

CITY OF HOUSTON



PUBLIC WORKS AND ENGINEERING PLANNING & DEVELOPMENT DIVISION

EXECUTIVE SUMMARY

Designated Property Location

The Designated Property for which this Municipal Setting Designation (MSD) Application has been developed consists of an approximately 16.8939-acre parcel of land located on a lot with a historical address of 13501 Industrial Road in Houston, Harris County, Texas (Designated Property). The current property owner is Densimix Holding Corporation, a Prince Minerals Company (DHC) and MSD applicant. The Designated Property is located north/northeast of Industrial Road and immediately south/southeast of Greens Bayou.

The location, topography and layout of the Designated Property are shown on **Figures 1, 2 and 4** in **Appendix C**. The Designated Property consists of three contiguous tracts (TRS 2, 2A, & 15A, ABST 31 Harris & Wilson).

The Designated Property is currently a developed industrial facility. The Designated Property has historically been listed and is currently listed in appraisal district records at 13501 Industrial Road. The Designated Property was purchased by DHC from Densimix, Inc., in 2012. Densimix, Inc., purchased the Designated Property from Tenn-Tex Alloy Corporation in 1980.

Property Ownership

Densimix Holding Corporation, a
Prince Minerals Company
21 West 46th Street
New York, New York 10036

MSD Applicant

Densimix Holding Corporation, a
Prince Minerals Company
21 West 46th Street
New York, New York 10036

Environmental Conditions

The Designated Property has historically contained industrial facilities based upon historical directories and maps. The Designated Property has been used for metal processing since the late 1940s.

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A number of historical activities of environmental concern were identified as part of an environmental review for the Designated Property. Tenn-Tex Alloy Corporation (a former occupant and owner of the Designated Property) processed manganese ore from West Africa at the Designated Property from the late 1940s until 1977. Prior tenant Densimix, Inc. and its subsidiary, and a prior property owner, E&B, Inc. respectively manufactured and marketed iron oxide for use in drilling mud, glass, coatings, and other purposes from approximately 1980 to 2012. Potential historical sources of impacts to the Site include sludge derived from particulate scrubbers that was processed in the settling ponds located in the northeast portion of the Designated Property.

As a result of these historic operations, W&M Environmental Group, Inc. (W&M) conducted subsurface investigations at the Designated Property for new owner DHC. The investigations included groundwater data collection from seven permanent monitoring wells and soil condition evaluation of 21 soil borings. Additionally, soil conditions were evaluated in the area of the historic sludge settling ponds located in the northeast portion of the Designated Property. A total of 17 soil samples of the sludge material were collected on a composite and grab sample basis. Synthetic precipitation leachate procedure (SPLP) analysis was performed on the soil samples collected from the historic sludge settling ponds.

Chemicals of concerns (COCs) in the soil that exceed the Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program (TRRP) critical protective concentration levels (PCLs) for residential properties are the following metals: antimony, arsenic, barium, beryllium, cadmium, lead, manganese, mercury, nickel, selenium, silver, and zinc. The aforementioned metals, with the exception of nickel, also exceed critical soil PCLs for commercial/industrial properties. Additionally, arsenic, cadmium, manganese, and selenium were at concentrations exceeding their respective leachable ingestion PCLs in the sludge samples collected during the subsurface investigation.

Arsenic, manganese, and selenium exceeded the TRRP ^{GW}GW_{Ing} residential PCL in groundwater. No analytes exceed non-ingestion (MSD-adjusted) residential PCLs for groundwater.

Tables in Appendix F provide specific values and assessment levels for soil and groundwater.

CITY OF HOUSTON



**PUBLIC WORKS AND
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EXECUTIVE SUMMARY

There are currently seven groundwater monitoring wells on the Designated Property (MW-01 through MW-07). Groundwater is first encountered at a depth of approximately 30 feet below ground surface (bgs). Only one groundwater bearing unit (GWBU) has been identified. This is a confined GWBU with a potentiometric surface at a depth of approximately 16 feet bgs. Groundwater flow direction was determined to be to the northwest. Arsenic was detected above the ingestion PCL in all monitoring wells with the exception of MW-06. Manganese was only detected with a concentration exceeding the ingestion PCL in monitoring well MW-03. Selenium was detected in monitoring wells MW-04 and MW-05 at concentrations exceeding the ingestion PCL. These metals were detected at concentrations below the ingestion PCL in all other monitoring wells.

No water wells used for potable purposes exist within the Site. Two former on-Site water supply wells have been properly plugged and abandoned.

The arsenic, manganese, and selenium-impacted groundwater at the Site have been fully delineated to the TRRP assessment levels. Five groundwater sampling events indicate that arsenic, manganese, and selenium concentrations are relatively stable. Monitoring wells MW-06 and MW-07 have delineated the metals to the west and southeast at the Designated Property. Manganese and selenium are occasionally slightly above the ingestion PCL in monitoring wells MW-04 and MW-05.

The Designated Property and area within 0.5-mile are either served or are capable of being served by the City of Houston or other municipal water suppliers. There are 587 State-registered water wells, owned by 293 different entities, located within approximately 5-miles of the Designated Property. There are 24 water wells located within a 0.5-mile radius of the Designated Property as identified in the water well search.

There are no other jurisdictional boundaries within 0.5-mile of the Site other than the City of Houston. Municipalities that operate water wells within 5 miles of the Designated Property are: Jacinto City, Galena Park, and Pasadena. There are a total of 59 reported Water Utility Database (WUD) drinking water wells operating within 5 miles of the Designated Property.

Regulatory Setting

The Designated Property has been submitted by DHC into the Corrective Action Program of the TCEQ. The Designated Property currently has a solid waste registration (SWR) and Corrective Action number of T3077.

Appendix A

MUNICIPAL SETTING DESIGNATION APPLICATION

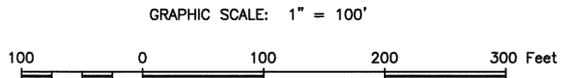
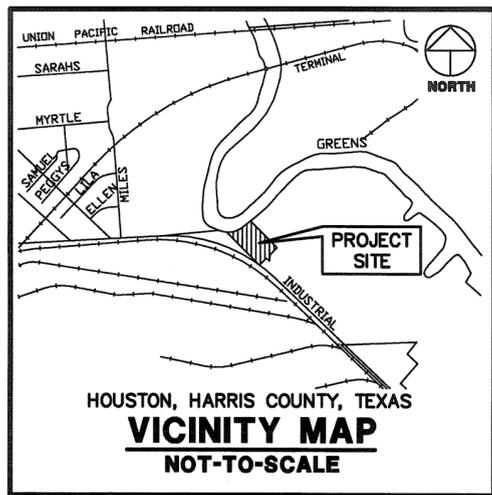
13501 INDUSTRIAL ROAD HOUSTON, TEXAS

LEGAL DESCRIPTION and DEED

The Designated Property for which this MSD application has been developed consists of a 16.8939-acre parcel of land located on a lot at 13501 Industrial Road in Houston, Harris County, Texas. The current property owner and MSD applicant is DHC. The Designated Property is located north/northeast of Industrial Road and immediately south/southeast of Greens Bayou.

Legal descriptions of the tracts, a copy of the deed, and a sealed survey are provided in **Appendix A**.

The location, topography and layout of the Designated Property are shown on **Figures 1, 2 and 4** in **Appendix C**. The Designated Property consists of three contiguous tracts (TRS 2, 2A, & 15A, ABST 31 Harris & Wilson).



LEGAL DESCRIPTION

A TRACT OR PARCEL CONTAINING 16.8939 ACRES OR 735,897 SQUARE FEET OF LAND, SITUATED IN THE HARRIS & WILSON SURVEY, ABSTRACT NO. 31, BEING ALL OF A CALLED 1.8264 ACRE (TRACT 1), CALLED 15 ACRES (TRACT 2) AND CALLED 6,760 SQ. FT. (TRACT 3) CONVEYED TO DENSIMIX HOLDING CORPORATION IN H.C.C.F. NO. 20120462106, WITH SAID 16.8939 ACRE TRACT BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS, WITH ALL BEARINGS BEING BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE 4204, NAD83:

BEGINNING AT A 5/8 INCH IRON ROD FOUND ON THE CURVED NORTHEASTERLY RIGHT-OF-WAY LINE OF INDUSTRIAL ROAD, (CALLED 80' R.O.W.) PER VOL. 379, PG. 44, H.C.M.R., AND VOL. 338, PG. 141, H.C.M.R., MARKING THE SOUTHWEST CORNER OF THE RESIDUE OF A CALLED 40.81 ACRE TRACT I CONVEYED TO WOMBLE COMPANY, INC. IN THAT CERTAIN WARRANTY DEED FILED FOR RECORD UNDER H.C.C.F. NO. T-455362, SAME BEING THE COMMON MOST SOUTHERLY CORNER OF SAID TRACT 2, AND OF THE HEREIN DESCRIBED TRACT;

THENCE IN A NORTHWESTERLY DIRECTION, ALONG THE CURVED NORTHEASTERLY RIGHT-OF-WAY LINE OF SAID INDUSTRIAL ROAD, A DISTANCE OF 444.54 FEET ALONG THE ARC OF A CURVE TO THE LEFT, HAVING A RADIUS OF 2909.56 FEET, SUBTENDING A CENTRAL ANGLE OF 08 DEG. 45 MIN. 14 SEC., AND HAVING A CHORD BEARING AND DISTANCE OF NORTH 51 DEG. 03 MIN. 22 SEC. WEST, 444.11 FEET TO THE MOST EASTERLY CORNER OF A CALLED 1.973 ACRE (TRACT 3) CONVEYED TO SOUTHERN TUBE, LLC. IN THAT CERTAIN WARRANTY DEED FILED FOR RECORD UNDER H.C.C.F. NO. 20120523640, FROM WHICH A 5/8 INCH IRON ROD FOUND FOR REFERENCE BEARS NORTH 61 DEG. 14 MIN. E, 0.3 FEET;

THENCE LEAVING SAID RIGHT-OF-WAY, NORTH 45 DEG. 54 MIN. 40 SEC. WEST, ALONG AND WITH THE COMMON LINE BETWEEN SAID 15 ACRE TRACT AND SAID 1.973 ACRE TRACT, A DISTANCE OF 762.34 FEET TO A POINT ON THE CALLED EASTERLY HIGHBANK OF GREENS BAYOU, MARKING AN INTERIOR CORNER OF SAID 1.973 ACRE TRACT AND THE COMMON MOST WESTERLY CORNER OF SAID 15 ACRE TRACT AND OF THE HEREIN DESCRIBED TRACT;

THENCE IN A NORTHEASTERLY DIRECTION, ALONG THE CALLED MEANDERS OF GREENS BAYOU AND WESTERLY LINE OF SAID 15 ACRE TRACT AND SAID 1.8264 ACRE TRACT, THE FOLLOWING SIX (6) COURSES AND DISTANCES;

- SOUTH 87 DEG. 14 MIN. 35 SEC. EAST, 93.58 FEET;
- NORTH 77 DEG. 34 MIN. 34 SEC. EAST, 225.64 FEET;
- NORTH 74 DEG. 30 MIN. 53 SEC. EAST, 47.44 FEET;
- NORTH 61 DEG. 10 MIN. 53 SEC. EAST, 111.40 FEET;
- NORTH 48 DEG. 14 MIN. 53 SEC. EAST, 152.86 FEET;
- NORTH 41 DEG. 12 MIN. 53 SEC. EAST, 193.26 FEET TO A POINT MARKING A WESTERLY CORNER OF SAID 40.81 ACRE, MARKING THE COMMON MOST NORTHERLY CORNER OF SAID 1.8264 ACRE TRACT AND OF THE HEREIN DESCRIBED TRACT;

THENCE ALONG AND WITH A SOUTHWESTERLY LINE OF SAID 40.81 ACRE TRACT, SAME BEING THE NORTHEASTERLY LINE OF SAID 1.8264 ACRE TRACT AND SAID 15 ACRE TRACT, SOUTH 45 DEG. 57 MIN. 07 SEC. EAST, A DISTANCE OF 936.99 FEET TO AN INTERIOR CORNER OF SAID 40.81 ACRE TRACT AND THE COMMON NORTHEAST CORNER OF SAID 15 ACRE TRACT AND THE HEREIN DESCRIBED TRACT;

THENCE SOUTH 42 DEG. 53 MIN. 20 SEC. WEST, ALONG AND WITH A COMMON LINE BETWEEN SAID 15 ACRE TRACT AND SAID 40.81 ACRE TRACT, A DISTANCE OF 274.16 FEET TO A 5/8 INCH IRON ROD FOUND MARKING THE MOST NORTHERLY CORNER OF SAID 6,760 SQ. FT. TRACT, AND AN ANGLE POINT OF THE HEREIN DESCRIBED TRACT;

THENCE ALONG AND WITH THE COMMON LINE BETWEEN SAID 6,760 SQ. FT. TRACT AND SAID 40.81 ACRE TRACT, SOUTH 26 DEG. 01 MIN. 51 SEC. WEST, A DISTANCE OF 46.85 FEET TO THE BEGINNING OF A TANGENT CURVE TO THE LEFT;

THENCE IN A SOUTHERLY DIRECTION, CONTINUING ALONG SAID LINE, A DISTANCE OF 168.07 FEET ALONG THE ARC OF SAID CURVE TO THE LEFT, HAVING A RADIUS OF 291.64 FEET, SUBTENDING A CENTRAL ANGLE OF 33 DEG. 01 MIN. 10 SEC., AND HAVING A CHORD BEARING AND DISTANCE OF SOUTH 09 DEG. 31 MIN. 16 SEC. WEST, 165.76 FEET TO A POINT OF TANGENCY;

THENCE CONTINUING ALONG SAID LINE, SOUTH 06 DEG. 59 MIN. 19 SEC. EAST, A DISTANCE OF 20.56 FEET TO THE MOST SOUTHERLY CORNER OF SAID 6,760 SQ. FT. TRACT, AND AN INTERIOR CORNER OF SAID 40.81 ACRE TRACT;

THENCE NORTH 32 DEG. 28 MIN. 40 SEC. WEST, ALONG AND WITH THE SOUTHWESTERLY LINE OF SAID 6,730 SQ. FT. TRACT, A DISTANCE OF 124.51 FEET TO A 3/4 INCH IRON ROD FOUND ON THE SOUTHEASTERLY LINE OF SAID 15 ACRE TRACT, MARKING THE MOST WESTERLY CORNER OF SAID 6,760 SQ. FT. TRACT, AND AN INTERIOR CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE SOUTH 42 DEG. 53 MIN. 20 SEC. WEST, ALONG AND WITH A COMMON LINE BETWEEN SAID 15 ACRE TRACT AND SAID 40.81 ACRE TRACT, A DISTANCE OF 264.62 FEET TO THE PLACE OF BEGINNING AND CONTAINING 16.8939 ACRES OR 735,897 SQ. FT. OF LAND, AS SHOWN ON THE EXHIBIT, JOB NO. 51481, FILED IN THE OFFICES OF WINDROSE LAND SERVICES, INC.

THIS LEGAL DESCRIPTION IS A COMPILATION OF EXISTING DESCRIPTIONS PREPARED UNDER 22 TAC 663.21. IT IS NOT TO BE USED TO CONVEY OR ESTABLISH INTEREST IN REAL PROPERTY EXCEPT THOSE RIGHTS IMPLIED OR ESTABLISHED BY THE CREATION OR RECONFIGURATION OF THE BOUNDARY OF THE POLITICAL SUBDIVISION FOR WHICH IT WAS PREPARED.

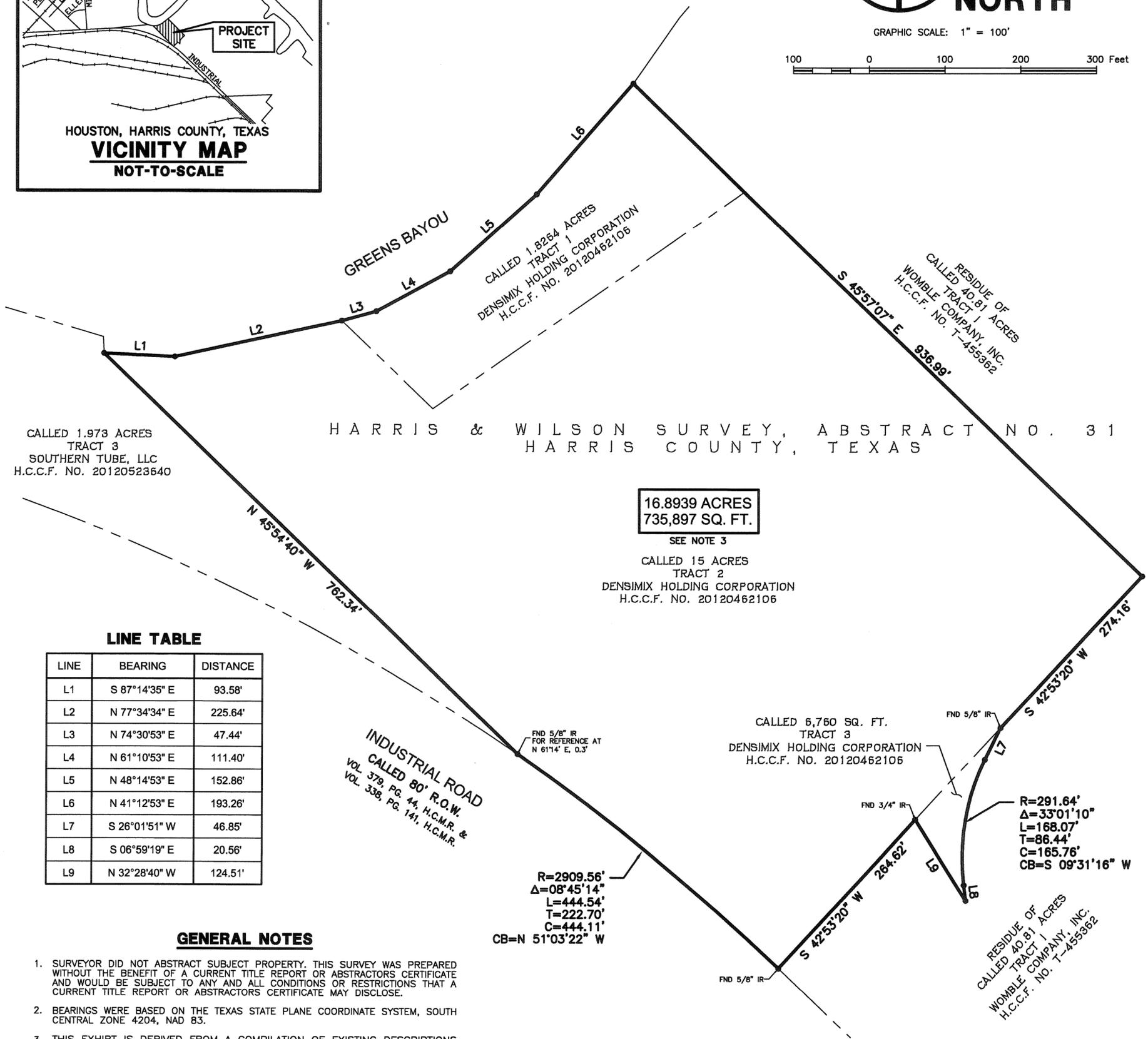
SURVEYOR'S CERTIFICATION

I DO HEREBY CERTIFY THAT THIS SURVEY WAS THIS DAY MADE ON THE GROUND AND WAS PERFORMED UNDER MY SUPERVISION. THAT THIS PLAT CORRECTLY REPRESENTS THE FACTS FOUND AT THE TIME OF THIS SURVEY TO THE BEST OF MY KNOWLEDGE.

Mike Kurkowski
Mike Kurkowski
Registered Professional Land Surveyor
Texas Registration No. 5101



12/04/13
DATE



LINE TABLE

LINE	BEARING	DISTANCE
L1	S 87°14'35" E	93.58'
L2	N 77°34'34" E	225.64'
L3	N 74°30'53" E	47.44'
L4	N 61°10'53" E	111.40'
L5	N 48°14'53" E	152.86'
L6	N 41°12'53" E	193.26'
L7	S 26°01'51" W	46.85'
L8	S 06°59'19" E	20.56'
L9	N 32°28'40" W	124.51'

GENERAL NOTES

- SURVEYOR DID NOT ABSTRACT SUBJECT PROPERTY. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A CURRENT TITLE REPORT OR ABSTRACTORS CERTIFICATE AND WOULD BE SUBJECT TO ANY AND ALL CONDITIONS OR RESTRICTIONS THAT A CURRENT TITLE REPORT OR ABSTRACTORS CERTIFICATE MAY DISCLOSE.
- BEARINGS WERE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE 4204, NAD 83.
- THIS EXHIBIT IS DERIVED FROM A COMPILATION OF EXISTING DESCRIPTIONS PREPARED UNDER 22 TAC 663.21 AND DOES NOT IMPLY TO BE A COMPLETE BOUNDARY SURVEY OF THE SUBJECT PROPERTY; IT IS NOT TO BE USED TO CONVEY OR ESTABLISH INTEREST IN REAL PROPERTY EXCEPT THOSE RIGHTS IMPLIED OR ESTABLISHED BY THE CREATION OR RECONFIGURATION OF THE BOUNDARY OF THE POLITICAL SUBDIVISION FOR WHICH IT WAS PREPARED.

REVISIONS		
DATE	REASON	BY

Windrose Land Services, Inc.
3200 Wilcrest, Suite 325
Houston, Texas 77042
Phone (713) 458-2281 Fax (713) 461-1151

Professional Development Consultants
Land Surveying, Platting, Project Management, GIS Services

EXHIBIT OF
16.8939 ACRES OR 735,897 SQ. FT.
DENSIMIX SITE
SITUATED IN THE
HARRIS & WILSON SURVEY
ABSTRACT NO. 31
HARRIS COUNTY, TEXAS

FILED BY: CM	CHECKED BY: MJK	JOB NO. 51481
DRAWN BY: RK	DATE: 12/03/13	SHEET NO. 1 OF 1



Windrose Land Services, Inc

3200 Wilcrest, Suite 325

Houston, Texas 77042

Phone (713) 458-2281 Fax (713) 461-1151

Professional Development Consultants

Land Surveying, Platting, Project Management and GIS Services

**DESCRIPTION OF
16.8939 ACRES OR 735,897 SQUARE FEET**

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**DESCRIPTION OF
16.8939 ACRES OR 735,897 SQUARE FEET (CONTD.)**

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MIKE KURKOWSKI, RPLS #5101
DECEMBER 04, 2013
JOB #51481

SPECIAL WARRANTY DEED

THE STATE OF TEXAS §
 § KNOW ALL BY THESE PRESENTS
COUNTY OF HARRIS §

THAT **E & B, INC.**, a corporation organized and existing under the laws of the State of Texas ("Grantor"), for and in consideration of the sum of Ten Dollars (\$10.00) and other good and valuable consideration to Grantor in hand paid by **DENSIMIX HOLDING CORPORATION**, a corporation organized under the laws of the State of Delaware ("Grantee"), whose mailing address is 21 East 46th Street, 14th Floor, New York, NY 10036, the receipt and sufficiency of which considerations are hereby acknowledged and confessed, and upon and subject to the exceptions hereinafter set forth and described, has GRANTED, BARGAINED, SOLD and CONVEYED, and by these presents does hereby GRANT, BARGAIN, SELL, and CONVEY, unto Grantee the real property situated in Harris County, Texas described in Exhibit "A" attached hereto and made a part hereof by this reference (the "Land"), together all improvements situated thereon and all fixtures attached thereto (such Land, improvements, and fixtures are herein referred to collectively as the "Property"). 1EE

This conveyance is made subject and subordinate to (a) the matters disclosed on Exhibit "B" attached hereto, and (b) such matters, if any, as would be revealed by a true and correct on-the-ground survey of the Property ((a) and (b) herein referred to collectively, as the "Permitted Exceptions").

