boot material is recommended)*

D) Once boot is positioned, seal the perimeter to the membrane by applying 2-sided Raven Butyl Seal Tape in between the two layers. Secure boot down firmly over the membrane taking care not to have any large folds or creases.

E) Use VaporBoot Tape or VaporBond Plus Tape to secure the boot to the pipe.

VaporBoot Tape (option) – fold tape in half lengthwise, remove half of the release liner and wrap around the pipe allowing 1" extra for overlap sealing. Peel off the second half of the release liner and work the tape outward gradually forming a complete seal.

VaporBond Plus Tape (option) - Tape completely around pipe overlapping the to get a tight seal against the pipe.

F) Complete the process by taping over the boot perimeter edge with VaporBond Plus Tape to create a monolithic membrane between the surface of the slab and gas/ moisture sources below and at the slab perimeter. (Fig. 4 & 6)

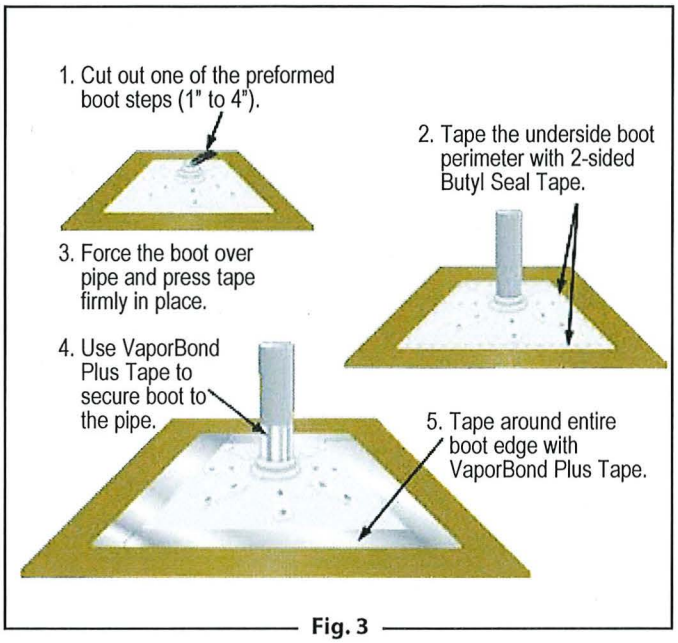


Fig. 3

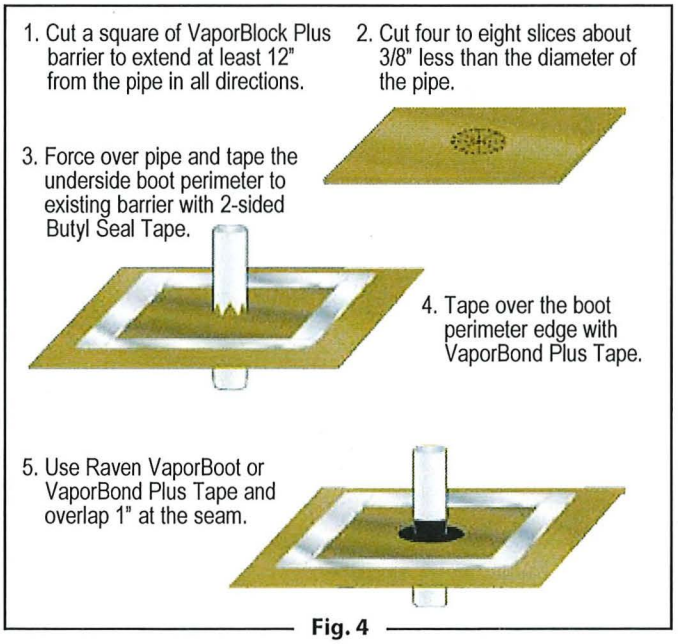


Fig. 4

Preformed Pipe Boot

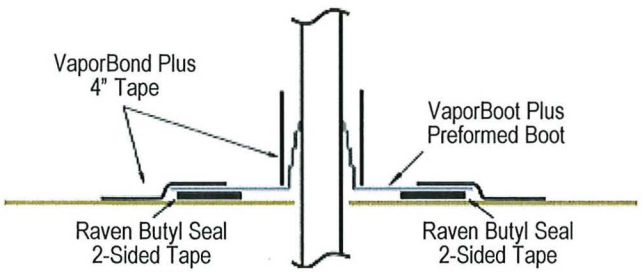


Fig. 5

Square Material Pipe Boot

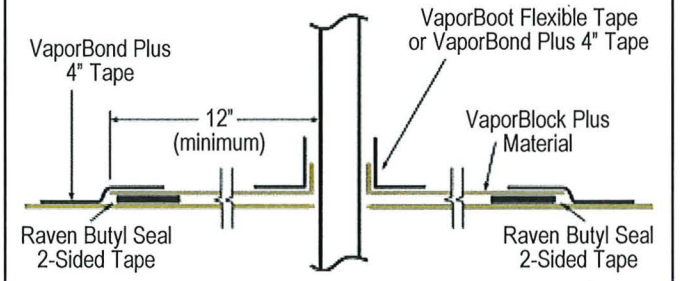


Fig. 6

MULTIPLE PENETRATION PIPE BOOT INSTALLATION

1.5. For side-by-side multiple penetrations;

A) Cut a patch large enough to overlap 12" in all directions (Fig. 7) of penetrations.

B) Mark where to cut openings and cut four to eight slices about 3/8" less than the diameter of the penetration for each.

C) Slide patch material over penetration to achieve a tight fit.

D) Once patch is positioned, seal the perimeter to the membrane by applying 2-sided Raven Butyl Seal Tape in-between the two layers. (Fig. 8)

E) After applying Raven Butyl Seal Tape between the patch and membrane, tape around each of the penetrations and the patch with VaporBond Plus 4" foil tape. (Fig. 9) For additional protection apply an acceptable polyurethane elastomeric sealant around the penetrations. (Fig. 10)

1.6. Holes or openings through **VaporBlock Plus** are to be repaired by cutting a piece of **VaporBlock Plus** 12" larger in all directions from the opening. Seal the patch to the barrier with 2-sided Raven Butyl Seal Tape and seal the edges of the patch with VaporBond Plus Tape.