TO HAVE AND TO HOLD the Property, subject to the Permitted Exceptions as aforesaid, unto Grantee, and Grantee's successors and assigns, forever; and Grantor does hereby bind Grantor, and Grantor's successors and legal representatives, to WARRANT AND FOREVER DEFEND all and singular the Property unto Grantee, and Grantee's successors and assigns, against any person whomsoever lawfully claiming or to claim the same, or any part hereof, by, through or under Grantor, and not otherwise, subject to the Permitted Exceptions.

Grantor, for the same consideration and subject to the Permitted Exceptions, grants, sells, and conveys to Grantee, without any warranty, whether express or implied, all of Grantor's right, title and interest in and to, the strips and gores, if any, between the Property and any abutting or adjacent property, and any land lying in or under any public thoroughfare, opened or proposed, abutting or adjacent to the Property, together with, all and singular the rights, benefits, privileges, easements, tenements, hereditaments and appurtenances on the Property or in anywise appertaining thereto or in any way belonging, including, but not limited to, all rights to sanitary sewer wastewater capacity, water and storm drainage service, if any; to have and to hold it unto Grantee, and Grantee's successors and assigns, forever. All warranties that might arise by common law, by statute or otherwise, including, without limitation, the warranties set forth in Section 5.023 (as amended) of the Texas Property Code (or its successor), are expressly excluded as to the property and items conveyed by this paragraph.

ER 037 - 13 - 0832

This Deed is being executed and delivered by Grantor in connection with the Purchase Agreement of even date herewith between, *inter alia*, Grantor and Grantee. Grantor and Grantee acknowledge and agree that the representations, warranties, covenants, agreements, and indemnities contained in the Purchase Agreement with regards to the Property are not superseded hereby but remain in full force and effect to the full extent provided therein and are incorporated herein, and similarly, any disclaimers and limitations on any such representations, warranties, covenants, agreements, or indemnities contained in the Purchase Agreement with regards to the Property are not superseded but remain in full force and effect to the full extent provided therein and are incorporated herein. In the event of any conflict or inconsistency between the terms of the Purchase Agreement and the terms hereof, the terms of the Purchase Agreement will govern.

By acceptance of this Special Warranty Deed, Grantee assumes payment of all ad valorem property taxes and assessments on the Property for the current year and for all subsequent years.

REMAINDER INTENTIONALLY LEFT BLANK

ER 037 - 13 - 0833

IN WITNESS WHEREOF, this Special Warranty Deed has been executed by Grantor on the date of the acknowledgment set forth below, to be effective for all purposes as of the 31 day of August 2012.

E & B, INC., a Texas corporation

10R

By: [Signature]
Name: Steven J. Lindley
Title: President

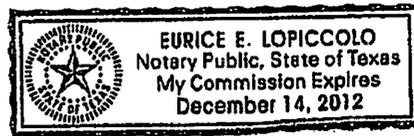
THE STATE OF TEXAS §
 §
 §
COUNTY OF HARRIS §

This instrument was acknowledged before me on the 28th day of August, 2012, by Steven J. Lindley, the President of E & B, INC., a Texas corporation, on behalf of and as the act and deed of said corporation.

[Signature]
Notary Public in and for the State of Texas

ONCE RECORDED RETURN TO:

Attn: _____



ER 037 - 13 - 0834

EXHIBIT "A"

LEGAL DESCRIPTION OF LAND

Tract 1:

FIELD NOTE DESCRIPTION OF 79558.58 SQUARE FEET OR 1.8264 ACRES OF LAND OUT OF AND PART OF A 89,469 ACRE TRACT IN THE HARRIS AND WILSON SURVEY, A-31, CITY OF HOUSTON, HARRIS COUNTY, TEXAS; SAID 1.8264 ACRES BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

D

BEGINNING, at a 1/2 inch Iron pipe set in concrete found at the Northwest corner of a 14.7465 acres (called 15 ac) conveyed from Parker Bros. & Company, Inc. to Tenn Tex Alloy and Chemical Corporation and recorded under Volume 2326, Page 132 of the Deed Records of Harris County, Texas;

THENCE, S 57° 34' 00" W, along the Northwesterly line of aforesaid 14.7465 acre tract, a distance of 501.92 feet to a 1/2 inch Iron rod set for a point for corner, on the Westerly line of aforesaid 89.469 acre tract;

THENCE, N 43° 22' 00" W, along the Westerly line of said 89.469 acre tract a distance of 167.69 feet to a point on the shoreline of Greens Bayou and the most Northwesterly corner of aforesaid 89.469 acre tract;

THENCE, following the meanders in the shoreline of Greens Bayou, the following courses and distances:

N 77° 06' 00" E, 47.44 feet;

N 63° 46' 00" E, 111.39 feet;

N 50° 50' 00" E, 152.86 feet;

N 43° 48' 00" E, 193.26 feet to the Northeasterly corner of the herein described tract;

THENCE, S 43° 22' 00" E, a distance of 204.38 feet to the POINT OF BEGINNING of the herein, described tract and containing as aforesaid 79558.58 square feet or 1.8264 acres of land.

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Tract 2:

All of that certain tract or parcel of land containing 15 acres, more ss, out of the Harris and Wilson Survey, Abstract No. 31, in Harris County, Texas, being more particularly described by metes and bounds as follows:

Beginning at a 3-inch iron pipe fence corner post on the Southwest line of the Parker Brothers & Co., Inc., tract, said point being located on the Northeast line of Industrial Road and said point being the Southeast corner of the tract of land described as the "Second Tract", containing 3.034 acres, in the deed from Lewis L. Middleton, Trustee, to Sheffield Steel Corporation of Texas, dated February 21, 1941, recorded in Volume 1191, Page 665 of the Deed Records of Harris County, Texas, which tract is also described the "Second Tract" in each of the Deeds dated February 11, 1941, to Lewis L. Middleton, Trustee, from Knox B. Howe, Individually and as Independent Executor of the Estate of J. Milton Howe, deceased, recorded in Volume 1197, at Page 46 of the Deed Records of Harris County, Texas, and from Birdsall P. Briscoe et al, recorded in Volume 1194, at Page 137 of the Deed Records of Harris County, Texas, to all of which deeds reference is here made for a description of the said 3.034-acre tract of land;

Thence North 43° 22' West along the Northeasterly line of above mentioned "Second Tract" at 761.94 feet a concrete monument and in all a total of 791.0 feet to the water's edge of Greens Bayou;

Thence in an Easterly direction along the water's edge of Greens Bayou with all of its meanders to a point in the water's edge of Greens Bayou, said point being North 43° 22' West a distance of 14.0 feet from a 3/4-inch galvanized iron pipe for corner;

Thence South 48° 22' East a distance of 200.00 feet to a 3/4-inch galvanized iron pipe for corner;

Thence North 51° 34' East a distance of 502.57 feet to a 3/4-inch galvanized iron pipe for corner;

Thence South 43° 22' East a distance of 730.87 feet to a 3/4-inch galvanized iron pipe for corner;

Thence South 45° 26' 30" West a distance of 730.87 feet to a 3/4-inch galvanized iron pipe for corner on the Northeast line of Industrial Road, the same being a point on a corner;

Thence around said curve to the left, whose radius is 2909.56 feet, a distance of 444.54 feet to the place of beginning, and containing 15.0 acres of land, more or less, and being the same tract of land conveyed to Tenn-Tex Alloy & Chemical Corporation by deed from Parker Brothers & Co., Inc. dated August 15, 1961, recorded in Volume 2326, at Page 132 of the Deed Records of Harris County, Texas.

Tract 3:

All that certain tract or parcel of land, containing 6760 square feet, more or less, out of the Harris and Wilson Survey, Abstract No. 31 in Harris County, Texas, and being a part of that certain 40-acre tract conveyed to W. R. Parker by H. L. Nicholson, Administrator De Bonis Non of the Estate of R. E. Brooks, recorded in Volume 1211, Page 5 of the Deed Records of Harris County, Texas, being more particularly described by metes and bounds as follows:

Beginning at a point for reference, a 3/4-inch galvanized iron pipe on the Northeast line of Industrial Road at the most Southerly corner of a 15-acre tract conveyed by deed dated August 15, 1951, from Parker Brothers and Company, Inc. to Tenn-Tex Alloy and Chemical Corporation recorded in Volume 2326, at Page 132 of the Deed Records of Harris County, Texas, said point also being the Northwesterly corner of said 40-acre tract;

Thence North 45° 26' 30" East along the Southeasterly line of said 15-acre tract, and the Northwesterly line of said 40-acre tract a distance of 264.62 feet to a point the Place of Beginning of the tract herein de- scribed, being at the intersection of the said South-easterly line of said 15-acre tract and the North terminus of the Easterly line of the railroad easement described as paragraph (3) in said deed from Parker Brothers & Co., Inc. to Tenn-Tex Alloy & Chemical Corporation;

Thence continuing North 45° 26' 30" East along said Southeasterly line of said 15-acre tract a distance of 165.04 feet to a point for corner;

Thence South 28° 34' 31" West a distance of 46.85 feet to the beginning of a curve to the left whose radius is 291.64 feet and whose internal angle is 330 01' 10" for a distance of 168.07 feet to the end of said curve;

Thence South 4° 26' 39" East a distance of 20.56 feet to a point in the Easterly line of the above mentioned railroad easement;

Thence North 29° 56' West a distance of 124.51 feet to the Place of Beginning, being the tract and parcel of land conveyed to Tenn-Tex Alloy & Chemical Corporation by Parker Brothers & Co., Inc., by deed dated February 27, 1956, recorded in Volume 3114, at Page 594 of the Deed Records of Harris County, Texas.

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EXHIBIT "B"

PERMITTED EXCEPTIONS

1. Unlocated right-of-way for pipelines granted to Houston Pipe Line Company by instrument dated May 21, 1936, recorded in Volume 1015, Page 586 of the Deed Records of Harris County, Texas. (Tracts 1 and 2)
2. Unlocated right-of-way and easement for pipeline and forty (40) inch by forty (40) inch valve box, granted to Houston Pipe Line Company by instrument dated October 10, 1941, recorded in Volume 1228, Page 82 of the Deed Records of Harris County, Texas (All Tracts)
3. Easements, rights-of-way and rights granted and conveyed by Parker Brothers & Co., Inc. to Tenn-Tex Alloy & Chemical Corporation by Deed dated August 15, 1951, recorded in Volume 2326, Page 132 of the Deed Records of Harris County, Texas. As released by Parker Brothers & Company, Inc. to E & B, Inc. by instrument filed for record under Harris County Clerk's File No. P436926. (Tracts 2 and 3)
4. Two easements, both dated August 7, 1952, executed by Armco Steel Corporation in favor of Houston Lighting and Power Company, as evidenced by instrument filed for record under Harris County Clerk's File No. G724836. (Tract 2 and 3)
5. Easement over the Northwesterly twenty (20) feet as reserved in the deed from Parker Brothers & Co., Inc. to Tenn-Tex Alloy & Chemical Corporation, dated February 27, 1956, recorded in Volume 3114, Page 594 of the Deed Records of Harris County, Texas. (Tract 3)
6. Easement granted to Houston Lighting and Power Company, being ten (10) feet in width and 77.53 feet in length, together with an unobstructed aerial easement adjoining thereto, five (5) feet in width from a plant twenty (20) feet above the ground upwards, located on both sides of and adjoining said ten (10) feet wide easement, as set forth and described in instrument filed for record under Harris County Clerk's File No. H238792, the centerline of said easement being shown by a dot-dash symbol on Sketch No. 81-065 attached thereto. (Tracts 2 and 3)
7. Easement granted to Houston Lighting and Power Company being ten (10) feet in width and 220.0 feet in length, together with an unobstructed aerial easement adjoining thereto ten (10) feet in width from a plane sixteen (16) feet above the ground upward, located on both sides of and adjoining said ten (10) feet wide easement as set forth in instrument filed for record under Harris County Clerk's File

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No. P012105, the centerline of which is shown by a dot-dash symbol on Sketch No. 92-523 attached thereto. (All Tracts)

8. Interest in and to all coal, lignite, oil, gas and other minerals, and all rights incident thereto, contained in instrument dated May 10, 1941, recorded at Volume 1210, Page 30 of the Deed Records of Harris County, Texas of the Official Records of Harris County, Texas. (All Tracts)
9. Any obligations imposed upon Tennessee Products & Chemical Corporation by reason of Agreement dated September 1, 1951, by and among Harris County Houston Ship Channel Navigation District, Port Terminal Railroad Association, Parker Brothers & Co., Inc. and Tenn-Tex Alloy & Chemical Corporation, including any obligations of Tennessee Products & Chemical Corporation arising under Agreement dated April 7, 1942, by and among Harris County Houston Ship Channel Navigation District, Port Terminal Railroad Association and Parker Brothers & Co., Inc., as evidenced by instrument filed for record under Harris County Clerk's File No. G724836. (Tract 2 and 3)
11. Any and all rights, titles, interests, or claims which the owner might have or could assert in and to that portion of Industrial Road which is contiguous to the subject property and that portion of Greens Bayou which is contiguous to the subject property, as evidenced by instrument filed for record under Harris County Clerk's File No. G724836. (Tract 2)
12. Terms, conditions and stipulations contained in that certain Boundary Line Agreement and Consent to Encroach by and between E & B, Inc. and The Womble Company, dated January 27, 2001, as set forth in instrument filed for record under Harris County Clerk's File No. W277367 (All Tracts)

Return to
CHARTER TITLE COMPANY
11 GREENWAY PLAZA
SUMMIT TOWER, SUITE 120
HOUSTON, TEXAS 77046

SPECIAL WARRANTY DEED

THE STATE OF TEXAS
COUNTY OF HARRIS

§
§
§

KNOW ALL BY THESE PRESENTS

THAT E & B, INC., a corporation organized and existing under the laws of the State of Texas ("Grantor"), for and in consideration of the sum of Ten Dollars (\$10.00) and other good and valuable consideration to Grantor in hand paid by DENSIMIX HOLDING CORPORATION, a corporation organized under the laws of the State of Delaware ("Grantee"), whose mailing address is 21 East 46th Street, 14th Floor, New York, NY 10036, the receipt and sufficiency of which considerations are hereby acknowledged and confessed, and upon and subject to the exceptions hereinafter set forth and described, has GRANTED, BARGAINED, SOLD and CONVEYED, and by these presents does hereby GRANT, BARGAIN, SELL, and CONVEY, unto Grantee the real property situated in Harris County, Texas described in Exhibit "A" attached hereto and made a part hereof by this reference (the "Land"), together all improvements situated thereon and all fixtures attached thereto (such Land, improvements, and fixtures are herein referred to collectively as the "Property").

This conveyance is made subject and subordinate to (a) the matters disclosed on Exhibit "B" attached hereto, and (b) such matters, if any, as would be revealed by a true and correct on-the-ground survey of the Property ((a) and (b) herein referred to collectively, as the "Permitted Exceptions").

TO HAVE AND TO HOLD the Property, subject to the Permitted Exceptions as aforesaid, unto Grantee, and Grantee's successors and assigns, forever; and Grantor does hereby bind Grantor, and Grantor's successors and legal representatives, to WARRANT AND FOREVER DEFEND all and singular the Property unto Grantee, and Grantee's successors and assigns, against any person whomsoever lawfully claiming or to claim the same, or any part hereof, by, through or under Grantor, and not otherwise, subject to the Permitted Exceptions.

Grantor, for the same consideration and subject to the Permitted Exceptions, grants, sells, and conveys to Grantee, without any warranty, whether express or implied, all of Grantor's right, title and interest in and to, the strips and gores, if any, between the Property and any abutting or adjacent property, and any land lying in or under any public thoroughfare, opened or proposed, abutting or adjacent to the Property, together with, all and singular the rights, benefits, privileges, easements, tenements, hereditaments and appurtenances on the Property or in anywise appertaining thereto or in any way belonging, including, but not limited to, all rights to sanitary sewer wastewater capacity, water and storm drainage service, if any; to have and to hold it unto Grantee, and Grantee's successors and assigns, forever. All warranties that might arise by common law, by statute or otherwise, including, without limitation, the warranties set forth in Section 5.023 (as amended) of the Texas Property Code (or its successor), are expressly excluded as to the property and items conveyed by this paragraph.

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ER 037 - 13 - 0841

20120407300
Pages 9
09/05/2012 12:06:15 PM
e-Filed & e-Recorded in the
Official Public Records of
HARRIS COUNTY
STAN STANART
COUNTY CLERK
Fees 44.00

RECORDERS MEMORANDUM
This instrument was received and recorded electronically
and any blackouts, additions or changes were present
at the time the instrument was filed and recorded.

Any provision herein which restricts the sale, rental, or
use of the described real property because of color or
race is invalid and unenforceable under federal law.
THE STATE OF TEXAS
COUNTY OF HARRIS
I hereby certify that this instrument was FILED in
File Number Sequence on the date and at the time stamped
hereon by me; and was duly RECORDED in the Official
Public Records of Real Property of Harris County, Texas.



Sta Stanart
COUNTY CLERK
HARRIS COUNTY TEXAS

ER 037 - 13 - 0842

20120462106
Pages 11
10/04/2012 11:38:40 AM
e-Filed & e-Recorded in the
Official Public Records of
HARRIS COUNTY
STAN STANART
COUNTY CLERK
Fees 52.00

RECORDERS MEMORANDUM

This instrument was received and recorded electronically and any blackouts, additions or changes were present at the time the instrument was filed and recorded.

Any provision herein which restricts the sale, rental, or use of the described real property because of color or race is invalid and unenforceable under federal law.
THE STATE OF TEXAS
COUNTY OF HARRIS

I hereby certify that this instrument was FILED in File Number Sequence on the date and at the time stamped hereon by me; and was duly RECORDED in the Official Public Records of Real Property of Harris County, Texas.



Stan Stanart
COUNTY CLERK
HARRIS COUNTY, TEXAS

Appendix B

MUNICIPAL SETTING DESIGNATION APPLICATION

13501 INDUSTRIAL ROAD HOUSTON, TEXAS

PROPERTY USE INFORMATION

The Designated Property consists of one property located at 13501 Industrial Road comprising 16.8939 acres. The Designated Property is comprised of three contiguous tracts; TRS 2, 2A, & 15A, ABST 31 Harris & Wilson. The Designated Property is currently a developed industrial facility operated by DHC. DHC currently manufactures and markets iron oxide for drilling mud, glass, coatings and other purposes at the Designated Property. The future use of the Designated Property is anticipated to remain heavy industrial.

The Designated Property is approximately 800 feet by 925 feet with the Industrial Road right-of-way bordering to the west/southwest and Greens Bayou bordering to the north and northwest. The Womble Company, Inc. borders the Designated Property to the northeast and east. The historic Brown and Root Greens Bayou facility is southeast of the Designated Property.

The entity with the power to restrict the use of groundwater is DHC, owner of the parcel since August 2012.

DHC is not aware of future changes to the use of the surrounding properties that would include the use of the GWBU.

Appendix C

MUNICIPAL SETTING DESIGNATION APPLICATION

13501 INDUSTRIAL ROAD HOUSTON, TEXAS

SITE MAPS

Twenty-four maps are attached in this section depicting relevant Designated Property information.

The Designated Property is located at 13501 Industrial Road in Houston, Texas, as presented on **Figure 1**. There are currently six buildings including an office and industrial buildings on the Designated Property.

Figure 2 depicts the area topography, which is generally level, sloping to the southeast, away from Greens Bayou.

Figure 3 is a Federal Emergency Management Agency (FEMA) flood map showing that the Designated Property is primarily in Flood Zone X, which implies, “areas determined to be outside the 0.2% annual chance floodplain.” A small portion of the Designated Property located along the southern boundary is located in the FEMA Flood Zone AE, which implies, “areas subject to a 1% or greater annual chance of flooding in any given year.”

Figure 4 presents the Designated Property layout, property boundaries, and the locations of all sampling locations that were investigated on behalf of the DHC.

Initial analyses of groundwater from the Designated Property included testing for Resource Conservation and Recovery Act (RCRA) 8 metals and manganese. Seven permanent groundwater monitoring wells were installed at the Designated Property to horizontally delineate elevated concentrations of metals at the Designated Property. Groundwater sampling has been conducted on a quarterly basis at the Designated Property to monitor metal concentrations in the groundwater. Initial results indicate elevated concentrations of arsenic, manganese, and selenium in exceedance of the TCEQ TRRP residential ingestion PCLs in the groundwater.

In the groundwater sampling event conducted on May 31, 2013, arsenic was identified as exceeding the TRRP residential ingestion PCL in monitoring wells MW-01, MW-02, MW-03, MW-04, and MW-05. Samples collected from monitoring wells MW-06 and MW-07 indicated concentrations of arsenic below the TRRP residential ingestion PCL, delineating the arsenic concentrations to the west and to the south, respectively. Manganese was also identified as exceeding the TRRP residential ingestion PCL in only monitoring well MW-03. Selenium was identified exceeding the TRPP residential ingestion PCL in monitoring wells MW-02, MW-03, MW-04, and MW-05.

Appendix C

In the most recent groundwater sampling event conducted on August 26, 2013, arsenic was identified as exceeding the TRRP residential ingestion PCL in monitoring wells MW-01 and MW-04. Samples collected from monitoring wells MW-02, MW-03, MW-05, MW-06 and MW-07 indicated concentrations of arsenic below the TRRP residential ingestion PCL. Manganese and selenium were not identified as exceeding the TRRP residential ingestion PCL in any of the groundwater samples collected from the monitoring wells.

Information obtained from a public records search of Womble Company, Inc. (northeast and east adjacent property) identified higher concentrations of arsenic in the groundwater on that site, which are delineated with monitoring wells below the PCL to the east and south. Therefore, the impacted groundwater at the Designated Property is fully delineated.

The seven permanent on-Site groundwater monitoring wells were used to determine groundwater elevations, gradient and approximate flow direction. The groundwater gradient is depicted on **Figure 5**, indicating groundwater flow to the northwest.

Figures 6, 7 and 8 depict the groundwater PCL exceedance (PCLE) zones for arsenic, manganese, and selenium, respectively, on the Designated Property.

In addition to the groundwater assessment, 21 soil borings were advanced on the Designated Property. Soil samples were submitted for analysis of priority pollutant metals, barium, and manganese. The following COCs were identified in soil samples collected at the Designated Property at concentrations above the applicable TCEQ TRRP Tier 1 ingestion PCL: antimony, arsenic, barium, beryllium, cadmium, lead, manganese, mercury, nickel, selenium, silver, and zinc. Impacted soils for the aforementioned COCs are fully delineated. **Figures 9 through 20** provide the respective soil PCL exceedance zone for each of the aforementioned COCs at the Designated Property.

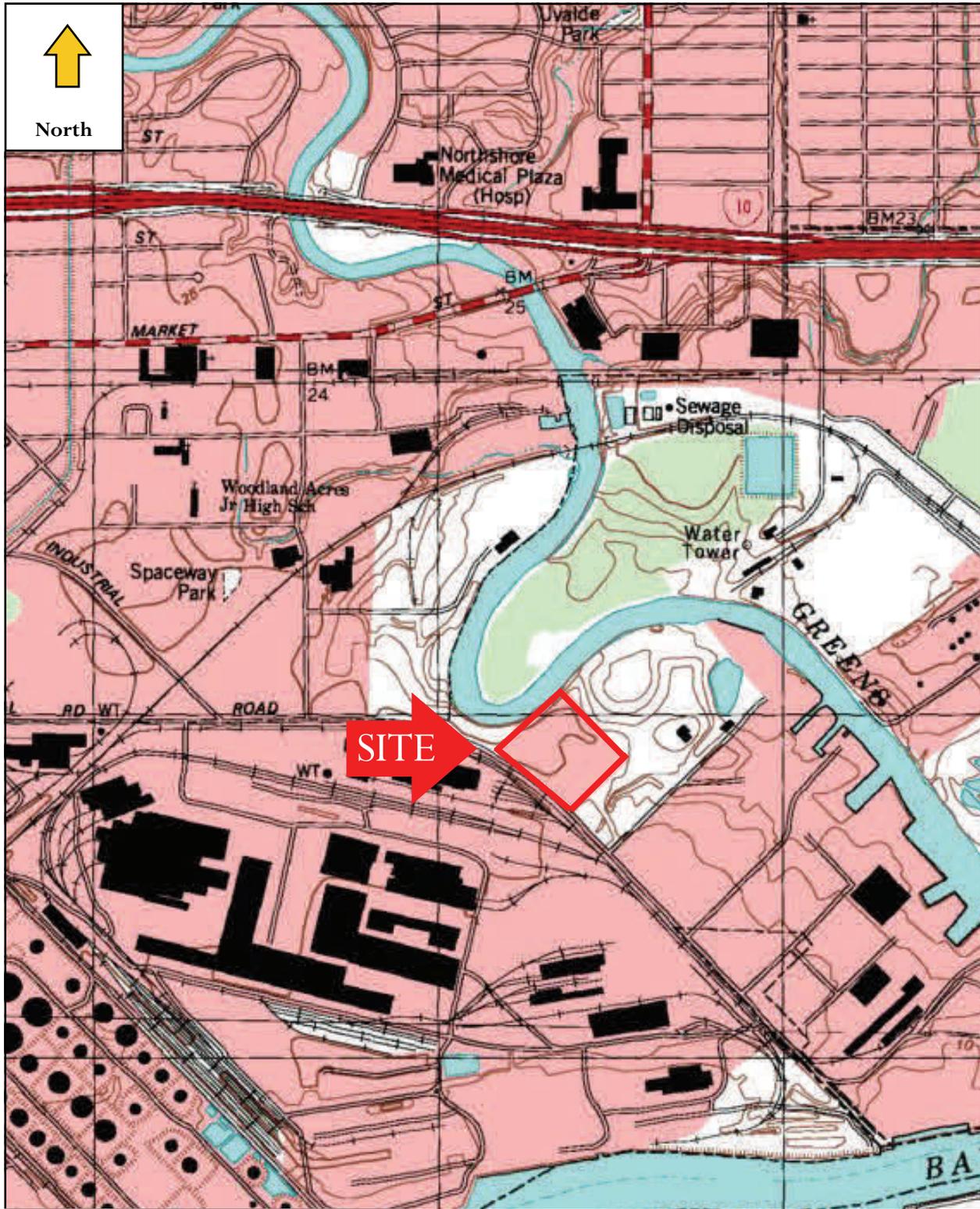
A total of 17 sludge samples were collected from historic sludge settling ponds in the northeast portion of the Designated Property. Sludge samples were submitted for analysis of arsenic, cadmium, chromium, manganese, and selenium using the SPLP. The following COCs were identified in the sludge samples at concentrations above their respective leachable ingestion PCLs: arsenic, cadmium, manganese, and selenium. **Figures 21 through 24** provide the boundaries of the areas of the aforementioned COCs on the Designated Property.



Image from City of Houston GIMS
1" = 600'



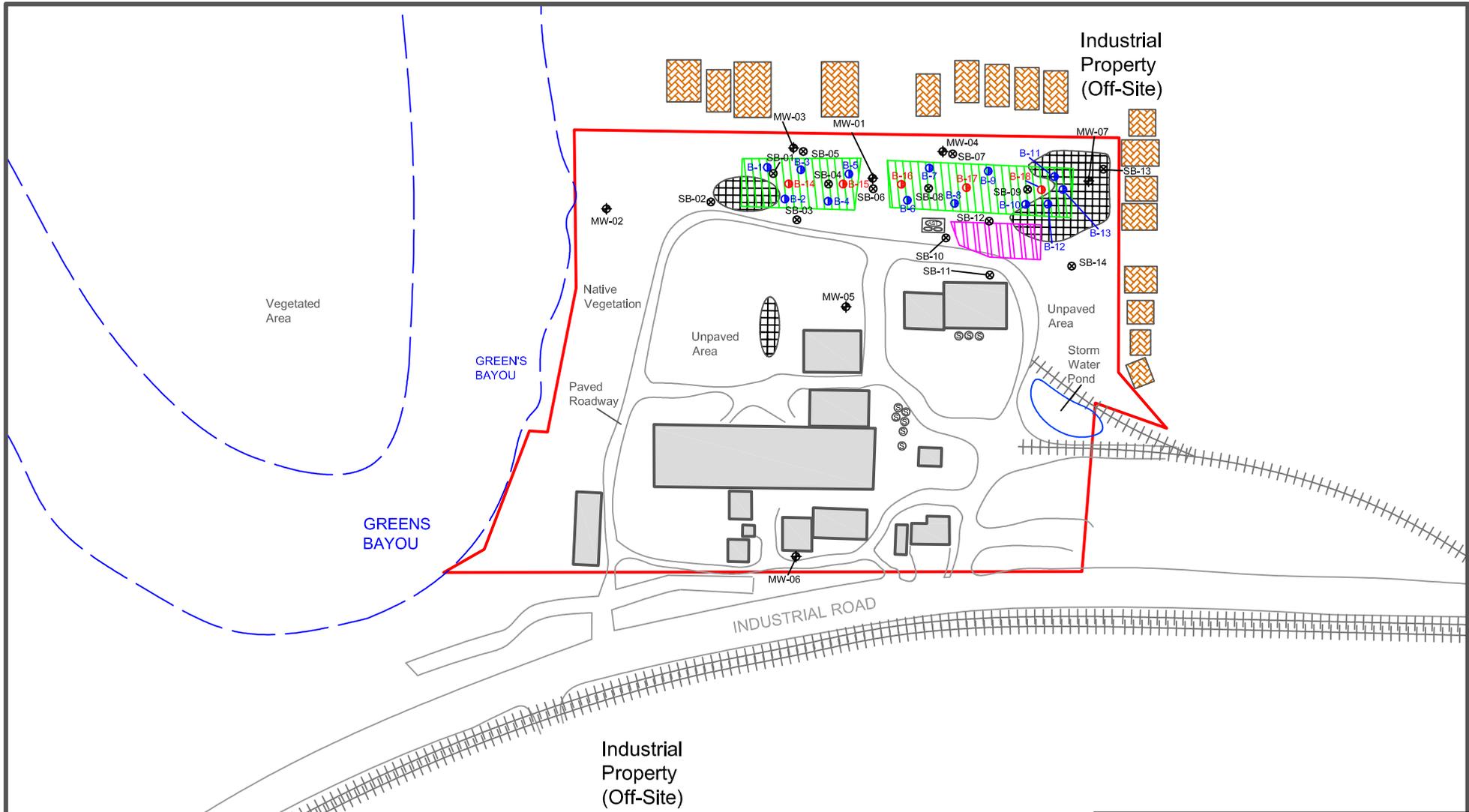
Figure 1
Site Location
13501 Industrial Road
Houston, Texas



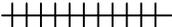
Map Notes:
 Topo Map Source: Jacinto City
 Map Source Year: 2000
 Approximate Scale: 1 : 24,000



Figure 2
 Topographic Map
 13501 Industrial Road
 Houston, Texas



LEGEND

-  Approximate Site Boundary
-  Water's Edge
-  Railway
-  Building Footprint
-  Proposed Monitor Well (MW)

-  Excavation Pile
-  Approximate Location of Historic Overflow Area
-  Approximate Location of Historic Sludge Pits
-  Silo
-  Soil Boring (SB)
-  SPLP Boring (B)
-  Soil Boring (B)
-  ASTs in Secondary Containment

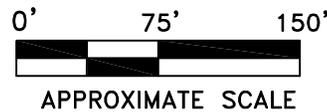
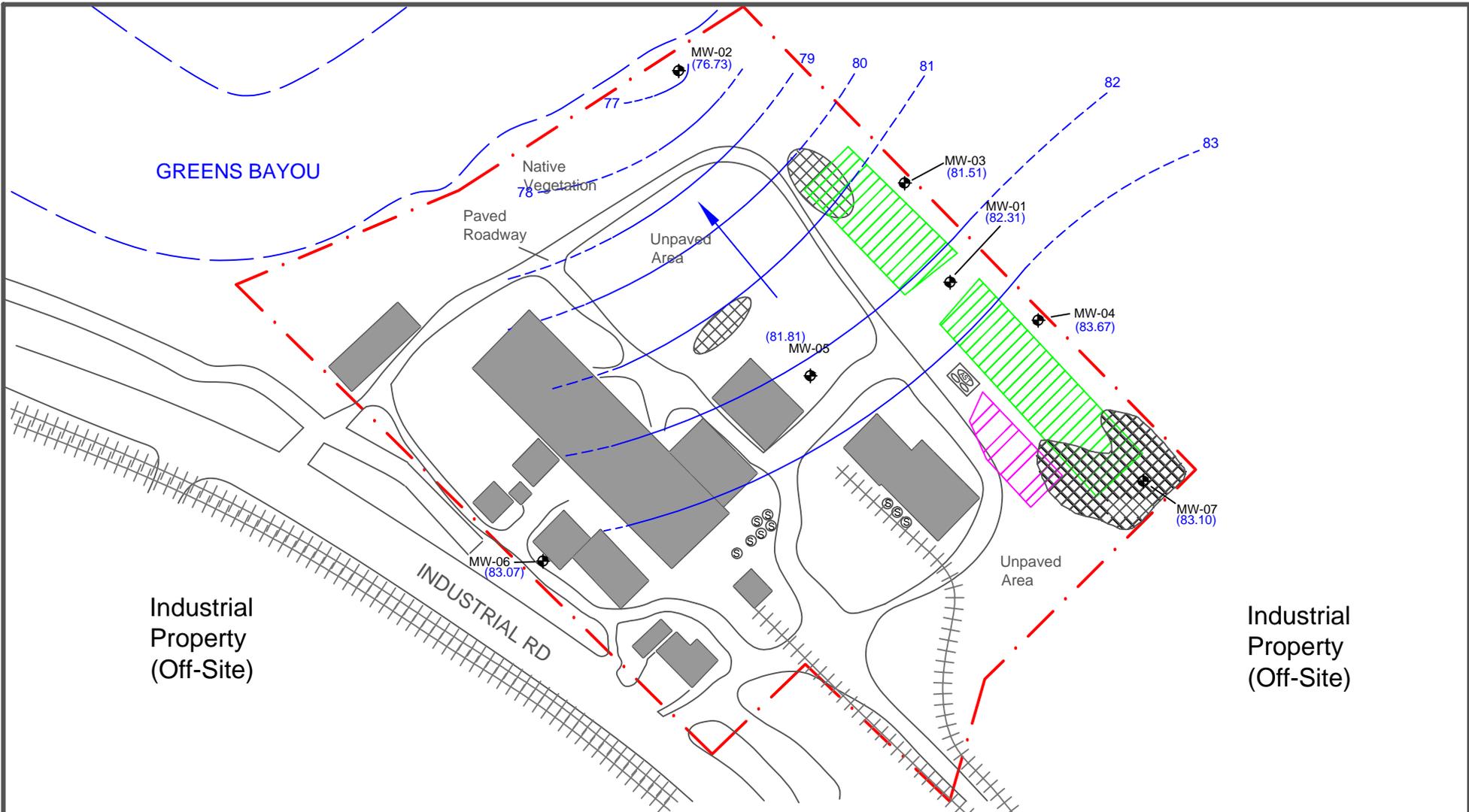


Figure 4
Site Layout
 13501 Industrial Road
 Houston, Harris County, Texas





LEGEND

- Approximate Site Boundary
- Water's Edge
- Railway
- Groundwater Contour Line
- Groundwater Flow Direction
- Building Footprint

- Excavation Pile
- Approximate Location of Historic Sludge Pits
- Approximate Location of Historic Overflow Area
- Silo
- ASTs in Secondary Containment
- Monitoring Well (MW)
- (81.69) Groundwater Elevation (ft.)

Note: Groundwater elevation is referenced to an arbitrary datum of 100 ft. located at MW-05.

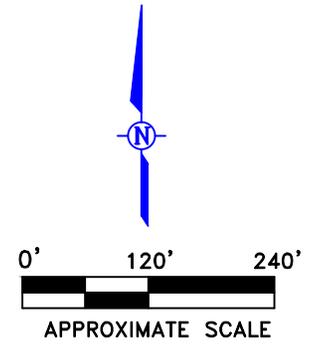
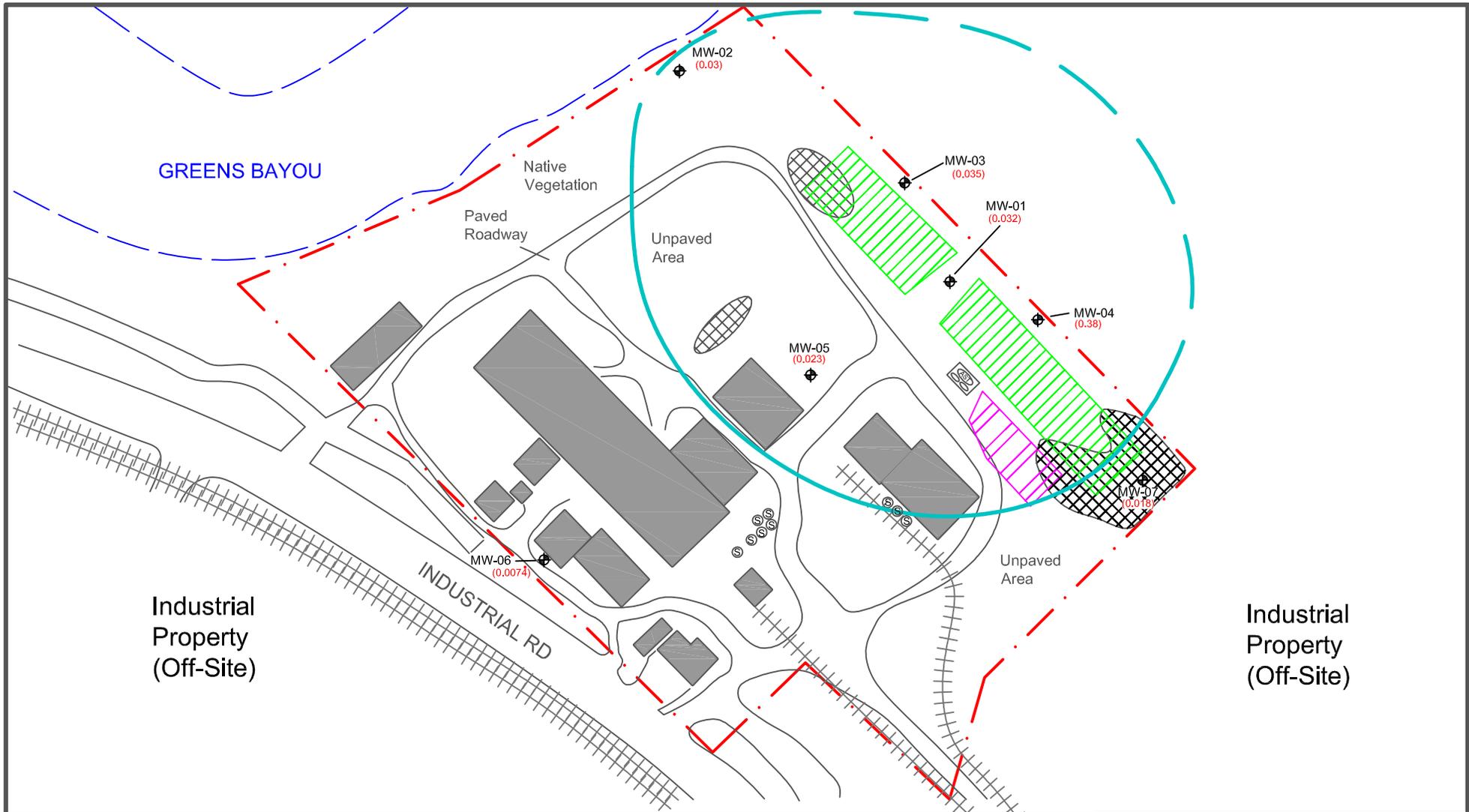
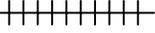


Figure 5
Groundwater Gradient
Map - 5/31/2013
 13501 Industrial Road
 Houston, Harris County, Texas





LEGEND

-  Approximate Site Boundary
-  Water's Edge
-  Railway
-  Building Footprint
-  ASTs in Secondary Containment
-  Silo

-  Excavation Pile
-  Approximate Location of Historic Sludge Pits
-  Approximate Location of Historic Overflow Area
-  (0.010) Arsenic concentration in mg/L
-  Monitoring Well (MW)
-  Arsenic PCLE Zone; cPCL=0.01 mg/L

Note: The Critical PCL reflects ^{GW}GW_{ing} 0.5-acre residential land use

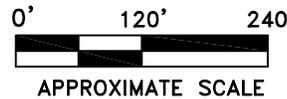
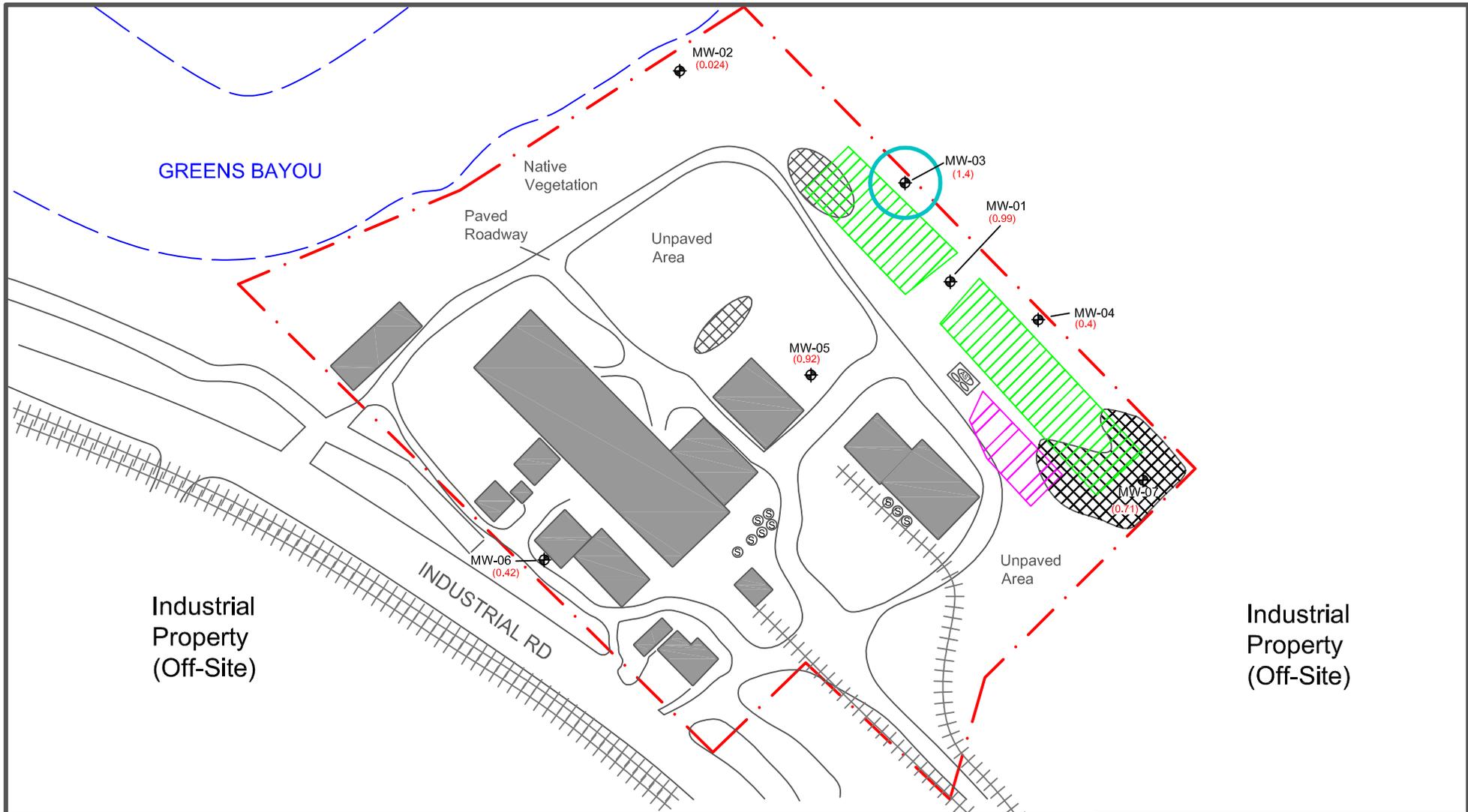


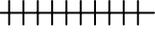
Figure 6
GW PCLE Zone - Arsenic
 13501 Industrial Road
 Houston, Harris County, Texas



www.wh-m.com



LEGEND

-  Approximate Site Boundary
-  Water's Edge
-  Railway
-  Building Footprint
-  ASTs in Secondary Containment
-  Silo
-  Excavation Pile
-  Approximate Location of Historic Sludge Pits
-  Approximate Location of Historic Overflow Area
-  Monitoring Well (MW)
-  Manganese PCLE Zone; cPCL=1.1 mg/L

Note: The Critical PCL reflects ^{GW}GW_{ing} 0.5-acre residential land use

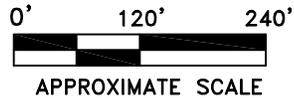
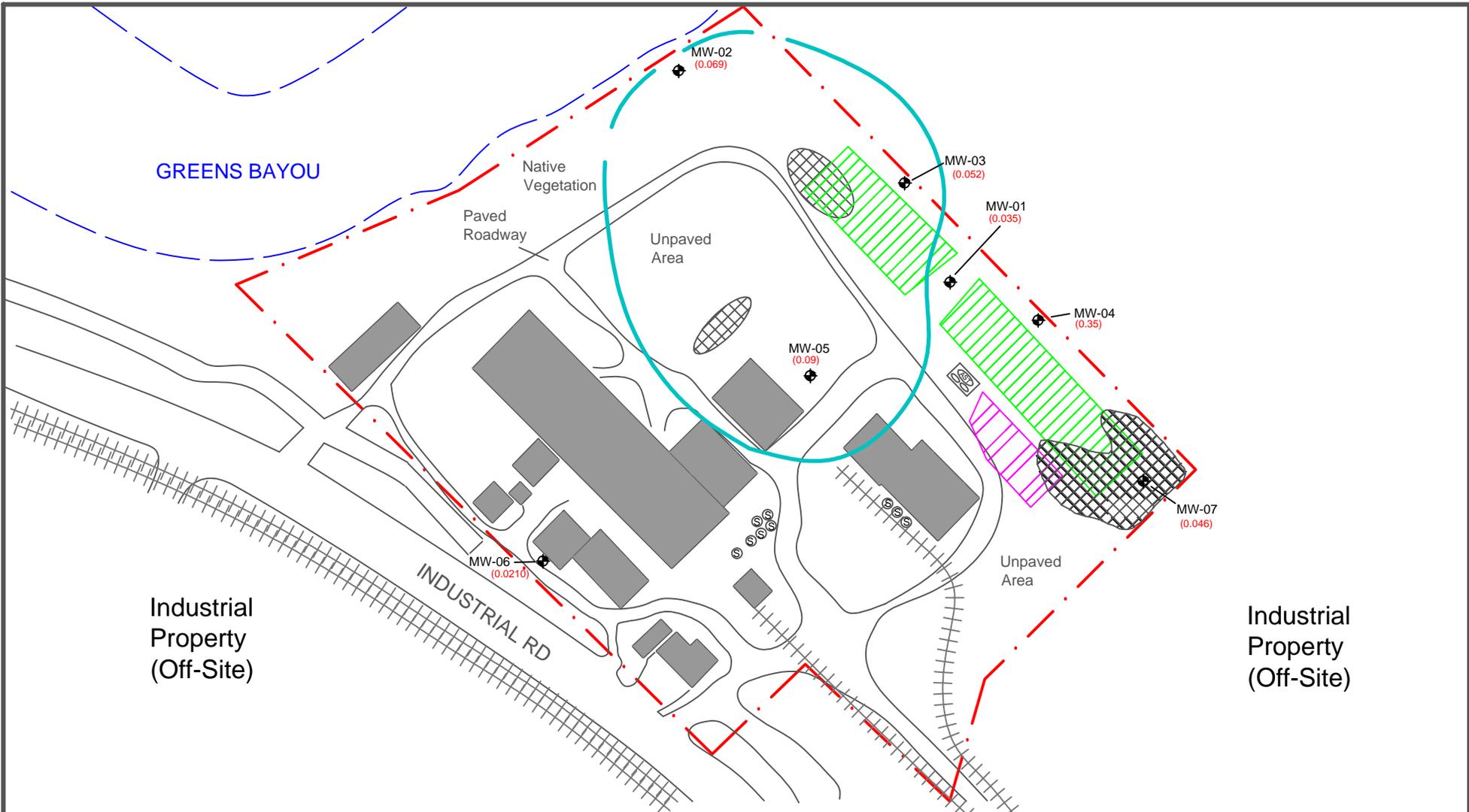
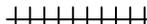