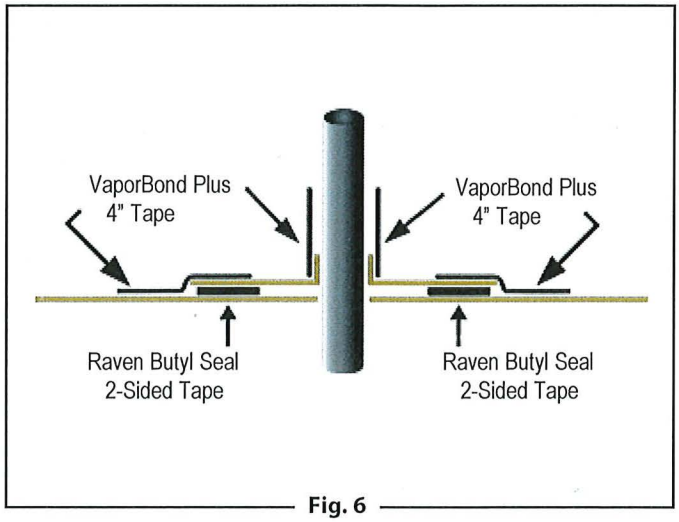


Fig. 6

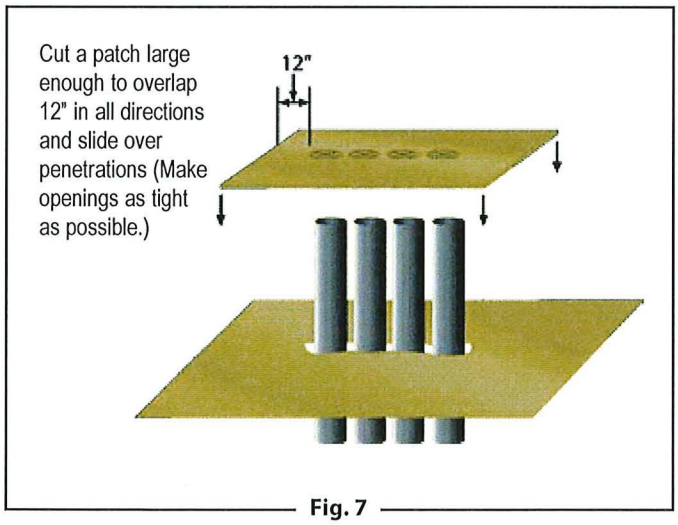


Fig. 7

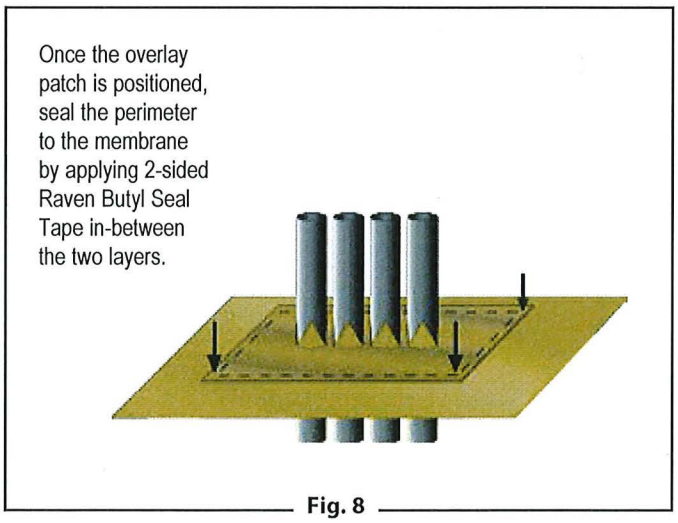


Fig. 8

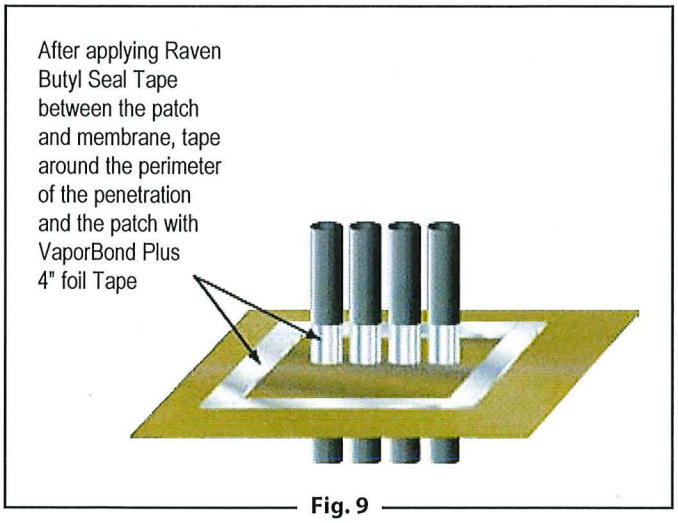


Fig. 9

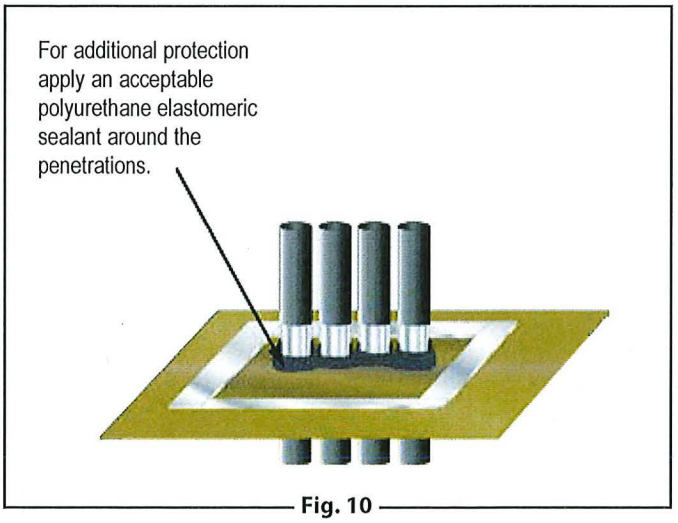


Fig. 10

VAPORBLOCK® PLUS™ PROTECTION

2.1. When installing reinforcing steel and utilities, in addition to the placement of concrete, take precaution to protect **VaporBlock Plus**. Carelessness during installation can damage the most puncture–resistant membrane. Sheets of plywood cushioned with geotextile fabric temporarily placed on **VaporBlock Plus** provide for additional protection in high traffic areas including concrete buggies.

2.2. Use only brick-type or chair-type reinforcing bar supports to protect **VaporBlock Plus** from puncture.

2.3. Avoid driving stakes through **VaporBlock Plus**. If this cannot be avoided, each individual hole must be repaired per section 1.6.