Figure 7
GW PCLE Zone - Manganese
 13501 Industrial Road
 Houston, Harris County, Texas





LEGEND

-  Approximate Site Boundary
 -  Water's Edge
 -  Railway
 -  Building Footprint
 -  ASTs in Secondary Containment
 -  Silo
 -  Excavation Pile
 -  Approximate Location of Historic Sludge Pits
 -  Approximate Location of Historic Overflow Area
 -  (0.010) Concentration of Selenium in mg/L
 -  Monitoring Well (MW)
 -  Selenium PCLE Zone; cPCL=0.05 mg/L
- Note: The Critical PCL reflects $^{GW}_{Ing}$ 0.5-acre residential land use

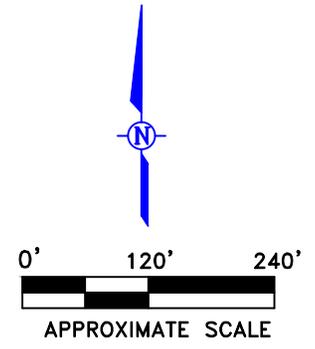
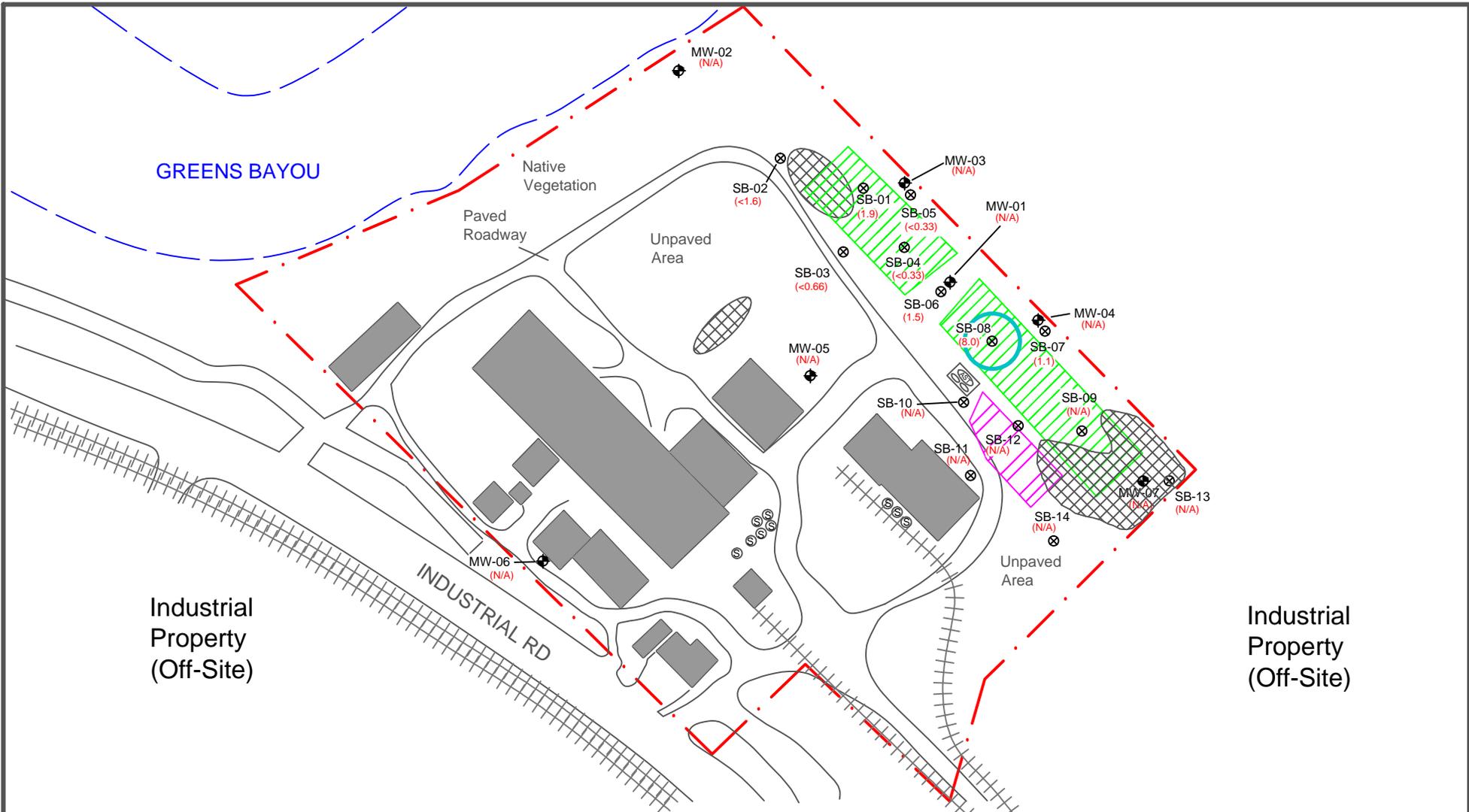


Figure 8
GW PCLE Zone - Selenium
 13501 Industrial Road
 Houston, Harris County, Texas





LEGEND

- Approximate Site Boundary
- Water's Edge
- Railway
- Building Footprint
- ASTs in Secondary Containment
- Silo

Note: The Critical PCL is the lower of the Tier 1 Residential Use Total Soil Combined and Soil to Groundwater Ingestion pathways and the greater of that pathway as compared to the Texas Specific Background value.

- Excavation Pile
- Approximate Location of Historic Sludge Pits
- Approximate Location of Historic Overflow Area
- Monitoring Well (MW)
- Concentration of Antimony, mg/kg; N/A=Not Analyzed
- Soil Boring (SB)
- Antimony PCLE Zone; cPCL=2.7 mg/kg

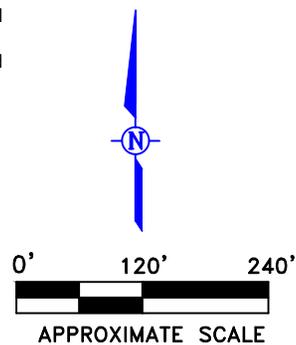
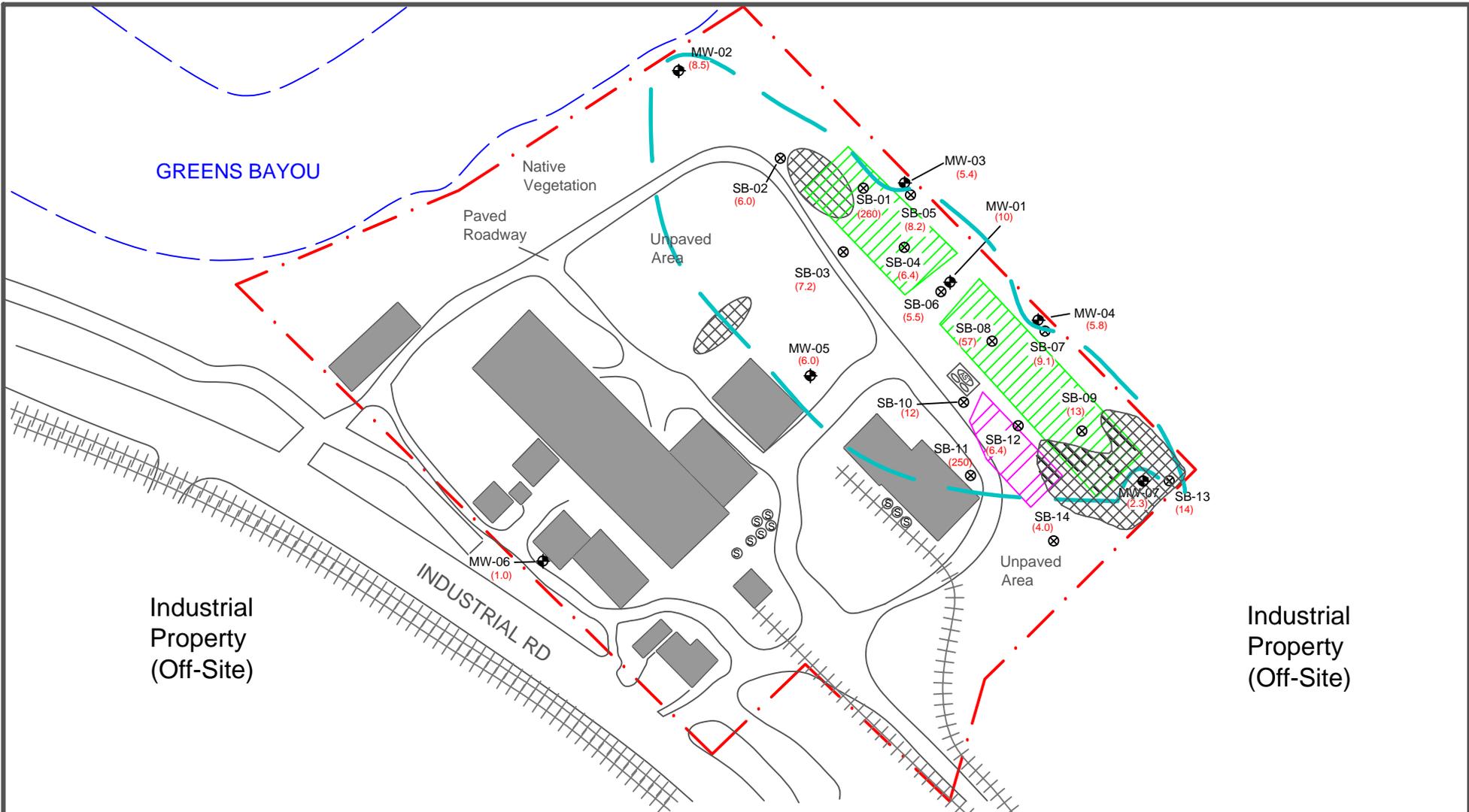


Figure 9
Soil PCLE Zone - Antimony
 13501 Industrial Road
 Houston, Harris County, Texas





GREENS BAYOU

Native Vegetation

Paved Roadway

Unpaved Area

Industrial Property (Off-Site)

INDUSTRIAL RD

Industrial Property (Off-Site)

LEGEND

- Approximate Site Boundary
- Water's Edge
- Railway
- Building Footprint
- ASTs in Secondary Containment
- Silo

- Note: The Critical PCL is the lower of the Tier 1 Residential Use Total Soil Combined and Soil to Groundwater Ingestion pathways and the greater of that pathway as compared to the Texas Specific Background value.
- Excavation Pile
 - Approximate Location of Historic Sludge Pits
 - Approximate Location of Historic Overflow Area
 - Monitoring Well (MW)
 - Concentration of Arsenic, mg/kg; N/A=Not Analyzed
 - Soil Boring (SB)
 - Arsenic PCLE Zone; cPCL=5.9 mg/kg

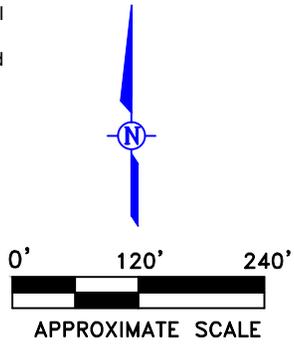
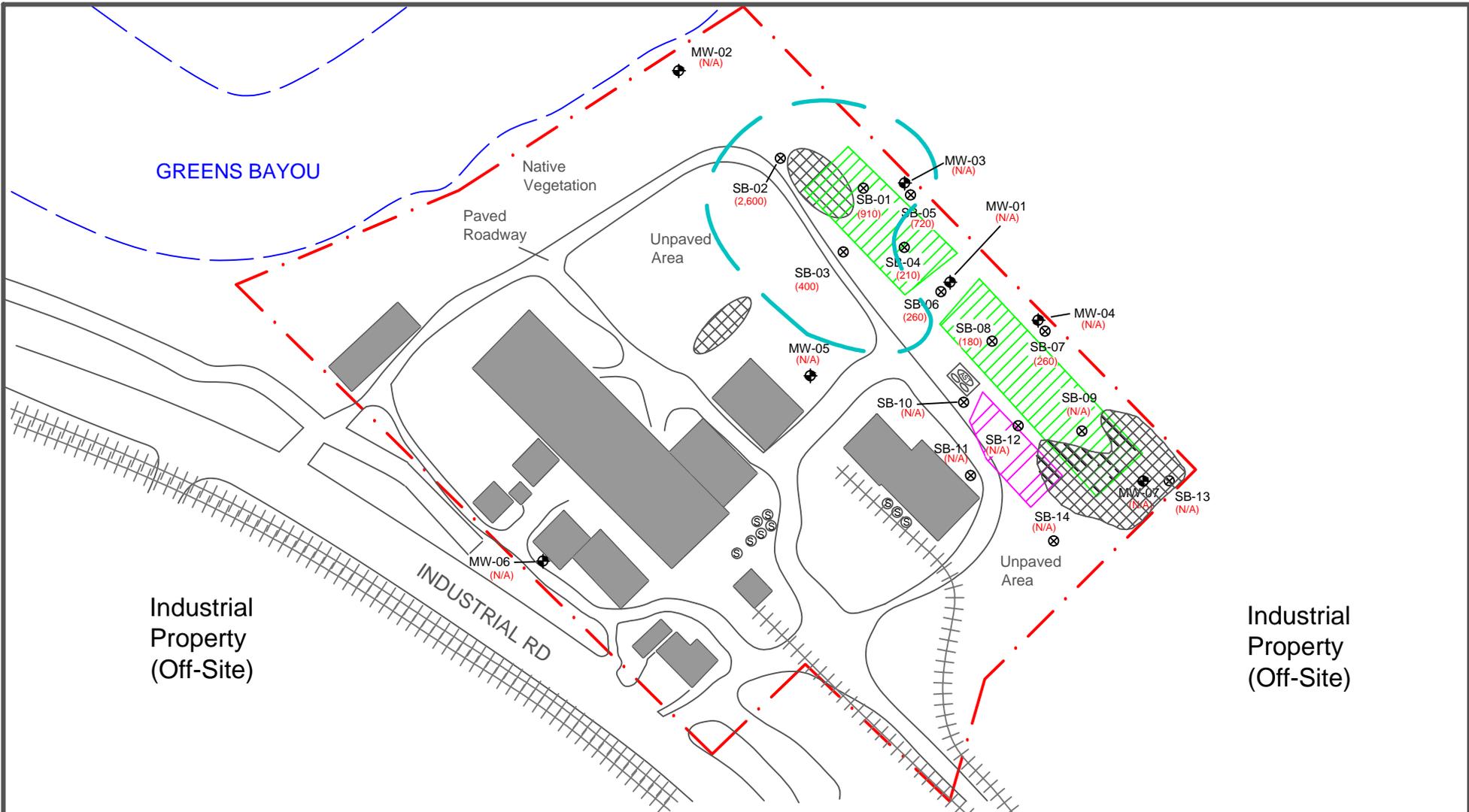


Figure 10
Soil PCLE Zone - Arsenic
 13501 Industrial Road
 Houston, Harris County, Texas





LEGEND

- Approximate Site Boundary
- Water's Edge
- Railway
- Building Footprint
- ASTs in Secondary Containment
- Silo

Note: The Critical PCL is the lower of the Tier 1 Residential Use Total Soil Combined and Soil to Groundwater Ingestion pathways and the greater of that pathway as compared to the Texas Specific Background value.

- Approximate Location of Historic Sludge Pits
- Approximate Location of Historic Overflow Area
- Concentration of Barium, mg/kg; N/A=Not Analyzed
- Monitoring Well (MW)
- Soil Boring (SB)
- Barium PCLE Zone; cPCL=300 mg/kg

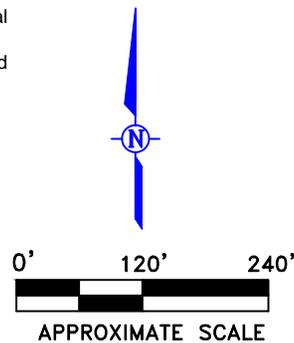
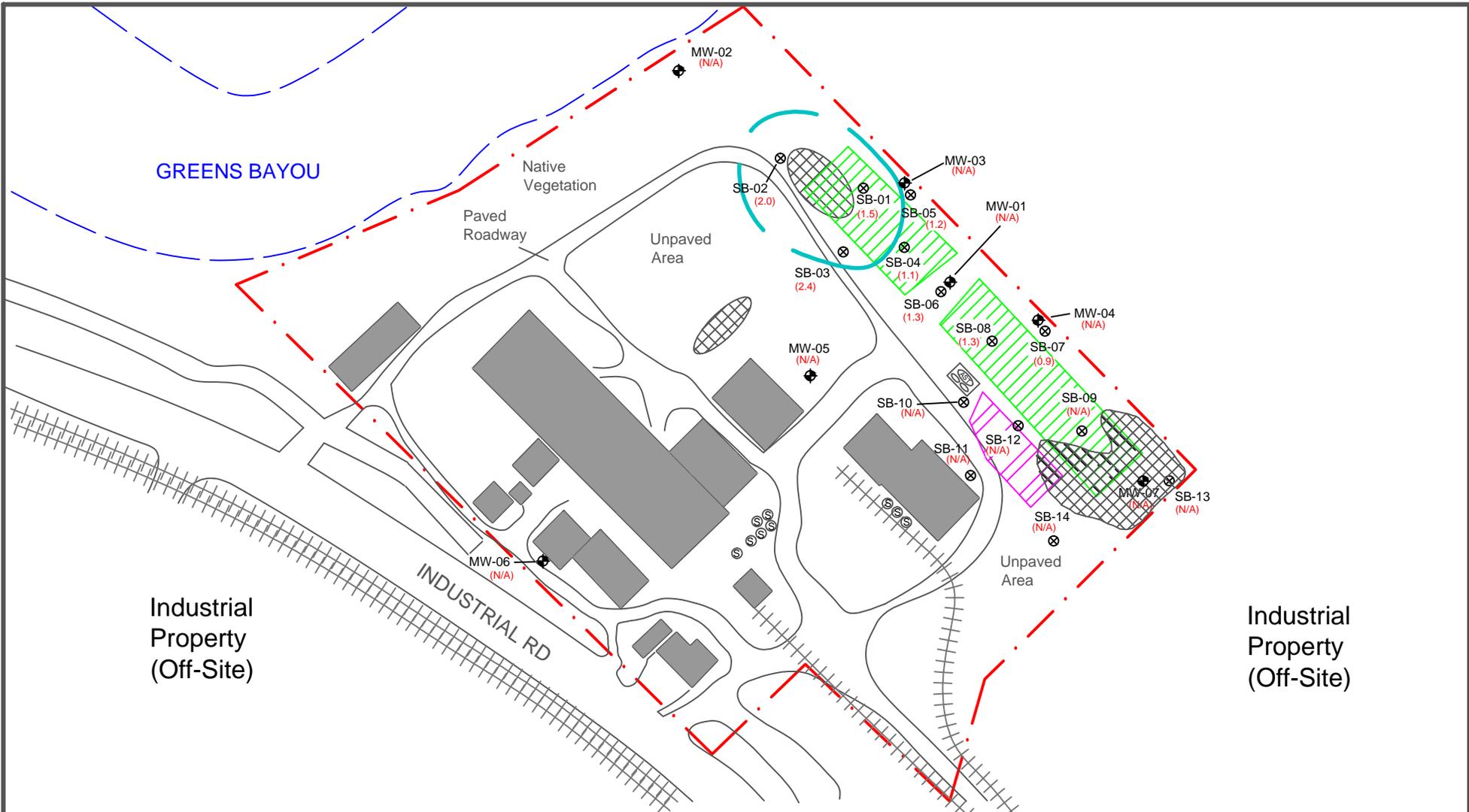


Figure 11
Soil PCLE Zone - Barium
 13501 Industrial Road
 Houston, Harris County, Texas





Industrial Property (Off-Site)

Industrial Property (Off-Site)

LEGEND

- Approximate Site Boundary
- Water's Edge
- Railway
- Building Footprint
- ASTs in Secondary Containment
- Silo

Note: The Critical PCL is the lower of the Tier 1 Residential Use Total Soil Combined and Soil to Groundwater Ingestion pathways and the greater of that pathway as compared to the Texas Specific Background value.

- Excavation Pile
- Approximate Location of Historic Sludge Pits
- Approximate Location of Historic Overflow Area
- Monitoring Well (MW)
- Concentration of Beryllium, mg/kg; N/A=Not Analyzed
- Soil Boring (SB)
- Beryllium PCLE Zone; cPCL=1.5 mg/kg

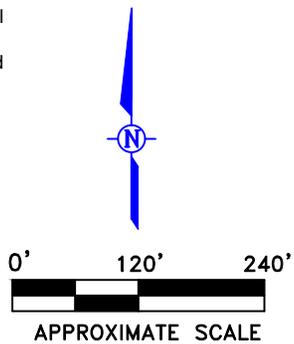
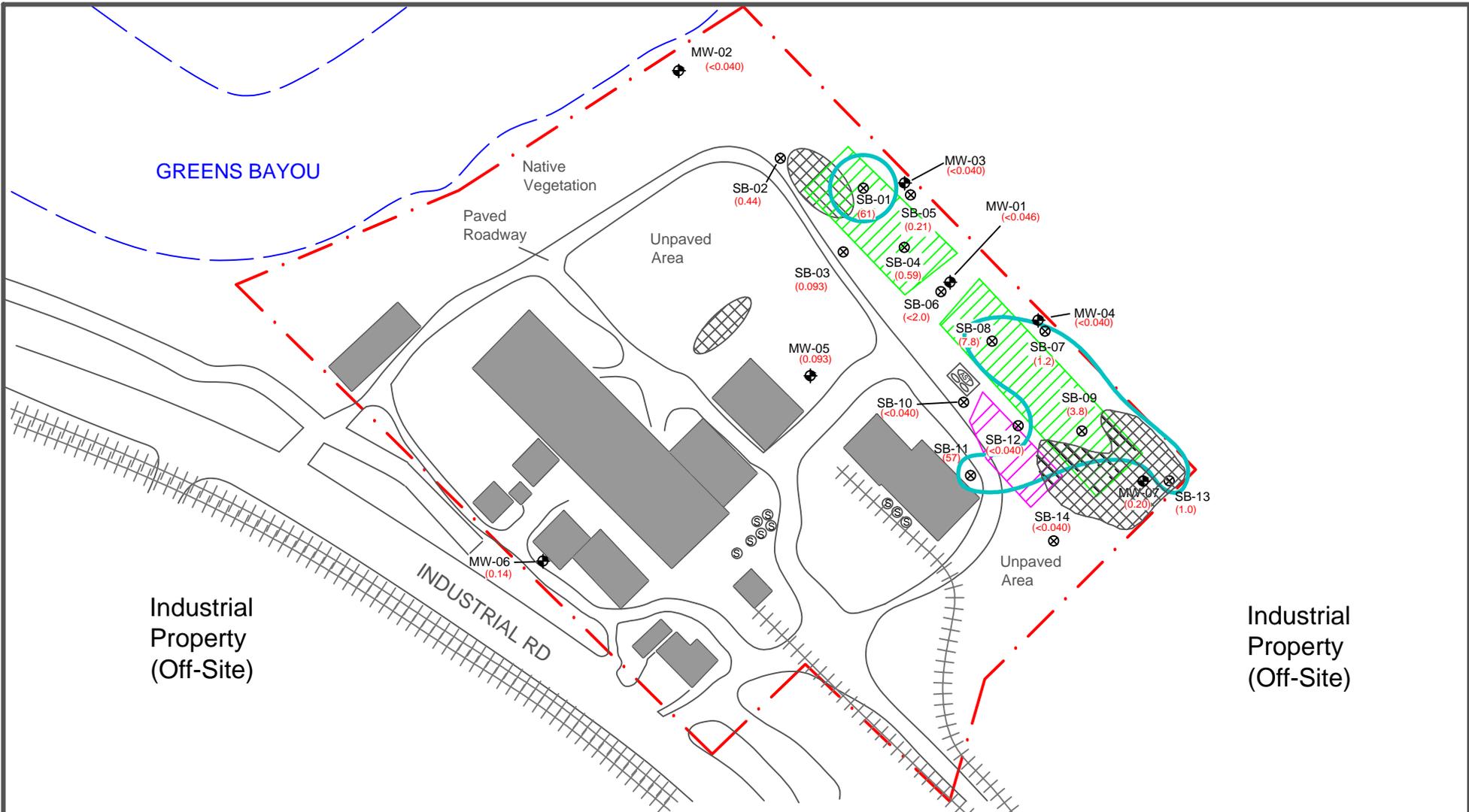


Figure 12
Soil PCLE Zone - Beryllium
 13501 Industrial Road
 Houston, Harris County, Texas





LEGEND

- Approximate Site Boundary
- Water's Edge
- Railway
- Building Footprint
- ASTs in Secondary Containment
- Silo

Note: The Critical PCL is the lower of the Tier 1 Residential Use Total Soil Combined and Soil to Groundwater Ingestion pathways and the greater of that pathway as compared to the Texas Specific Background value.

- Excavation Pile
- Approximate Location of Historic Sludge Pits
- Approximate Location of Historic Overflow Area
- Monitoring Well (MW)
- (0.010)** Concentration of Cadmium, mg/kg; N/A=Not Analyzed
- Soil Boring (SB)
- Cadmium PCLE Zone; cPCL=0.75 mg/kg

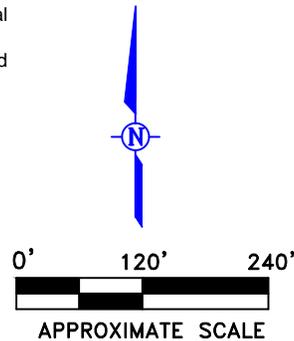
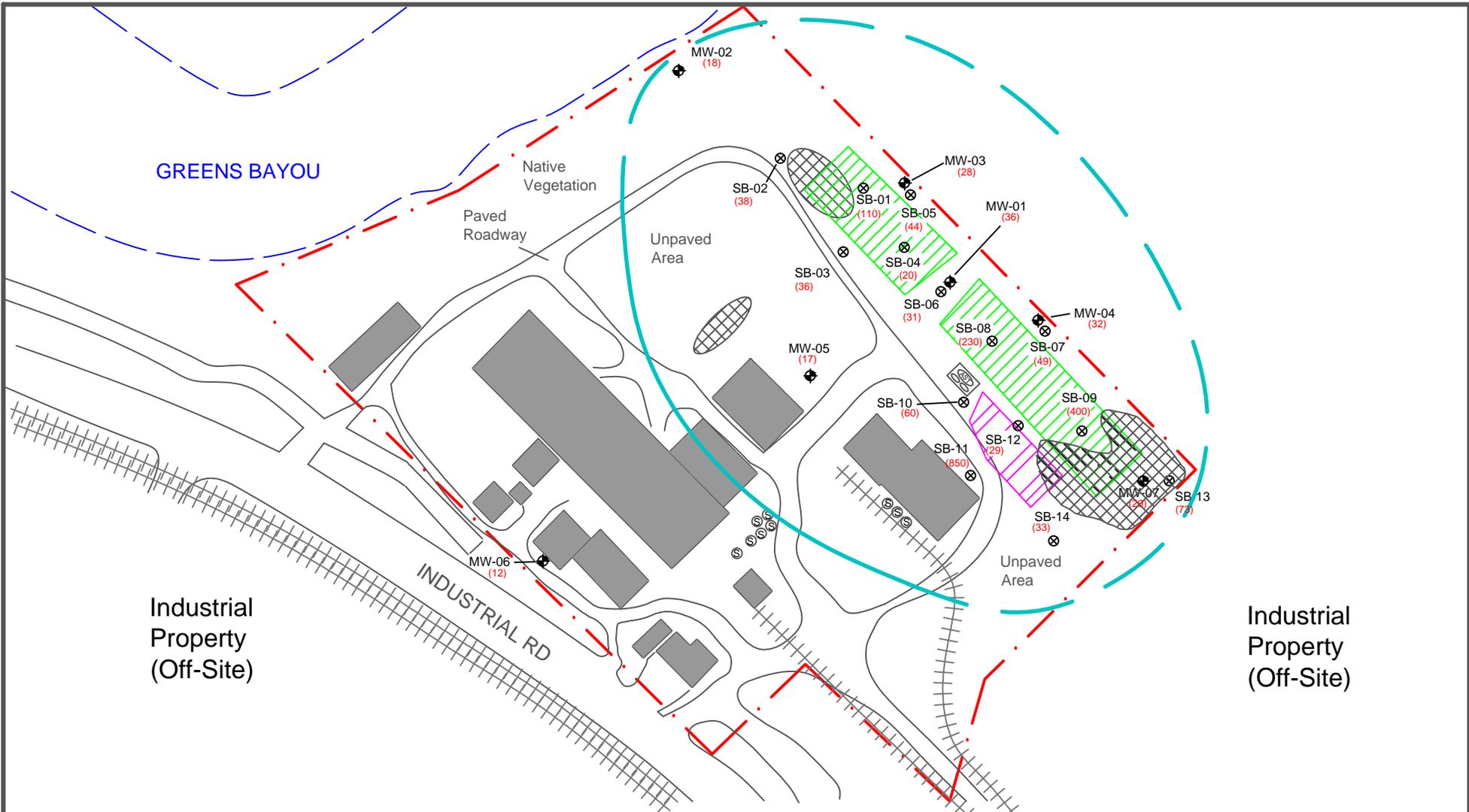


Figure 13
Soil PCLE Zone - Cadmium
 13501 Industrial Road
 Houston, Harris County, Texas





GREENS BAYOU

Native Vegetation

Paved Roadway

Unpaved Area

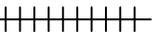
Industrial Property (Off-Site)

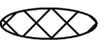
INDUSTRIAL RD

Unpaved Area

Industrial Property (Off-Site)

LEGEND

-  Approximate Site Boundary
-  Water's Edge
-  Railway
-  Building Footprint
-  ASTs in Secondary Containment
-  Silo

- Note: The Critical PCL is the lower of the Tier 1 Residential Use Total Soil Combined and Soil to Groundwater Ingestion pathways and the greater of that pathway as compared to the Texas Specific Background value.
-  Excavation Pile
 -  Approximate Location of Historic Sludge Pits
 -  Approximate Location of Historic Overflow Area
 -  Monitoring Well (MW)
 -  Concentration of Lead, mg/kg; N/A=Not Analyzed
 -  Soil Boring (SB)
 -  Lead PCLE Zone; cPCL=15 mg/kg

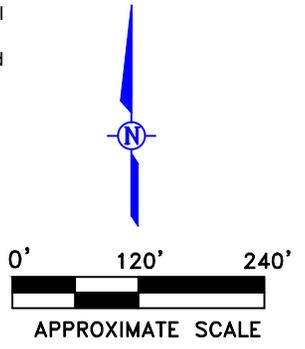
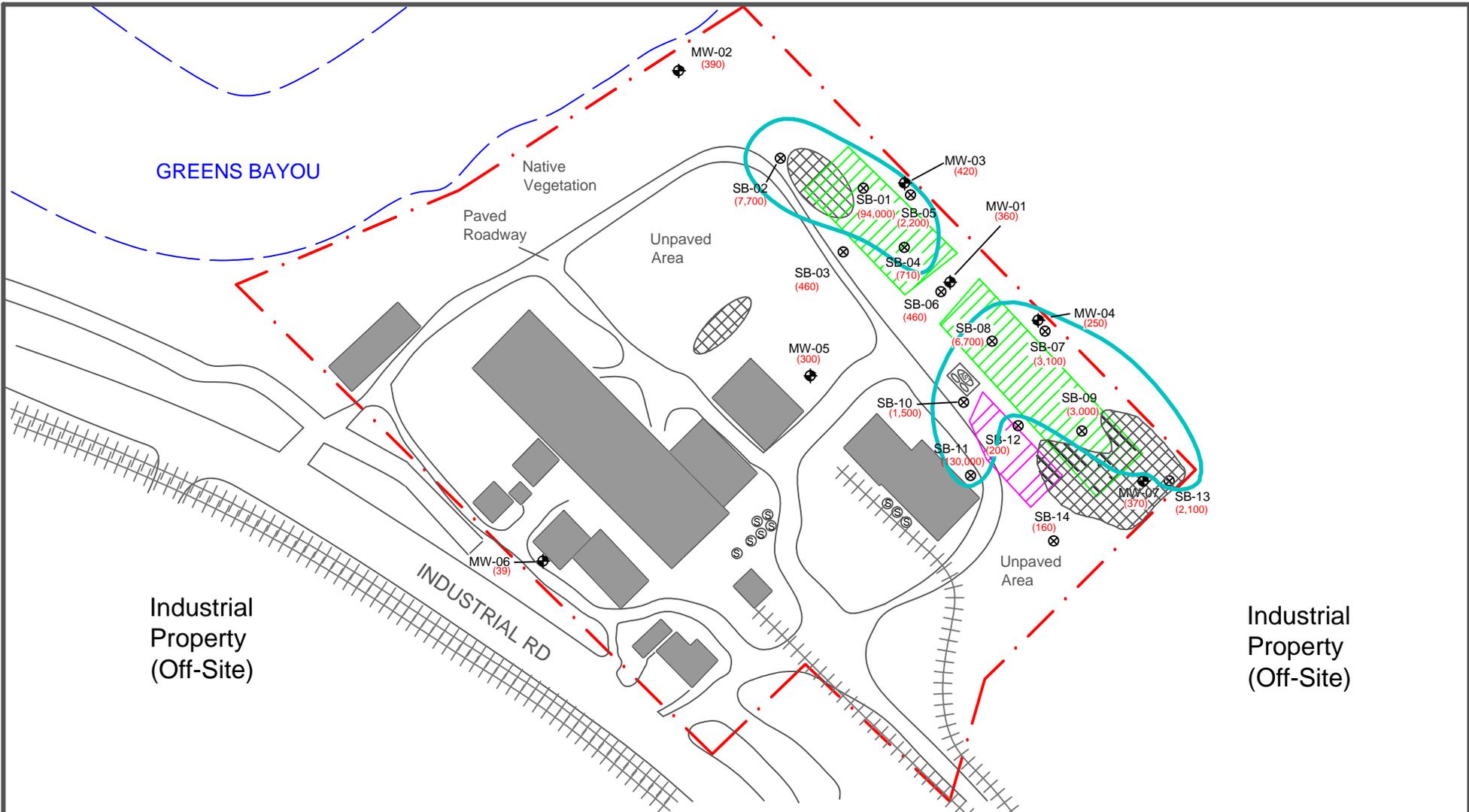


Figure 14
Soil PCLE Zone - Lead
 13501 Industrial Road
 Houston, Harris County, Texas





LEGEND

- Approximate Site Boundary
- Water's Edge
- Railway
- Building Footprint
- ASTs in Secondary Containment
- Silo

Note: The Critical PCL is the lower of the Tier 1 Residential Use Total Soil Combined and Soil to Groundwater Ingestion pathways and the greater of that pathway as compared to the Texas Specific Background value.

- Excavation Pile
- Approximate Location of Historic Sludge Pits
- Approximate Location of Historic Overflow Area
- Monitoring Well (MW)
- (0.010)** Concentration of Manganese, mg/kg; N/A=Not Analyzed
- Soil Boring (SB)
- Manganese PCLE Zone; cPCL=580 mg/kg

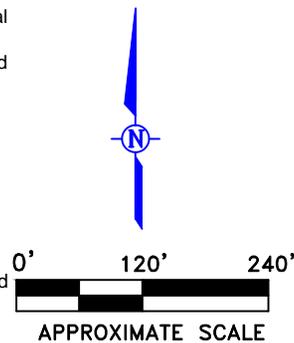
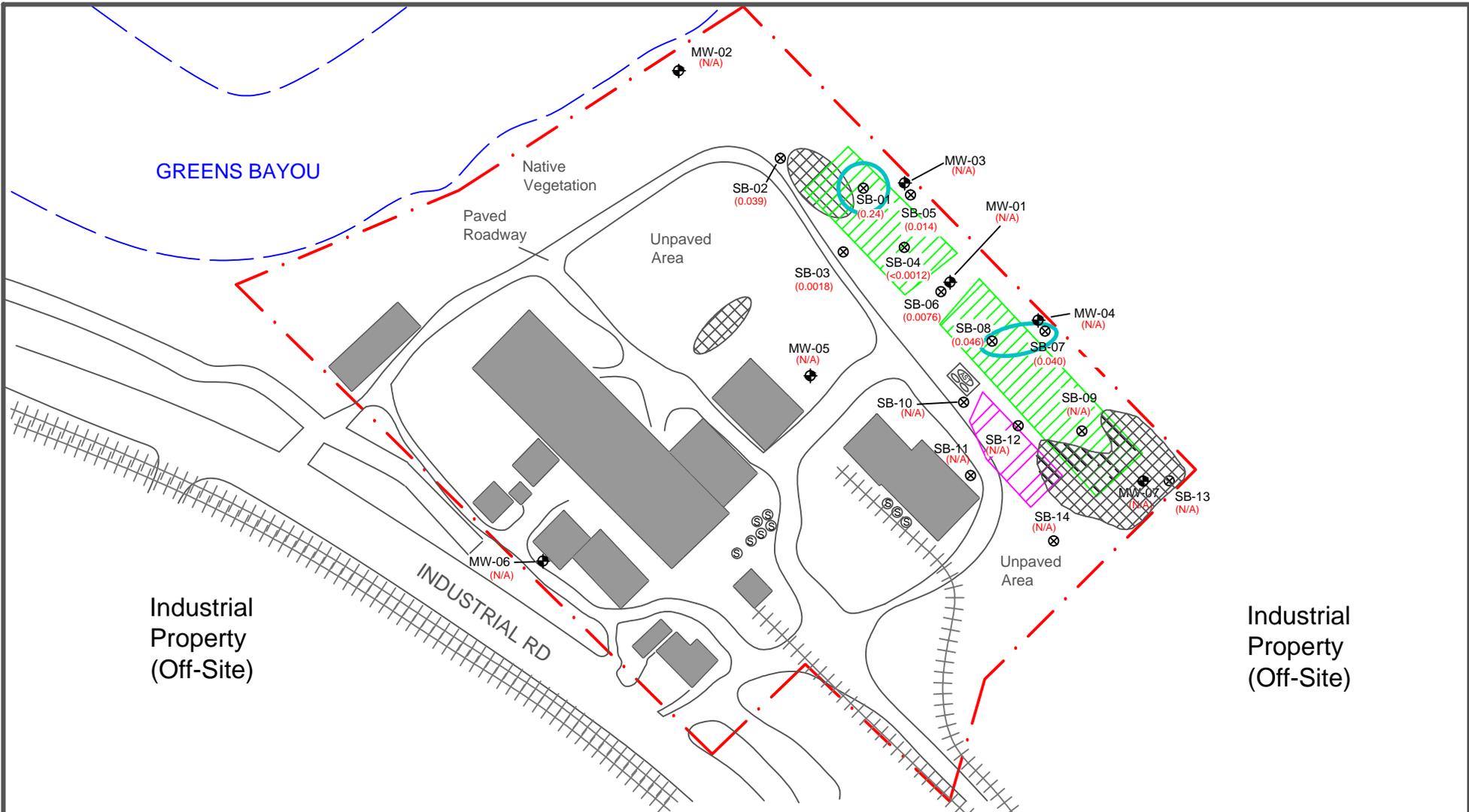


Figure 15
Soil PCLE Zone - Manganese
13501 Industrial Road
Houston, Harris County, Texas





LEGEND

- Approximate Site Boundary
- Water's Edge
- Railway
- Building Footprint
- ASTs in Secondary Containment
- Silo

Note: The Critical PCL is the lower of the Tier 1 Residential Use Total Soil Combined and Soil to Groundwater Ingestion pathways and the greater of that pathway as compared to the Texas Specific Background value.

- Excavation Pile
- Approximate Location of Historic Sludge Pits
- Approximate Location of Historic Overflow Area
- Monitoring Well (MW)
- (0.010) Concentration of Mercury, mg/kg; N/A=Not Analyzed
- Soil Boring (SB)
- Mercury PCLE Zone; cPCL=0.04 mg/kg

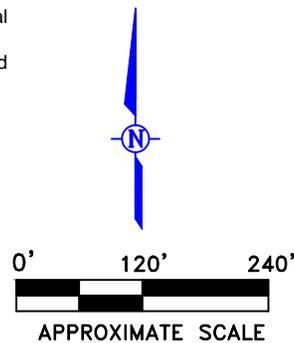
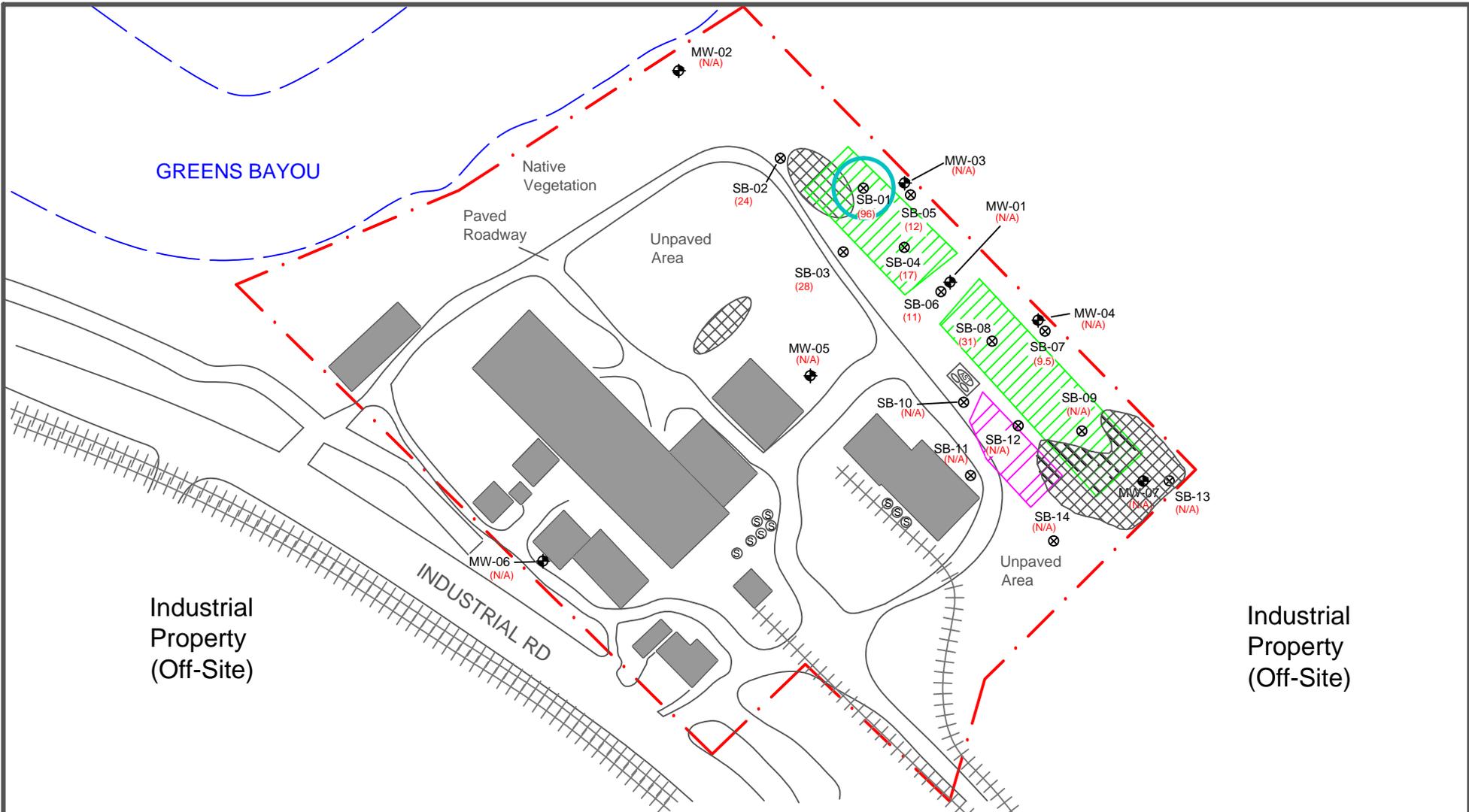


Figure 16
Soil PCLE Zone - Mercury
13501 Industrial Road
Houston, Harris County, Texas





LEGEND

- Approximate Site Boundary
- Water's Edge
- Railway
- Building Footprint
- ASTs in Secondary Containment
- Silo

Note: The Critical PCL is the lower of the Tier 1 Residential Use Total Soil Combined and Soil to Groundwater Ingestion pathways and the greater of that pathway as compared to the Texas Specific Background value.