2.4. If a cushion or blotter layer is required in the design between **VaporBlock Plus** and the slab, additional care should be given if sharp crushed rock is used. Washed rock will provide less chance of damage during placement. Care must be taken to protect blotter layer from precipitation before concrete is placed.

Note: To the best of our knowledge, these are typical installation procedures and are intended as guidelines only. Architectural or structural drawings must be reviewed and followed as well on a project basis. NO WARRANTIES ARE MADE AS TO THE FITNESS FOR A SPECIFIC USE OR MERCHANTABILITY OF PRODUCTS OR GUIDELINES REFERRED TO, no guarantee of satisfactory results from reliance upon contained information or recommendations and we disclaim all liability for resulting loss or damage.

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ISO 9001:2000
CERTIFIED MANAGEMENT SYSTEM

www.vaporblockplus.com

6/09 EFD 1127

POLE IDENTIFICATION AND RESULTANT FORCES

POLE DESIGNATION	POLE TYPE	PRECAST BASE TYPE	FIXTURE CONFIGURATION (FIX. PER XARM)	FIXTURE AND ACCESSORIES EPA (FT^2)	FORCES		
					MOMENT (M) FT-LBS	SHEAR (V) LBS	VERTICAL (P) LBS (1.)
S1, S2	LSS70C	4B	13 (7+6)	28.8	87,710	1,729	2,727
S3, S4	LSS70C	4B	15 (7+6) / (2)	31.5	94,539	1,820	2,907

1. WEIGHT OF DRESSED STEEL POLE (DOES NOT INCLUDE PRECAST BASE WEIGHT)

PRECAST BASE ID FOR PILE CAP

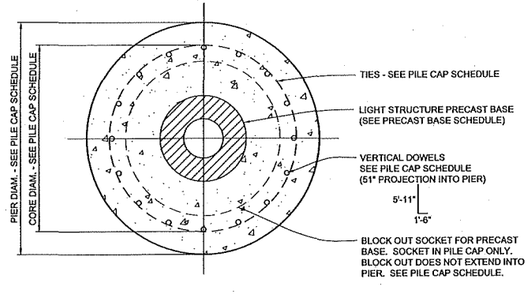
PRECAST BASE TYPE	PRECAST BASE WEIGHT (1.)	PRECAST BASE LENGTH (1.)	PROJECTION ABOVE TOP OF PIER	STANDARD EMBEDMENT (1.)	OUTSIDE DIAMETER	CUT LENGTH OFF BOTTOM (2.)	EMBEDMENT INTO PIER & PILE CAP (3.)
4B	3,490 LBS	22'-0"	8'-0"	14'-0"	15.75"	8'-0"	6'-0"

1. PRECAST BASE WEIGHT, LENGTH AND STANDARD EMBEDMENT ARE PRECUT PROPERTIES
2. EPOXY COAT NEW BOTTOM SURFACE OF PRECAST BASE AFTER CUTTING
3. EMBEDMENT EQUALS 4'-0" PIER HEIGHT PLUS 2'-0" DEPTH INTO PILE CAP

PILE CAP SCHEDULE

POLE DESIGNATION	CAP					PIER					PILE (1.)			
	SIDE LENGTH	THICKNESS	DEPTH TO TOP OF PILE CAP	REINFORCEMENT TOP & BOTTOM (TOTAL) QUANTITY - SIZE	BLOCKOUT DIAMETER	PIER HEIGHT	PIER DIAMETER	CORE DIAMETER (2.)	VERTICAL REINFORCING (3.)	TIES	QUANTITY	CENTER TO CENTER SPACING	PILE CAP EDGE DISTANCE TO PILE CENTER	DEPTH TO TOP OF PILE
S1 - S4	10'-0" x 10'-0"	2'-6"	4'-0"	(48) 12 - #7's EACH WAY	24"	4'-0"	42"	35"	16 - #7	#4's @ 12"	4	7'-6"	1'-3"	6'-0"

1. HP 10x42 w/ 2 - #6 ASTM A706 VERTICALS (w/ 12", 90 DEGREE HOOK) WELDED TO CENTER OF EACH FLANGE
2. CORE DIAMETER EQUAL TO INSIDE DIAMETER OF TIES.
3. EACH VERTICAL BAR TO HAVE AN 18" - 90 DEGREE HOOK AT BOTTOM



A PIER DETAIL
SCALE: NOT TO SCALE

DESIGN NOTES

WIND DESIGN PARAMETERS:
WIND: 90 MPH (EXP. C, I = 1.0) PER IBC CODE, 2009 EDITION (ASCE 7-05).
DESIGN WIND PARAMETERS ARE NOTED. ACTUAL WIND SPEED AND EXPOSURE MUST BE VERIFIED FOR THE SITE BY THE PROPER GOVERNING OFFICIAL.