- Excavation Pile
- Approximate Location of Historic Sludge Pits
- Approximate Location of Historic Overflow Area
- Monitoring Well (MW)
- Concentration of Nickel, mg/kg; N/A=Not Analyzed
- Soil Boring (SB)
- Nickel PCLE Zone; cPCL=79 mg/kg

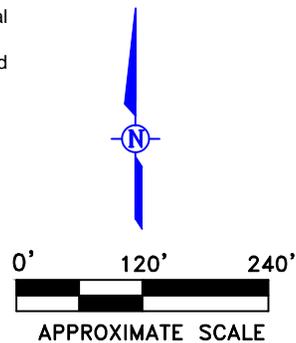
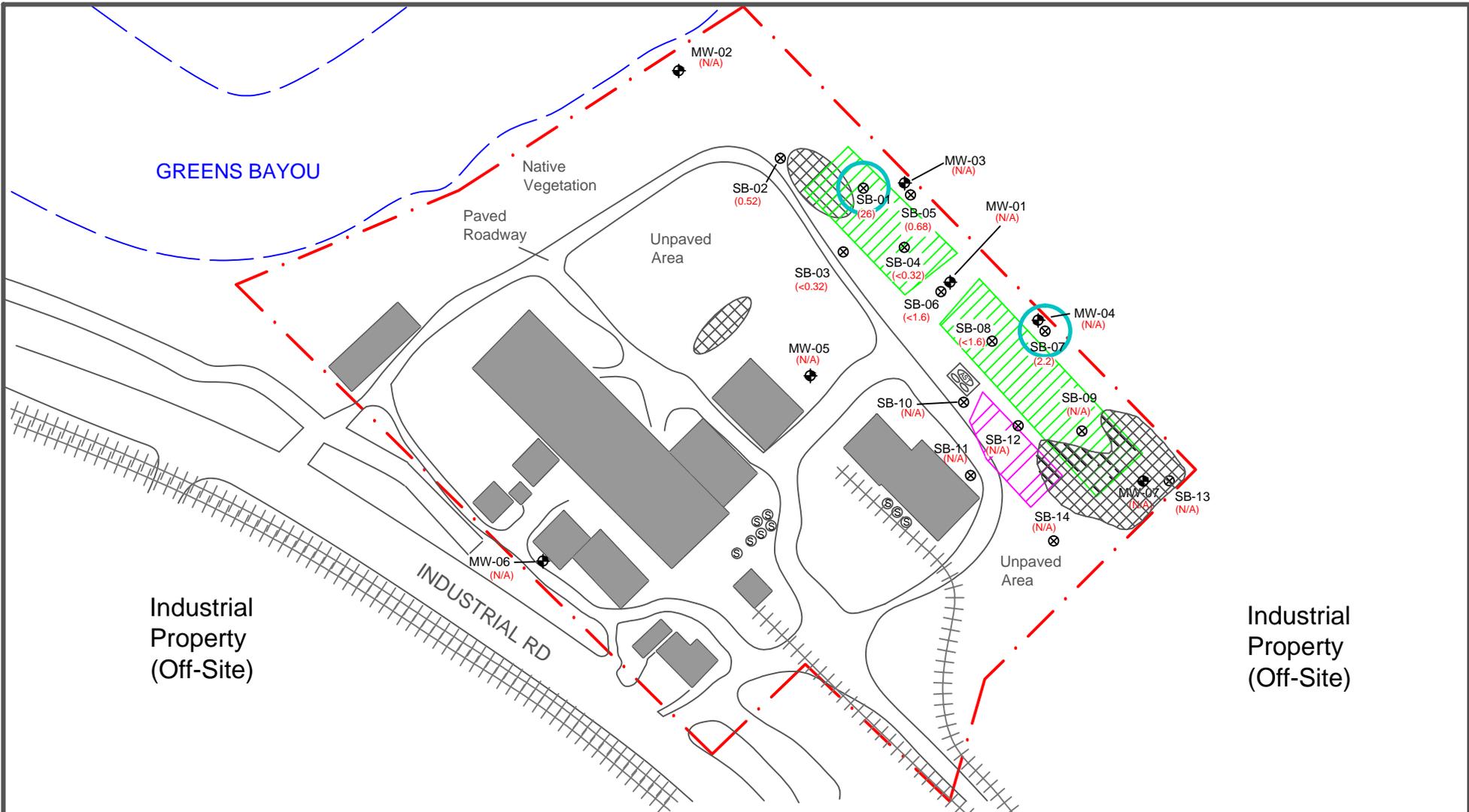


Figure 17
Soil PCLE Zone - Nickel
 13501 Industrial Road
 Houston, Harris County, Texas





LEGEND

- Approximate Site Boundary
- Water's Edge
- Railway
- Building Footprint
- ASTs in Secondary Containment
- Silo

Note: The Critical PCL is the lower of the Tier 1 Residential Use Total Soil Combined and Soil to Groundwater Ingestion pathways and the greater of that pathway as compared to the Texas Specific Background value.

- Excavation Pile
- Approximate Location of Historic Sludge Pits
- Approximate Location of Historic Overflow Area
- Monitoring Well (MW)
- Concentration of Selenium, mg/kg; N/A=Not Analyzed
- Soil Boring (SB)
- Selenium PCLE Zone; cPCL=1.1 mg/kg

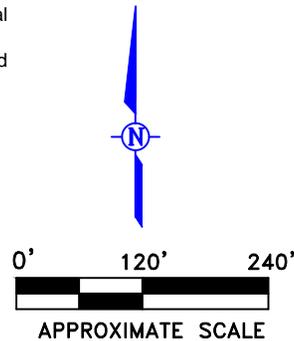
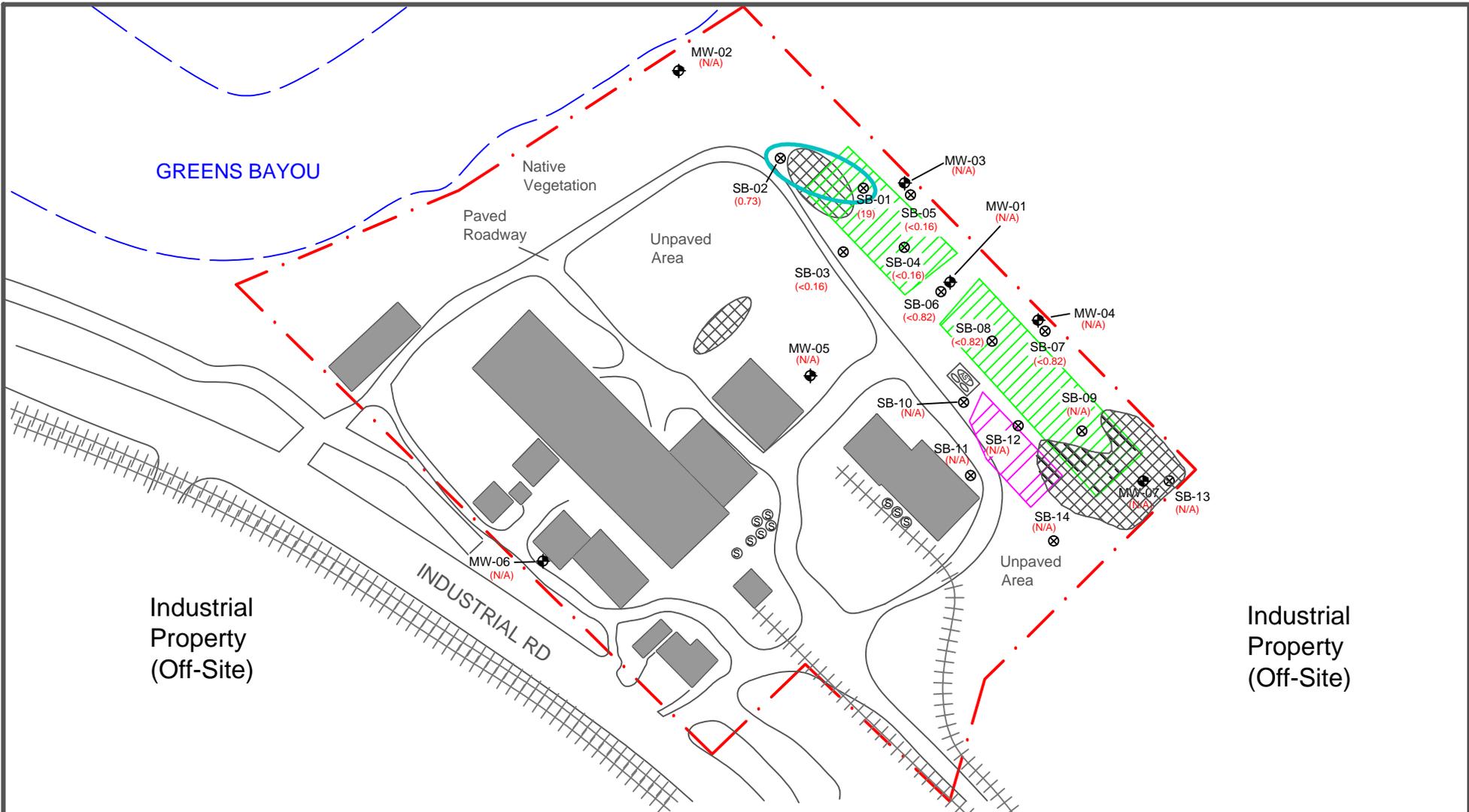


Figure 18
Soil PCLE Zone - Selenium
13501 Industrial Road
Houston, Harris County, Texas





LEGEND

- Approximate Site Boundary
- Water's Edge
- Railway
- Building Footprint
- ASTs in Secondary Containment
- Silo

Note: The Critical PCL is the lower of the Tier 1 Residential Use Total Soil Combined and Soil to Groundwater Ingestion pathways and the greater of that pathway as compared to the Texas Specific Background value.

- Excavation Pile
- Approximate Location of Historic Sludge Pits
- Approximate Location of Historic Overflow Area
- Monitoring Well (MW)
- (0.010) Concentration of Silver, mg/kg; N/A=Not Analyzed
- Soil Boring (SB)
- Silver PCLE Zone; cPCL=0.24 mg/kg

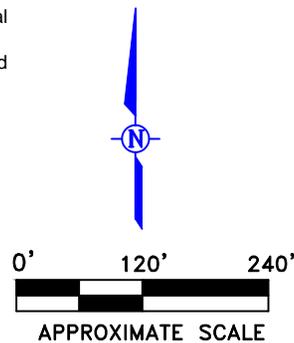
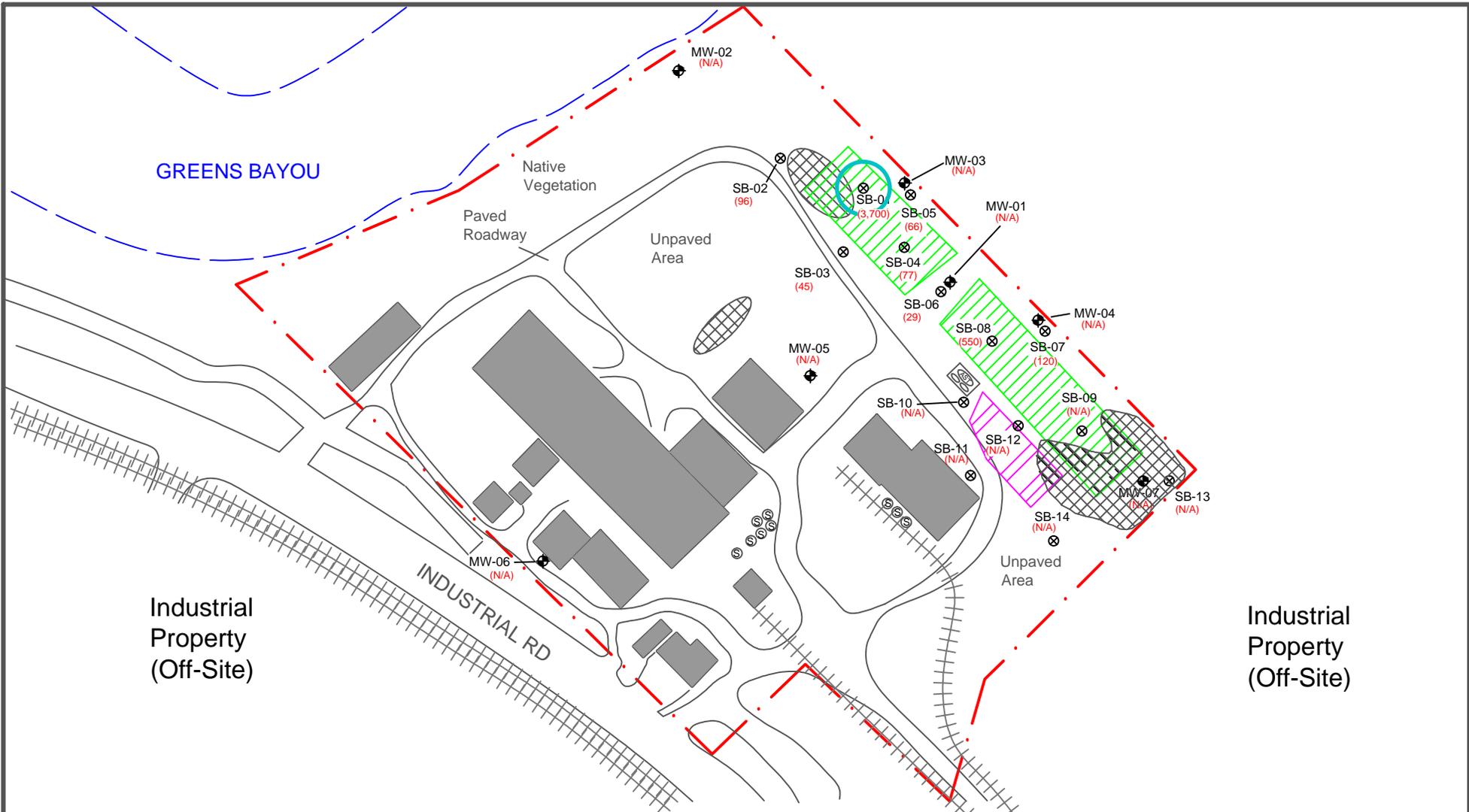


Figure 19
Soil PCLE Zone - Silver
 13501 Industrial Road
 Houston, Harris County, Texas





LEGEND

- Approximate Site Boundary
- Water's Edge
- Railway
- Building Footprint
- ASTs in Secondary Containment
- Silo

Note: The Critical PCL is the lower of the Tier 1 Residential Use Total Soil Combined and Soil to Groundwater Ingestion pathways and the greater of that pathway as compared to the Texas Specific Background value.

- Excavation Pile
- Approximate Location of Historic Sludge Pits
- Approximate Location of Historic Overflow Area
- Monitoring Well (MW)
(0.010) Concentration of Zinc, mg/kg; N/A=Not Analyzed
- Soil Boring (SB)
- Zinc PCLE Zone; cPCL=1,200 mg/kg

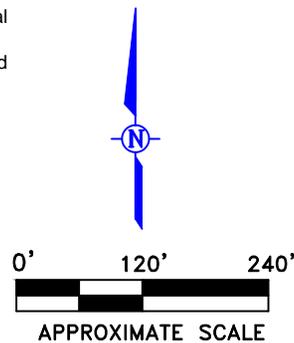
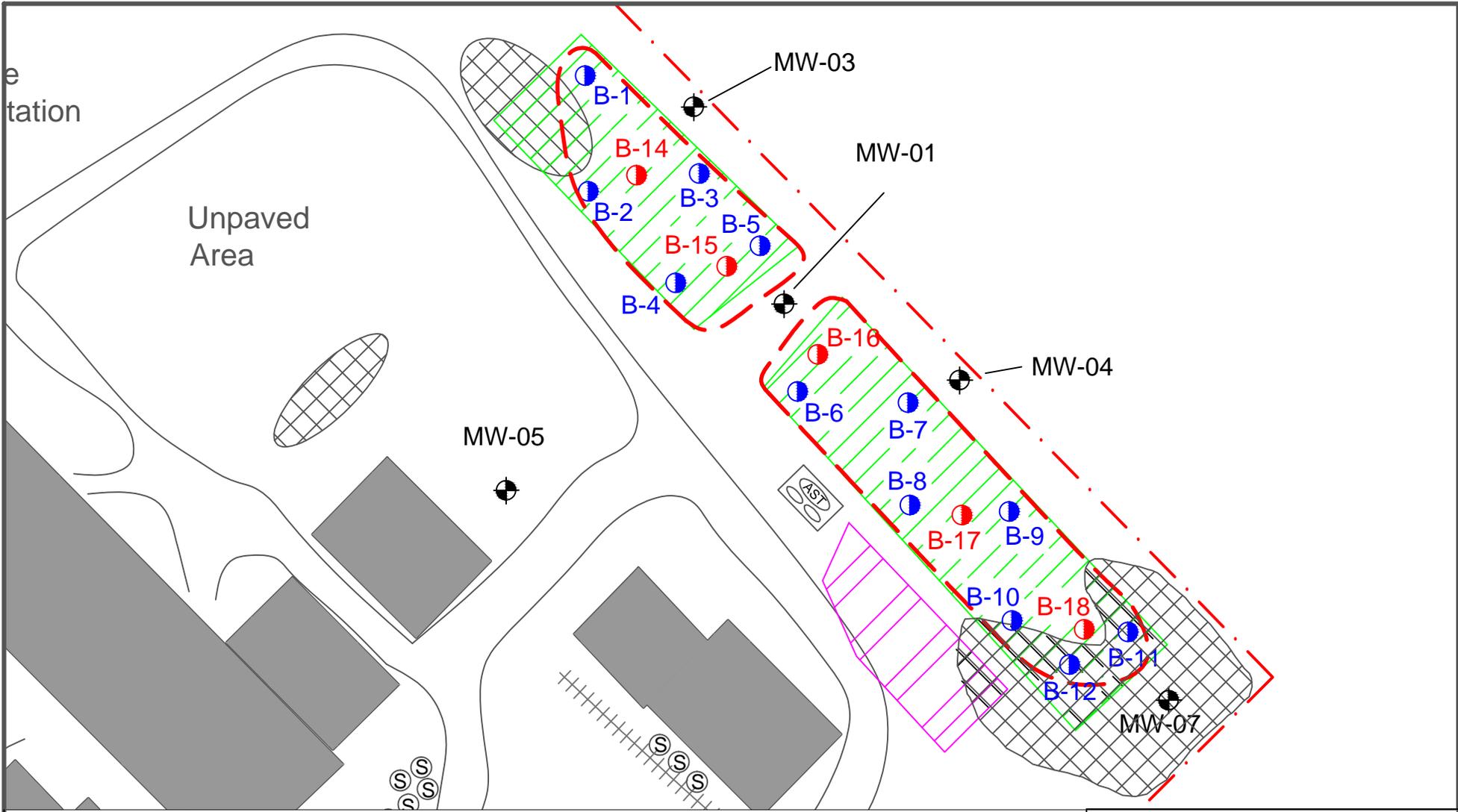


Figure 20
Soil PCLE Zone - Zinc
13501 Industrial Road
Houston, Harris County, Texas





LEGEND

- Approximate Site Boundary
- Railway
- Building Footprint
- ASTs in Secondary Containment
- Excavation Pile
- Silo

- Approximate Location of Historic Sludge Pits
- Approximate Location of Historic Overflow Area
- SPLP Boring (B)
- SPLP Grab Boring (B)
- Monitoring Well (MW)
- Extent of SPLP Leaching Zone - Arsenic

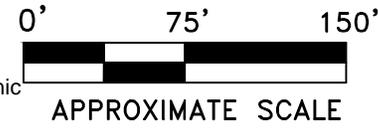
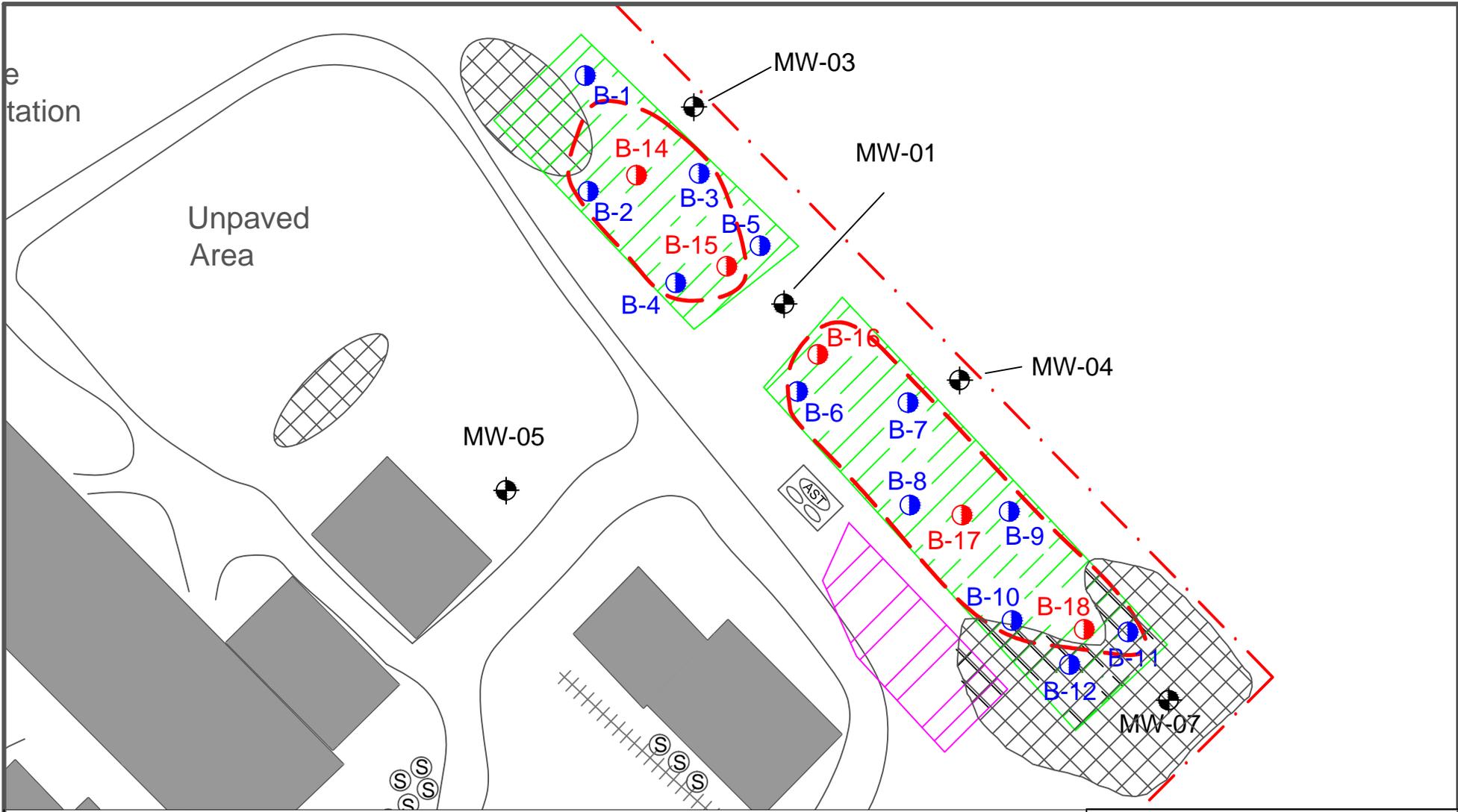
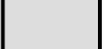


Figure 21
Boundary of SPLP Leaching Zone - Arsenic
 13501 Industrial Road
 Houston, Harris County, Texas





LEGEND

-  Approximate Site Boundary
-  Railway
-  Building Footprint
-  ASTs in Secondary Containment
-  Excavation Pile
-  Silo

-  Approximate Location of Historic Sludge Pits
-  Approximate Location of Historic Overflow Area
-  SPLP Boring (B)
-  SPLP Grab Boring (B)
-  Monitoring Well (MW)
-  Extent of SPLP Leaching Zone - Cadmium

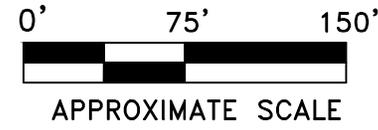
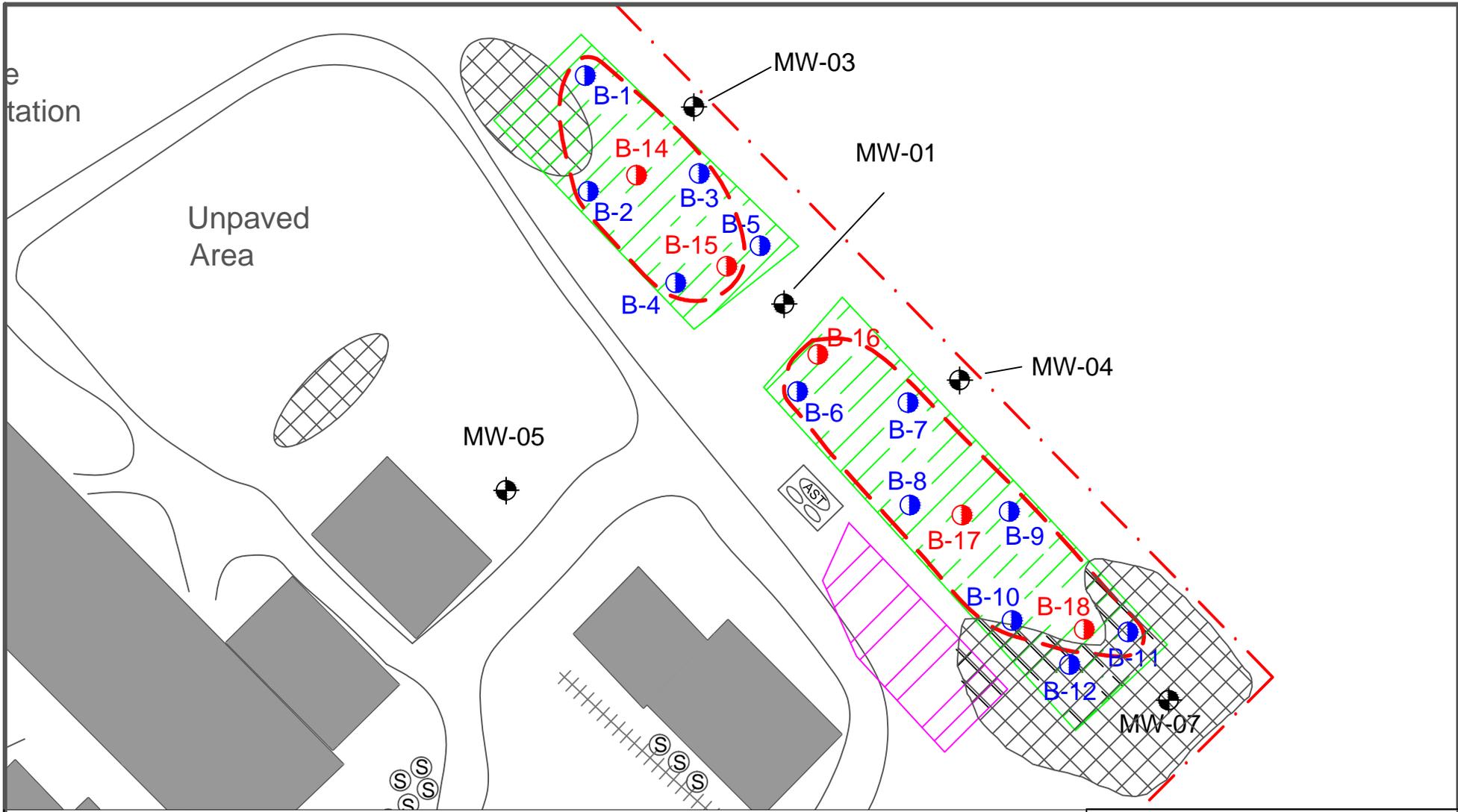


Figure 22
Boundary of SPLP Leaching Zone - Cadmium
 13501 Industrial Road
 Houston, Harris County, Texas





LEGEND

- Approximate Site Boundary
- Railway
- Building Footprint
- ASTs in Secondary Containment
- Excavation Pile
- Silo

- Approximate Location of Historic Sludge Pits
- Approximate Location of Historic Overflow Area
- SPLP Boring (B)
- SPLP Grab Boring (B)
- Monitoring Well (MW)
- Extent of SPLP Leaching Zone - Manganese

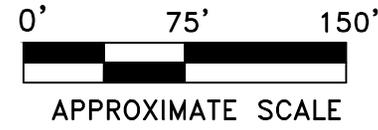
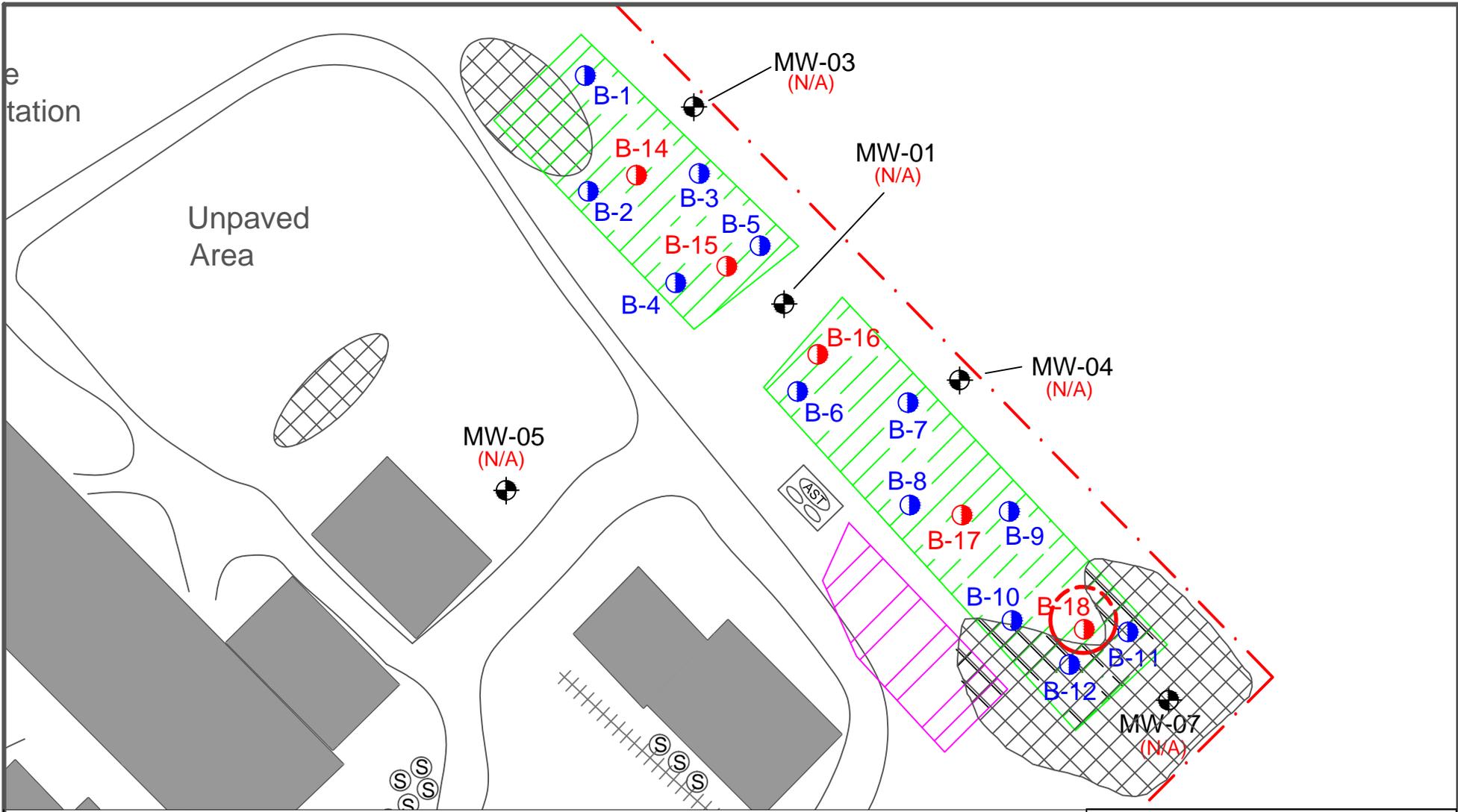
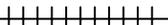


Figure 23
Boundary of SPLP Leaching Zone - Manganese
 13501 Industrial Road
 Houston, Harris County, Texas

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LEGEND

-  Approximate Site Boundary
-  Railway
-  Building Footprint
-  ASTs in Secondary Containment
-  Excavation Pile
-  Silo

-  Approximate Location of Historic Sludge Pits
-  Approximate Location of Historic Overflow Area
-  SPLP Boring (B)
-  SPLP Grab Boring (B)
-  Monitoring Well (MW)
-  Extent of SPLP Leaching Zone - Selenium

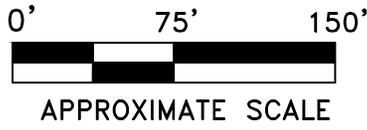


Figure 24
Boundary of SPLP Leaching Zone - Selenium
 13501 Industrial Road
 Houston, Harris County, Texas



Appendix D

MUNICIPAL SETTING DESIGNATION APPLICATION

13501 INDUSTRIAL ROAD HOUSTON, TEXAS

PROPERTIES OF CHEMICALS of CONCERN WITHIN INGESTION PCL EXCEEDANCE ZONE

Ingestion PCLE zones exist for the following COCs in soil:

- Antimony
- Barium
- Cadmium
- Manganese
- Nickel
- Silver
- Arsenic
- Beryllium
- Lead
- Mercury
- Selenium
- Zinc

Ingestion PCLE zones exist for the following COCs in groundwater:

- Arsenic
- Manganese
- Selenium

Soil and groundwater analytical data tables are presented in **Tables 1** and **Table 3**, respectively (presented in **Appendix F**). The analytical data tables present the concentrations of each COC in soil and groundwater in comparison to their respective ingestion and non-ingestion (MSD-adjusted) PCLs.

Groundwater PCLE

Arsenic, manganese, and selenium in the groundwater exceed their respective residential ingestion PCLs. The following table reflects COCs identified at the Designated Property in exceedance of the Tier 1 residential ingestion PCL and the maximum and minimum concentrations identified from October 15, 2012 (1st sampling event) to May 31, 2013 (most recent sampling event). Exceedances of the ingestion PCL are indicated in **bold**. No analytes exceeded the non-ingestion PCL in groundwater. All concentrations are in mg/L.

Appendix D

Tier 1 Residential Ingestion PCLs and Maximum and Minimum COC Concentrations

Well ID	COC	^{GW} GW _{Ing}	Min Conc.	Max Conc.
MW-01	Arsenic	0.01	0.024	0.032
	Manganese	1.1	0.054	0.99
	Selenium	0.05	0.01	0.035
MW-02	Arsenic	0.01	0.014	0.03
	Manganese	1.1	0.045	0.24
	Selenium	0.05	0.021	0.069
MW-03	Arsenic	0.01	0.013	0.035
	Manganese	1.1	0.45	1.4
	Selenium	0.05	0.011	0.052
MW-04	Arsenic	0.01	0.11	0.038
	Manganese	1.1	0.016	0.4
	Selenium	0.05	0.03	0.35
MW-05	Arsenic	0.01	<0.0066	0.023
	Manganese	1.1	0.22	0.092
	Selenium	0.05	0.013	0.09
MW-06	Arsenic	0.01	0.0068	0.0074
	Manganese	1.1	0.07	0.42
	Selenium	0.05	0.006	0.021
MW-07	Arsenic	0.01	0.0092	0.018
	Manganese	1.1	0.14	0.71
	Selenium	0.05	0.016	0.046

All concentrations are in mg/L

Figure 6 through 8 (previously presented in **Appendix C**) depict the horizontal extent of the groundwater ingestion PCLE zones for arsenic, manganese, and selenium, respectively. The table below reflects the total estimated surface area of the ingestion PCLE zone for each COC.

Total Estimated Surface Area of the Ingestion PCLE Zone for COCs

COC	Estimate Surface Area of PCLE Zone (acres)
Arsenic	9.0
Manganese	0.2
Selenium	6.0

The area of groundwater impact extends to the Womble Company, Inc. property to the east and northeast of the Designated Property. Information obtained from a public records search of Womble Company, Inc. (north and east adjacent property) identified higher arsenic concentrations in the groundwater on their site. Arsenic is delineated with monitoring wells with arsenic concentrations below the residential ingestion PCL are located on the east side of the Womble site; therefore, the arsenic PCLE zone is fully delineated.

Appendix D

Soil PCLE

Antimony, arsenic, barium, beryllium, cadmium, lead, manganese, mercury, nickel, selenium, silver and zinc were identified in the soil in exceedance of their respective residential ingestion PCLs. The table below reflects COCs identified at the Designated Property in exceedance of the Tier 1 residential ingestion PCL, the Texas-Specific Soil Background Concentrations (TSBC) (as applicable), the Tier 1 residential non-ingestion PCL, and the maximum concentrations identified in designated soil borings. Exceedances of the ingestion PCL or TSBC (as applicable) are indicated in **bold** and exceedances of the non-ingestion PCL are indicated with an underline. All concentrations are in mg/kg.

Analytical Data Used to Establish Soil PCLE Zones

Sample ID	COC	^{GW} Soil _{Ing}	TSBC	^{Tot} Soil _{Comb}	^{Air} Soil _{Inh-v}	Max Conc.
SB-8 (16')	Antimony	2.7	1.0	15	--	8.0
SB-1 (12')	Arsenic	2.5	5.9	24	--	<u>260</u>
SB-2 (8')	Barium	220	300	8,100	--	2,600
SB-3 (8')	Beryllium	0.92	1.5	38	--	2.4
SB-1 (12')	Cadmium	0.75	--	52	--	<u>61</u>
SB-11 (2')	Lead	1.5	15	500	--	<u>850</u>
SB-11 (2')	Manganese	580	300	3,700	--	<u>130,000</u>
SB-1 (12')	Mercury	0.0039	0.04	3.6	4.6	0.24
SB-1 (12')	Nickel	79	10	840	--	96
SB-1 (12')	Selenium	1.1	0.3	310	--	26
SB-1 (12')	Silver	0.24	--	97	--	19
SB-1 (12')	Zinc	1,200	30	9,900	--	3,700

All concentrations are in mg/kg

Figures 9 through 20 (previously presented in **Appendix C**) depict the horizontal extent of the soil ingestion PCLE zones for antimony, arsenic, barium, beryllium, cadmium, lead, manganese, mercury, nickel, selenium, silver, and zinc, respectively. The table below reflects the total estimated surface area of the ingestion PCLE zone for each COC.

Appendix D

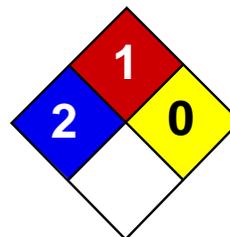
Total Estimated Surface Area of the Ingestion PCLE Zone for COCs

COC	Estimate Surface Area of PCLE Zone (acres)
Antimony	0.15
Arsenic	9.5
Barium	2.0
Beryllium	0.8
Cadmium	1.2
Lead	11.0
Manganese	2.3
Mercury	0.2
Nickel	0.15
Selenium	0.35
Silver	0.15
Zinc	0.15

The chemical properties of the aforementioned COCs, with the exception of barium, are provided in the chemical abstract and fact sheet attached in this Appendix.

Sludge Pond Areas

Arsenic, cadmium, manganese, and selenium were identified in the sludge samples in exceedance of their respective leachable ingestion PCL. **Figures 21** through **24** (previously presented in **Attachment C**) depict the boundary areas of the given COC. The historic settling ponds were constructed in the Beaumont Formation in the northern portion of the Designated Property. The Beaumont Formation beneath the Designated Property is approximately 100 feet thick and typically has a permeability ranging from 10^{-6} to 10^{-7} cm/sec. The Beaumont Formation is present beneath the pond area and represents the geologic unit that confines the settling ponds on all sides, with the exception of the upper 4 to 6 feet of fill material at the Designated Property. The settling ponds were part of the process to treat sludge derived from the particulate scrubbers. The settling ponds contain sludge at depths from approximately 4 feet to 19 feet below ground surface, with the thickest sludge found in the vicinity of boring B-7. The Beaumont Formation, a high plasticity clay with a low permeability, not only confines the sludge on all sides, but also beneath the pond areas. The metal impacts in the sludge have been delineated to the footprint of the former historical settling ponds.



Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet Antimony MSDS

Section 1: Chemical Product and Company Identification

Product Name: Antimony

Catalog Codes: SLA1453, SLA4462

CAS#: 7440-36-0

RTECS: CC4025000

TSCA: TSCA 8(b) inventory: Antimony

CI#: Not available.

Synonym: Stibium

Chemical Name: Not available.

Chemical Formula: Sb

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Antimony	7440-36-0	100

Toxicological Data on Ingredients: Antimony: ORAL (LD50): Acute: 7000 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to blood, kidneys, lungs, the nervous system, liver, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In

case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.5 Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 121.75 g/mole

Color: Not available.

pH (1% soln/water): Not applicable.

Boiling Point: 1635°C (2975°F)

Melting Point: 630°C (1166°F)

Critical Temperature: Not available.

Specific Gravity: 6.691 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 7000 mg/kg [Rat].

Chronic Effects on Humans: Causes damage to the following organs: blood, kidneys, lungs, the nervous system, liver, mucous membranes.

Other Toxic Effects on Humans:

Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Human: passes through the placenta, excreted in maternal milk.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Antimony powder UNNA: UN2871 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: Antimony Massachusetts RTK: Antimony TSCA 8(b) inventory: Antimony

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:**WHMIS (Canada):**

CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC): R36/38- Irritating to eyes and skin.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/11/2005 11:19 AM

Last Updated: 05/21/2013 12:00 PM

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Health	3
Fire	1
Reactivity	2
Personal Protection	E

Material Safety Data Sheet Arsenic MSDS

Section 1: Chemical Product and Company Identification

Product Name: Arsenic

Catalog Codes: SLA1006

CAS#: 7440-38-2

RTECS: CG0525000

TSCA: TSCA 8(b) inventory: Arsenic

CI#: Not applicable.

Synonym:

Chemical Name: Arsenic

Chemical Formula: As

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Arsenic	7440-38-2	100

Toxicological Data on Ingredients: Arsenic: ORAL (LD50): Acute: 763 mg/kg [Rat]. 145 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH. **MUTAGENIC EFFECTS:** Not available.

TERATOGENIC EFFECTS: Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance is toxic to kidneys, lungs, the nervous system, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Flammable in presence of open flames and sparks, of heat, of oxidizing materials.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:

Material in powder form, capable of creating a dust explosion. When heated to decomposition it emits highly toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, acids, moisture.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.01 from ACGIH (TLV) [United States] [1995] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 74.92 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: Not available.

Melting Point: Sublimation temperature: 615°C (1139°F)

Critical Temperature: Not available.

Specific Gravity: 5.72 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents, acids, moisture.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 145 mg/kg [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH. Causes damage to the following organs: kidneys, lungs, the nervous system, mucous membranes.

Other Toxic Effects on Humans:

Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Arsenic UNNA: UN1558 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Arsenic California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Arsenic Pennsylvania RTK: Arsenic Massachusetts RTK: Arsenic TSCA 8(b) inventory: Arsenic

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:**WHMIS (Canada):**

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R22- Harmful if swallowed. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 2

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 1

Reactivity: 2

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information**References:**

-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Liste des produits purs tératogènes, mutagènes, cancérigènes. Répertoire toxicologique de la Commission de la Santé et de la Sécurité du Travail du Québec. -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangereuses au Canada. Centre de conformité international Ltée. 1986.

Other Special Considerations: Not available.

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beryllium dust on its internal surface poses a potentially serious fire hazard. Extinguishing using Class D fire extinguisher media and shut down or isolate the affected portion of the ventilation system. Because of this potential risk, sources of ignition such as flame, spark, etc. must not be allowed to enter the ventilation duct work. Also, duct work must be made of non-combustible material.

V HEALTH HAZARD INFORMATION

Primary Routes of Exposure: Inhalation: An exposure to airborne beryllium in excess of the occupational standard can occur during routine handling, material transfer, chemical processing or further processing of powdered material and when machining, melting, casting, gross handling, picking, welding, grinding, sanding, polishing, milling, crushing, or otherwise abrading the surface of solid beryllium in a manner which generates finely divided particles. Machining operations conducted under a flood of liquid coolant usually require local exhaust ventilation. The cycling through a machine of liquid lubricant/coolant containing finely divided beryllium in suspension can result in the concentration building to a point where the particulate may become airborne during use. A filter, centrifuge, or settling chamber can be installed in-line if necessary. The potential for exposures also may occur during repair or maintenance activities on contaminated equipment such as: furnace rebuilding, maintenance or repair of air cleaning equipment, structural renovation, welding, etc.

Acute Effects:

Inhalation: This product is insoluble and does not cause acute health effects.

Ingestion: This product is insoluble and does not cause acute health effects.

Skin: Skin abrasion may cause irritation.

Eye: Injury to the eyes can result from particulate irritation or mechanical injury to the cornea or conjunctiva by dust or particulate.

Chronic Effects:

Inhalation: Overexposure to airborne beryllium particulate may cause a serious lung disease, in certain sensitive individuals, called chronic beryllium disease (chronic berylliosis). Chronic beryllium disease is a condition in which the tissues of the lungs become inflamed, restricting the exchange of oxygen between the lungs and the bloodstream. Symptoms may include cough, chest pain, shortness of breath, weight loss, weakness, and fatigue. Long term effects may include loss of lung function, fibrosis, or subsequent secondary effects on the heart with eventual permanent impairment.

Ingestion: There are no known cases of illness resulting from ingestion of beryllium.

Skin: Skin abrasion may cause irritation.

Eye: Injury to the eyes can result from particulate irritation or mechanical injury to the cornea or conjunctiva by dust or particulate.

Carcinogenic references: Hazard communication regulations of the U.S. Occupational Safety & Health Administration require that caution labels for materials listed as potential carcinogens in either the International Agency for Cancer Research Monograph Series or the National Toxicology Program Annual Report on carcinogens must contain a cancer warning. Beryllium has also been so listed based principally on animal tests and therefore this material bears a label identifying it as a potential cancer hazard.

Medical Conditions Aggravated by Exposure: Persons with impaired pulmonary function, airway diseases, or conditions such as asthma, emphysema, chronic bronchitis, etc. may incur further impairment if excessive concentrations of dust or fume are inhaled. If prior damage or disease to the neurologic (nervous), circulatory, hematologic (blood), or urinary (kidney) system has occurred, proper screening or examinations should be conducted on individuals who may be exposed to further risk where handling and use of this material may cause excessive exposure.

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: Remove to fresh air. Although no cases in which a person stopped breathing as a result of exposure are known, if breathing has stopped, perform artificial respiration and obtain medical help.

INGESTION: Swallowing metal powder or dust can be treated by having the affected person drink large quantities of water and attempting to induce vomiting if conscious. Obtain medical help.

SKIN: Remove contaminated clothing, brush material off skin, wash affected area with soap and water. If irritation persists, seek medical attention.

EYE: Flush eyes with copious amounts of clean water. If irritation persists obtain medical help. Contact lenses should not be worn when working with metal dusts and powders because the contact lens must be removed to provide adequate treatment.

VI REACTIVITY DATA

Stability: Stable

Conditions to Avoid: Oxidation will form on solid shapes when moist.

Incompatibility (Material to Avoid): Avoid contact with mineral acids and oxidizing agents which may generate hydrogen gas. Hydrogen gas can be an explosion hazard.

Hazardous Decomposition Products: Melting and dross handling or powdering operations can emit airborne dusts or fumes.

Hazardous Polymerization: Will not Occur

VII SPILL AND LEAK PROCEDURES

Steps to Be Taken in Case Material Is Released or Spilled: In solid form this material poses no health or environmental risk. If this material is in powder or dust form, establish a restricted entry zone based on the severity of the spill. Persons entering the restricted zone must wear adequate respiratory protection and protective clothing appropriate for the severity of the spill. Cleanup should be conducted with a vacuum system utilizing a high efficiency particulate air filtration system followed by wet cleaning methods. Special care must be taken when changing filters on HEPA vacuum cleaners when used to clean up potentially toxic materials. Caution should be taken to minimize airborne generation of powder or dust and avoid contamination of air and water. Depending upon the quantity of material released, fine powder or dust spills to the environment may require reporting the National Response Center at (800) 424-8802 as well as the State Emergency Response Commission and Local Emergency Planning Committee.

Waste Disposal Method: Dispose of in accordance with State, Federal and Local regulations.

VIII SPECIAL PROTECTION INFORMATION

Respiratory Protection: When potential exposures are above the occupational limits, approved respirators must be used. Exposure to unknown concentrations of fumes or dusts requires the wearing of a pressure-dem and self-contained breathing apparatus. Pressure-demand airline respirators are recommended for jobs with high potential exposures such as changing bags in a baghouse air cleaning device.

Ventilation: Whenever possible the use of local exhaust ventilation or other engineering controls is the preferred method of controlling exposure to airborne dust and fume to meet established occupational exposure limits. Powders should be stored and transported in tightly sealed containers and must only be handled under controlled ventilated conditions.

Protective Gloves: Wear gloves to prevent metal cuts and skin abrasions particularly during handling.