GEOTECHNICAL PARAMETERS:
IN ACCORDANCE WITH THE 2009 EDITION OF THE INTERNATIONAL BUILDING CODE, CHAPTER 18.

DESIGN SOIL PARAMETERS ARE AS NOTED. ACTUAL ALLOWABLE SOIL PARAMETERS MUST BE VERIFIED ON SITE. REFERENCE SOILS AND FOUNDATION REPORT, NO. 074702, PREPARED BY CONESTOGA-ROVERS & ASSOCIATES (INSPEC-SOIL, INC.); ST. PAUL, MN.

ENCOUNTERING SOIL FORMATIONS THAT WILL REQUIRE SPECIAL DESIGN CONSIDERATIONS OR EXCAVATION PROCEDURES MAY OCCUR. POLE FOUNDATIONS WILL NEED TO BE ANALYZED ACCORDING TO THE SOIL CONDITIONS THAT EXIST. IF ANY DISCREPANCIES OR INCONSISTENCIES ARISE, NOTIFY THE ENGINEER OF SUCH DISCREPANCIES. FOUNDATIONS WILL THEN BE REVISED ACCORDINGLY. REVISIONS WILL BE ANALYZED PER RECOMMENDATIONS DIRECTED BY A REGISTERED ENGINEER.

ALL EXCAVATIONS MUST BE FREE OF WATER, LOOSE SOIL AND DEBRIS PRIOR TO FOUNDATION INSTALLATION AND CONCRETE BACKFILL PLACEMENT. CONTRACTOR MUST BE FAMILIAR WITH THE COMPLETE SOIL INVESTIGATION REPORT AND BORINGS, AND CONTACT THE GEOTECHNICAL FIRM (IF NECESSARY) TO UNDERSTAND THE SOIL CONDITIONS AND THE POSSIBILITY OF GROUND WATER PUMPING AND EXCAVATION STABILIZATION OR BRACING DURING PLACEMENT OF CONCRETE.

PILE - HP 10x42:
SEE GEOTECHNICAL ENGINEERING REPORT REFERENCED ABOVE FOR PILE DETAILS AND RECOMMENDATIONS.
PILE TYPE: HP 10x42
ALLOWABLE LATERAL CAPACITY: MODULUS OF SUBGRADE - 25 PCI (LANDFILL MATERIAL); 35 PCI (MELTWATER SEDIMENTS, SUBMERGED)
ALLOWABLE COMPRESSION CAPACITY: 50 TONS (BEDROCK)
ALLOWABLE TENSION CAPACITY: 5 TONS
ESTIMATED DEPTH: 52'-0" TO 60'-0" (25'-0" TO 40'-0" NEAR BORING B-5)

INSTALLATION AND LOAD TESTS PER GEOTECHNICAL REPORT AND IBC 2009 AND TO BE VERIFIED BY GEOTECHNICAL ENGINEER.

GENERAL NOTES:
FIXTURES MUST BE LOCATED TO MAINTAIN 10'-0" MINIMUM HORIZONTAL CLEARANCE FROM ANY OBSTRUCTION. POLES, FIXTURES, PRECAST BASES, ELECTRICAL ITEMS AND INSTALLATION PER MUSCO LIGHTING.

CONCRETE/REINFORCEMENT NOTES

CONCRETE SHALL COMPLY WITH THE FOLLOWING ASTM STANDARDS:
MIXTURE WITH ASTM C-94, PORTLAND CEMENT WITH ASTM C-150 TYPE 1-A.
AGGREGATES WITH ASTM C-33 AND BE IN CONFORMANCE WITH ACI 318.

CONCRETE SHALL BE AIR-ENTRAINED (COMPLY WITH ASTM C-260), HAVE A MAXIMUM WATER-CEMENT RATIO, w/cm = 0.43 AND HAVE A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS OF 4,000 PSI.

DESIGN SLUMP LIMITS ARE 4" MINIMUM AND 6" MAXIMUM. THE JOB SITE SLUMP MAY BE INCREASED BY THE USE OF A WATER REDUCING AGENT MEETING ASTM C494-92.

CONCRETE REINFORCEMENT SHALL COMPLY WITH ASTM A615 GRADE 60, EXCEPT TIES CAN BE OF GRADE 40 AND BE IN CONFORMANCE WITH ACI 315 & 318. REINFORCEMENT BARS TO BE WELDED TO HP PILE, SHALL BE ASTM A706 GRADE 60.

CONCRETE MUST ATTAIN 3,000 PSI STRENGTH PRIOR TO POLE INSTALLATION AND FIXTURE MOUNTING.

SECURELY TIE ALL REINFORCING AND EMBEDDED ITEMS IN POSITION BEFORE PLACING CONCRETE OR GROUT. REINFORCING IN FOOTINGS SHALL BE ACCURATELY SET BEFORE PLACING CONCRETE. DO NOT FLOAT REINFORCING INTO CONCRETE.

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MARSHALLTOWN
IA
PROFESSIONAL ENGINEER
5-6-2013
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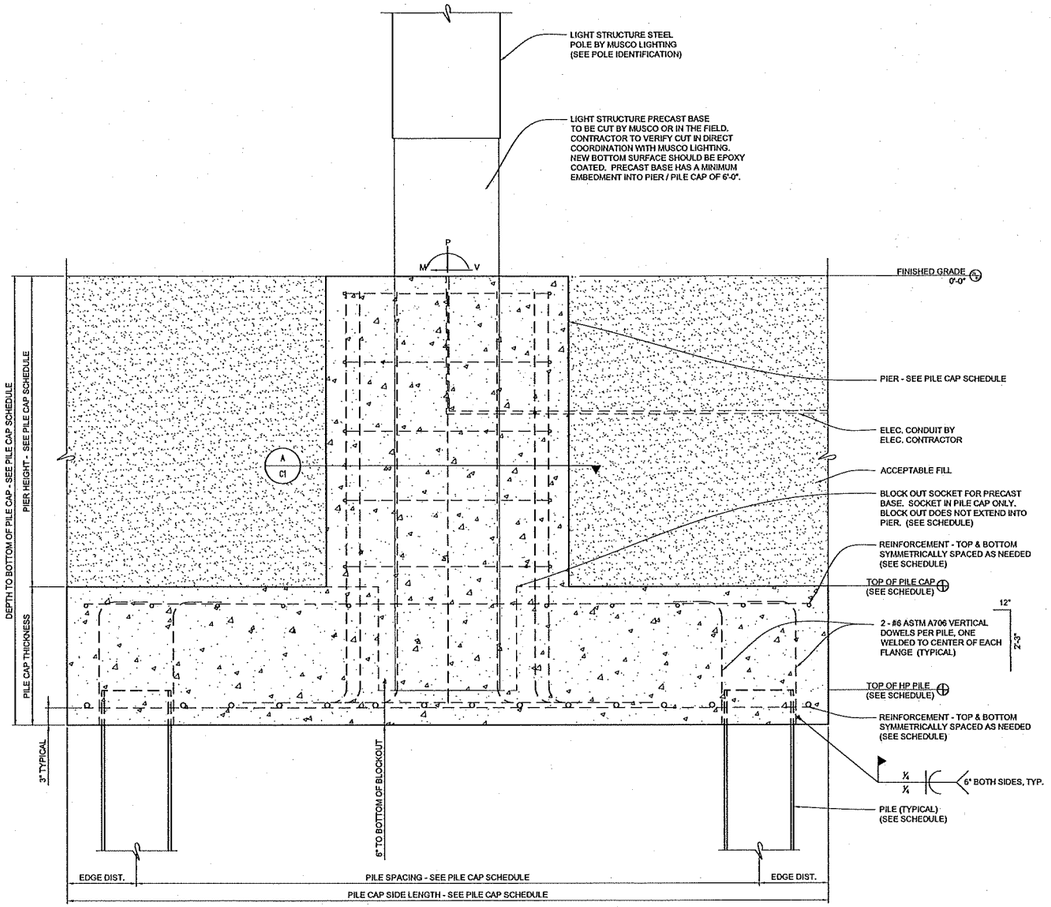
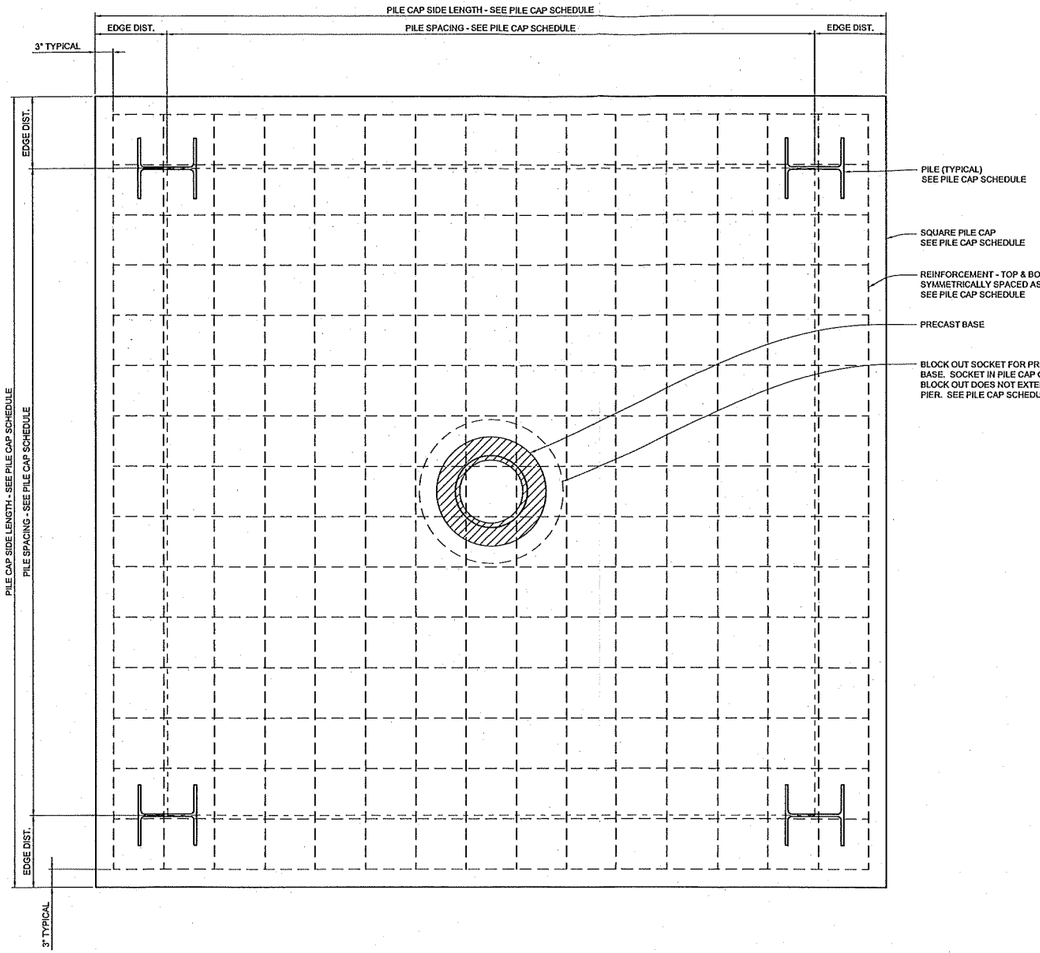
HOLTZ KRAUSE
SOCCER FIELD
FIELD LIGHTING
WAUSAU, WISCONSIN

DRAWING TITLE: POLE AND FOUNDATION
SCALE: SEE PLAN
NOTES: SCAN #162362A

PROJECT NUMBER: 162362
DATE: 16 MAY 2013
DRAWING NUMBER: C1
OF TWO



4 - HP PILE
SYMMETRICAL PILE CAP ELEVATION
NOTES: NOT TO SCALE. SEE PILE CAP SCHEDULE



4 - HP PILE
SYMMETRICAL PILE CAP PLAN VIEW
NOTES: NOT TO SCALE. SEE PILE CAP SCHEDULE

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DRAWING TITLE: POLE AND FOUNDATION
SCALE: SEE PLAN
NOTES: SCAN #162362A

PROJECT NUMBER: 162362
DATE: 16 MAY 2013
DRAWING NUMBER: C2
OF TWO