Eye Protection: Wear safety glasses, goggles, face shield, or welders helmet.

Other Protective Equipment: No protective equipment or clothing is required when handling solid forms. Protective overgarment or work clothing should be worn by persons who may become contaminated with dusts, fumes, or powders.

Work Practices: Vacuum or wet cleaning methods are recommended for dust removal. Be certain to de-energize electrical systems as necessary before beginning wet cleaning. Vacuum cleaners with high efficiency particulate air (HEPA) filters are the recommended type. The use of compressed air to remove dusts should be avoided as such an activity can result in unnecessary short-term elevated exposures to dusts. Contaminated work clothing and overgarment should be managed in such a manner so as to prevent secondary exposure to persons such as laundry operators and to prevent contamination to personal clothing. Never use compressed air to clean work clothing.

IX SPECIAL PRECAUTIONS

Packaging and Labeling Requirements: The following requirements of the U.S. Dept. of Transportation apply only to beryllium metal powder or dust, not to solid shapes:

Shipping Name: RQ Flammable Solid, Poisonous, N.O.S. (Beryllium Metal Powder).

NOTE: Must be marked on shipping papers and on the outside of the shipping container.

Hazard Class: Beryllium metal powder and dust are classified as Flammable Solid and Class B Poison.
NOTE: Hazard class must be included on shipping papers.

Identification Number: UN2926
NOTE: Must be marked on shipping papers and on the outside of the shipping container.

Label(s) Required: Flammable Solid and Poison (For Beryllium Metal Powder or Dust Only).
NOTE: Place on the outside of the shipping container.

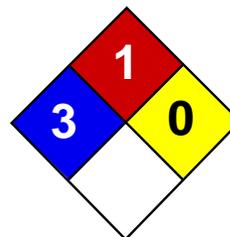
Reportable Quantity: 10 lbs. (4.54).
NOTE: The RQ is limited to particles having a diameter less than 100 micrometers.

DOT Specification Container: Suitable for Flammable Solids. Recommended double overpack when shipping powder.

Other: Emergency response information is provided within this MSDS.
NOTE: This information must be included, in some form, with the shipping papers.

SARA Title III: Beryllium is reportable under Section 313

Issued by: S. Dierks
Date: November 1992



Health	3
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet Cadmium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Cadmium

Catalog Codes: SLC3484, SLC5272, SLC2482

CAS#: 7440-43-9

RTECS: EU9800000

TSCA: TSCA 8(b) inventory: Cadmium

CI#: Not applicable.

Synonym:

Chemical Name: Cadmium

Chemical Formula: Cd

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Cadmium	7440-43-9	100

Toxicological Data on Ingredients: Cadmium: ORAL (LD50): Acute: 2330 mg/kg [Rat.]. 890 mg/kg [Mouse]. DUST (LC50): Acute: 50 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer), of eye contact (irritant). Severe over-exposure can result in death.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A2 (Suspected for human.) by ACGIH, 2 (Reasonably anticipated.) by NTP.

MUTAGENIC EFFECTS: Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance is toxic to kidneys, lungs, liver. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact: No known effect on eye contact, rinse with water for a few minutes.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 570°C (1058°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances:

Non-flammable in presence of open flames and sparks, of heat, of oxidizing materials, of reducing materials, of combustible materials, of moisture.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:

Material in powder form, capable of creating a dust explosion. When heated to decomposition it emits toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Highly toxic or infectious materials should be stored in a separate locked safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.01 (ppm) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 112.4 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: 765°C (1409°F)

Melting Point: 320.9°C (609.6°F)

Critical Temperature: Not available.

Specific Gravity: 8.64 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water, methanol, diethyl ether, n-octanol.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity: Reacts violently with potassium.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 890 mg/kg [Mouse]. Acute toxicity of the dust (LC50): 229.9 mg/m³ 4 hour(s) [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A2 (Suspected for human.) by ACGIH, 2 (Reasonably anticipated.) by NTP. The substance is toxic to kidneys, lungs, liver.

Other Toxic Effects on Humans:

Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: An allergen. 0047 Animal: embryotoxic, passes through the placental barrier.

Special Remarks on other Toxic Effects on Humans: May cause allergic reactions, exzema and/or dehydration of the skin.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification:

Identification:

Special Provisions for Transport:

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Cadmium California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Cadmium Pennsylvania RTK: Cadmium Massachusetts RTK: Cadmium TSCA 8(b) inventory: Cadmium SARA 313 toxic chemical notification and release reporting: Cadmium CERCLA: Hazardous substances.: Cadmium

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R26- Very toxic by inhalation. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References:

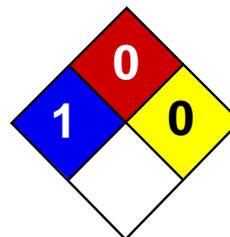
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Liste des produits purs tératogènes, mutagènes, cancérogènes. Répertoire toxicologique de la Commission de la Santé et de la Sécurité du Travail du Québec. -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangereuses au Canada. Centre de conformité international Ltée. 1986.

Other Special Considerations: Not available.

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Health	1
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet

Lead MSDS

Section 1: Chemical Product and Company Identification

Product Name: Lead

Catalog Codes: SLL1291, SLL1669, SLL1081, SLL1459, SLL1834

CAS#: 7439-92-1

RTECS: OF7525000

TSCA: TSCA 8(b) inventory: Lead

CI#: Not available.

Synonym: Lead Metal, granular; Lead Metal, foil; Lead Metal, sheet; Lead Metal, shot

Chemical Name: Lead

Chemical Formula: Pb

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Lead	7439-92-1	100

Toxicological Data on Ingredients: Lead LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

Slightly hazardous in case of skin contact (permeator). **CARCINOGENIC EFFECTS:** Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. **MUTAGENIC EFFECTS:** Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance may be toxic to blood, kidneys, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Non-flammable in presence of open flames and sparks, of shocks, of heat.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: When heated to decomposition it emits highly toxic fumes of lead.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.05 (mg/m³) from ACGIH (TLV) [United States] TWA: 0.05 (mg/m³) from OSHA (PEL) [United States] TWA: 0.03 (mg/m³) from NIOSH [United States] TWA: 0.05 (mg/m³) [Canada] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 207.21 g/mole

Color: Bluish-white. Silvery. Gray

pH (1% soln/water): Not applicable.

Boiling Point: 1740°C (3164°F)

Melting Point: 327.43°C (621.4°F)

Critical Temperature: Not available.

Specific Gravity: 11.3 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, excess heat

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Can react vigorously with oxidizing materials. Incompatible with sodium carbide, chlorine trifluoride, trioxane + hydrogen peroxide, ammonium nitrate, sodium azide, disodium acetylide, sodium acetylide, hot concentrated nitric acid, hot concentrated hydrochloric acid, hot concentrated sulfuric acid, zirconium.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. May cause damage to the following organs: blood, kidneys, central nervous system (CNS).

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:

Acute Potential: Skin: Lead metal granules or dust: May cause skin irritation by mechanical action. Lead metal foil, shot or sheets: Not likely to cause skin irritation Eyes: Lead metal granules or dust: Can irritate eyes by mechanical action. Lead metal foil, shot or sheets: No hazard. Will not cause eye irritation. Inhalation: In an industrial setting, exposure to lead mainly occurs from inhalation of dust or fumes. Lead dust or fumes: Can irritate the upper respiratory tract (nose, throat) as well as the bronchi and lungs by mechanical action. Lead dust can be absorbed through the respiratory system. However, inhaled lead does not accumulate in the lungs. All of an inhaled dose is eventually absorbed or transferred to the gastrointestinal tract. Inhalation effects of exposure to fumes or dust of inorganic lead may not develop quickly. Symptoms may include metallic taste, chest pain, decreased physical fitness, fatigue, sleep disturbance, headache, irritability, reduces memory, mood and personality changes, aching bones and muscles, constipation, abdominal pains, decreasing appetite. Inhalation of large amounts may lead to ataxia, delirium, convulsions/seizures, coma, and death. Lead metal foil, shot, or sheets: Not an inhalation hazard unless metal is heated. If metal is heated, fumes will be released. Inhalation of these fumes may cause "fume metal fever", which is characterized by flu-like symptoms. Symptoms may include metallic taste, fever, nausea, vomiting, chills, cough, weakness, chest pain, generalized muscle pain/aches, and increased white blood cell count. Ingestion: Lead metal granules or dust: The symptoms of lead poisoning include abdominal pain or cramps (lead colic), spasms, nausea, vomiting, headache, muscle weakness, hallucinations, distorted perceptions, "lead line" on the gums, metallic taste, loss of appetite, insomnia, dizziness and other symptoms similar to that of inhalation. Acute poisoning may result in high lead levels in the blood and urine, shock, coma and death in extreme cases. Lead metal foil, shot or sheets: Not an ingestion hazard for usual industrial handling.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations**Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information**Federal and State Regulations:**

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (female) which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (male) which would require a warning under the statute: Lead California prop. 65 (no significant risk level): Lead: 0.0005 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Lead Connecticut hazardous material survey.: Lead Illinois toxic substances disclosure to employee act: Lead Illinois chemical safety act: Lead New York release reporting list: Lead Rhode Island RTK hazardous substances: Lead Pennsylvania RTK: Lead

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R20/22- Harmful by inhalation and if swallowed. R33- Danger of cumulative effects. R61- May cause harm to the unborn child. R62- Possible risk of impaired fertility. S36/37- Wear suitable protective clothing and gloves. S44- If you feel unwell, seek medical advice (show the label when possible). S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

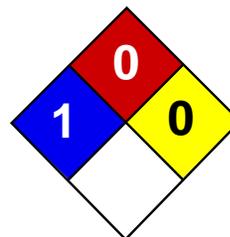
References: Not available.

Other Special Considerations: Not available.

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Health	1
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet Manganese MSDS

Section 1: Chemical Product and Company Identification

Product Name: Manganese

Catalog Codes: SLM2245

CAS#: 7439-96-5

RTECS: OO9275000

TSCA: TSCA 8(b) inventory: Manganese

CI#: Not available.

Synonym:

Chemical Name: Manganese

Chemical Formula: Mn

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Manganese	7439-96-5	100

Toxicological Data on Ingredients: Manganese: ORAL (LD50): Acute: 9000 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, lungs, brain, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:

Moderate fire potential, in the form of dust or powder, when exposed to flame. When manganese is heated in the vapor of phosphorus at a very dull red heat, union occurs with incandescence. Concentrated nitric acid reacts with powdered manganese with incandescence and explosion. Powdered manganese ignites in chlorine.

Special Remarks on Explosion Hazards: Moderate explosion potential, in the form of dust or powder, when exposed to flame.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, reducing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.1 (mg/m³) from ACGIH (TLV) [United States] TWA: 5 (mg/m³) [Canada] TWA: 1 STEL: 3 (mg/m³) from NIOSH [United States] TWA: 5 (mg/m³) from OSHA (PEL) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Odorless.

Taste: Not available.

Molecular Weight: 54.94 g/mole

Color: Grayish white.

pH (1% soln/water): Not applicable.

Boiling Point: 2095°C (3803°F)

Melting Point: 1244°C (2271.2°F)

Critical Temperature: Not available.

Specific Gravity: 7.44 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, reducing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Superficially oxidized on exposure to air. Reacts with aqueous solutions of sodium or potassium bicarbonate. Reacts with dilute mineral acids with evolution of hydrogen and formation of divalent manganous salts. Reacts with fluorine and chlorine to produce di or tri fluoride, and di and tri chloride, respectively. In the form of powder, it reduces most metallic oxides on heating. On heating, it reacts directly with carbon, phosphorus, antimony, or arsenic. Also incompatible with hydroxides, cyanides, carbonates.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 9000 mg/kg [Rat].

Chronic Effects on Humans: May cause damage to the following organs: blood, lungs, brain, central nervous system (CNS).

Other Toxic Effects on Humans:

Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant), of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

Manganese can cross the placenta. May cause cancer (tumorigenic) based on animal data.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: May cause skin irritation Eyes: Dust may cause mechanical irritation. Inhalation: Dust may cause respiratory tract irritation. May cause "Metal Fume Fever" which may include flu-like symptoms (fever, chills, upset stomach, vomiting, weakness, headache, body aches, muscle pains, dry mouth and throat, coughing, tightness of the chest). May affect behavior/Central Nervous system (change in motor activity, torpor, nervousness, tremor, yawning, mood swings, irritability, restlessness, fatigue, headache, apathy, languor, insomnia than somnolence, hallucinations, delusions, uncontrollable laughter followed by crying, compulsions, aggressiveness, weakness in legs, memory loss, decreased libido, impotence, salivation, hearing loss, slow gait,), and respiration (dyspnea, shallow respiration, cyanosis, alveolar inflammation). Ingestion: Repeated or prolonged exposure from ingestion may affect brain (degenerative changes), blood and metabolism. Ingestion: May cause digestive tract irritation. There is a low gastrointestinal absorption of manganese. Chronic Potential Health Effects: Inhalation: Repeated or prolonged exposure from inhalation may affect brain (degenerative changes), behavior/Central Nervous system with symptoms to acute exposure. May also affect liver (chronic liver disease, jaundice) Ingestion: Repeated or prolonged exposure from ingestion may affect brain, blood and metabolism

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:

Illinois toxic substances disclosure to employee act: Manganese Rhode Island RTK hazardous substances: Manganese Pennsylvania RTK: Manganese Minnesota: Manganese Massachusetts RTK: Manganese New Jersey: Manganese New Jersey spill list: Manganese Louisiana spill reporting: Manganese California Director's List of Hazardous Substances: Manganese TSCA 8(b) inventory: Manganese SARA 313 toxic chemical notification and release reporting: Manganese

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC): Not applicable.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Safety glasses.

Section 16: Other Information

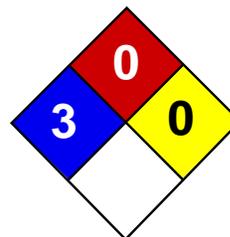
References: Not available.

Other Special Considerations: Not available.

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Health	3
Fire	0
Reactivity	0
Personal Protection	

Material Safety Data Sheet Mercury MSDS

Section 1: Chemical Product and Company Identification

Product Name: Mercury

Catalog Codes: SLM3505, SLM1363

CAS#: 7439-97-6

RTECS: OV4550000

TSCA: TSCA 8(b) inventory: Mercury

CI#: Not applicable.

Synonym: Quick Silver; Colloidal Mercury; Metallic Mercury; Liquid Silver; Hydragryum

Chemical Name: Mercury

Chemical Formula: Hg

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Mercury	7439-97-6	100

Toxicological Data on Ingredients: Mercury LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

Hazardous in case of skin contact (permeator). **CARCINOGENIC EFFECTS:** Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. **MUTAGENIC EFFECTS:** Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance may be toxic to blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation.

Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:

When thrown into mercury vapor, boron phosphodiiodide ignites at once. Flame forms with chlorine jet over mercury surface at 200 deg to 300 deg C. Mercury undergoes hazardous reactions in the presence of heat and sparks or ignition.

Special Remarks on Explosion Hazards:

A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. CHLORINE DIOXIDE & LIQUID HG, WHEN MIXED, EXPLODE VIOLENTLY. Mercury and Ammonia can produce an

explosive compound. A mixture of the dry carbonyl and oxygen will explode on vigorous shaking with mercury. Methyl azide in the presence of mercury was shown to be potentially explosive.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, metals.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 25°C (77°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.025 from ACGIH (TLV) [United States] SKIN TWA: 0.05 CEIL: 0.1 (mg/m³) from OSHA (PEL) [United States]
Inhalation TWA: 0.025 (mg/m³) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Heavy liquid)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 200.59 g/mole

Color: Silver-white

pH (1% soln/water): Not available.

Boiling Point: 356.73°C (674.1°F)

Melting Point: -38.87°C (-38°F)

Critical Temperature: 1462°C (2663.6°F)

Specific Gravity: 13.55 (Water = 1)

Vapor Pressure: Not available.

Vapor Density: 6.93 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Ground mixtures of sodium carbide and mercury, aluminum, lead, or iron can react vigorously. A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. Incompatible with boron diiodophosphide; ethylene oxide; metal oxides, metals(aluminum, potassium, lithium, sodium, rubidium); methyl azide; methylsilane, oxygen; oxidants(bromine, peroxyformic acid, chlorine dioxide, nitric acid, tetracarbonylnickel, nitromethane, silver perchlorate, chlorates, sulfuric acid, nitrates,); tetracarbonylnickel, oxygen, acetylinic compounds, ammonia, ethylene oxide, methylsilane, calcium,

Special Remarks on Corrosivity:

The high mobility and tendency to dispersion exhibited by mercury, and the ease with which it forms alloys (amalgam) with many laboratory and electrical contact metals, can cause severe corrosion problems in laboratories. Special precautions: Mercury can attack copper and copper alloy materials.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS).

Other Toxic Effects on Humans:

Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May affect genetic material. May cause cancer based on animal data. Passes through the placental barrier in animal. May cause adverse reproductive effects(paternal effects- spermatogenesis; effects on fertility - fetotoxicity, post-implantation mortality), and birth defects.

Special Remarks on other Toxic Effects on Humans:

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Mercury UNNA: 2809 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Mercury California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Mercury Connecticut hazardous material survey.: Mercury Illinois toxic substances disclosure to employee act: Mercury Illinois chemical safety act: Mercury New York acutely hazardous substances: Mercury Rhode Island RTK hazardous substances: Mercury Pennsylvania RTK: Mercury Minnesota: Mercury Massachusetts RTK: Mercury New Jersey: Mercury New Jersey spill list: Mercury Louisiana spill reporting: Mercury California Director's List of Hazardous Substances.: Mercury TSCA 8(b) inventory: Mercury SARA 313 toxic chemical notification and release reporting: Mercury CERCLA: Hazardous substances.: Mercury: 1 lbs. (0.4536 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):

R23- Toxic by inhalation. R33- Danger of cumulative effects. R38- Irritating to skin. R41- Risk of serious damage to eyes. R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S2- Keep out of the

reach of children. S7- Keep container tightly closed. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S46- If swallowed, seek medical advice immediately and show this container or label. S60- This material and its container must be disposed of as hazardous waste. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 0

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

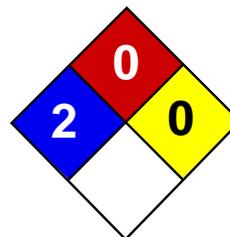
References: Not available.

Other Special Considerations: Not available.

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Health	2
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet Nickel metal MSDS

Section 1: Chemical Product and Company Identification

Product Name: Nickel metal

Catalog Codes: SLN2296, SLN1342, SLN1954

CAS#: 7440-02-0

RTECS: QR5950000

TSCA: TSCA 8(b) inventory: Nickel metal

CI#: Not applicable.

Synonym: Nickel Metal shot; Nickel metal foil.

Chemical Name: Nickel

Chemical Formula: Ni

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Nickel metal	7440-02-0	100

Toxicological Data on Ingredients: Nickel metal LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer), of eye contact (irritant), of ingestion.

Potential Chronic Health Effects:

Slightly hazardous in case of skin contact (sensitizer), of ingestion, of inhalation (lung sensitizer). **CARCINOGENIC EFFECTS:** Classified 2B (Possible for human.) by IARC. Classified 2 (Some evidence.) by NTP. **MUTAGENIC EFFECTS:** Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance is toxic to skin. The substance may be toxic to kidneys, lungs, liver, upper respiratory tract. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

Flammable solid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Material in powder form, capable of creating a dust explosion. This material is flammable in powder form only.

Special Remarks on Explosion Hazards:

Material in powder form, capable of creating a dust explosion. Mixtures containing Potassium Perchlorate with Nickel & Titanium powders & infusorial earth can explode. Adding 2 or 3 drops of approximately 90% peroxyformic acid to powdered nickel will result in explosion. Powdered nickel reacts explosively upon contact with fused ammonium nitrate at temperatures below 200 deg. C.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If you feel unwell, seek medical attention and show the label when possible. Keep away from incompatibles such as oxidizing agents, combustible materials, metals, acids.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 1 (mg/m³) from ACGIH (TLV) [United States] Inhalation Respirable. TWA: 0.5 (mg/m³) [United Kingdom (UK)] TWA: 1 (mg/m³) from OSHA (PEL) [United States] Inhalation Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid. Lustrous solid.)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 58.71 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: 2730°C (4946°F)

Melting Point: 1455°C (2651°F)

Critical Temperature: Not available.

Specific Gravity: Density: 8.908 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:

Insoluble in cold water, hot water. Insoluble in Ammonia. Soluble in dilute Nitric Acid. Slightly soluble in Hydrochloric Acid, Sulfuric Acid.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, combustible materials, metals, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Incompatible with strong acids, selenium, sulfur, wood and other combustibles, nickel nitrate, aluminum, aluminum trichloride, ethylene, p-dioxan, hydrogen, methanol, non-metals, oxidants, sulfur compounds, aniline, hydrogen sulfide, flammable solvents, hydrazine, and metal powders (especially zinc, aluminum, and magnesium), ammonium nitrate, nitryl fluoride, bromine pentafluoride, potassium perchlorate + titanium powder + indusorial earth.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. Classified 2 (Some evidence.) by NTP. Causes damage to the following organs: skin. May cause damage to the following organs: kidneys, lungs, liver, upper respiratory tract.

Other Toxic Effects on Humans:

Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer), of ingestion.

Special Remarks on Toxicity to Animals:

Lowest Published Lethal Dose/Conc: LDL [Rat] - Route: Oral; Dose: 5000 mg/kg LDL [Guinea Pig] - Route: Oral; Dose: 5000 mg/kg

Special Remarks on Chronic Effects on Humans: May cause cancer based on animal test data

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Nickel dust and fume can irritate skin. Eyes: Nickel dust and fume can irritate eyes. Inhalation: Inhalation of dust or fume may cause respiratory tract irritation with non-productive cough, hoarseness, sore throat, headache, vertigo, weakness, chest pain, followed by delayed effects, including tachypnea, dyspnea, and ARDS. Death due to ARDS has been reported following inhalation of high concentrations of respirable metallic nickel dust. Later effects may include pulmonary edema and fibrosis. Ingestion: Metallic nickel is generally considered not to be acutely toxic if ingested. Ingestion may cause nausea, vomiting, abdominal , and diarrhea. Nickel may damage the kidneys(proteinuria), and may affect liver function. It may also affect behavior (somnolence), and cardiovascular system (increased coronary artery resistance, decreased myocardial contractility, myocardial damage, regional or general arteriolar or venus dilation). Chronic Potential Health Effects: Skin: May cause skin allergy. Nickel and nickel compounds are among the most common sensitizers inducing allergic contact dermatitis. Inhalation: Chronic inhalation nickel dust or fume can cause chronic hypertrophic rhinitis, sinusitis, nasal polyps, perforation of the nasal septum, chronic pulmonary irritation, fibrosis, pulmonary edema, pulmonary eosinophilia, Pneumoconiosis, allergies (asthma-like allergy), and cancer of the nasal sinus cavities, lungs, and possibly other organs. Future exposures can cause asthma attacks with shortness of breath, wheezing, cough, and/or chest tightness. Chronic inhalation of nickel dust or fume may also affect the liver (impaired liver function tests), and blood (changes in red blood cell count). Ingestion: Prolonged or repeated ingestion of nickel can be a source chronic urticaria and other signs of allergy.

Chronic ingestion of Nickel may also affect respiration and cause pneumoconiosis or fibrosis. Note: In the general population, sensitization occurs from exposure to nickel-containing coins, jewelry, watches,

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Nickel metal California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Nickel metal Connecticut hazardous material survey.: Nickel metal Illinois toxic substances disclosure to employee act: Nickel metal Illinois chemical safety act: Nickel metal New York release reporting list: Nickel metal Rhode Island RTK hazardous substances: Nickel metal Pennsylvania RTK: Nickel metal Michigan critical material: Nickel metal Massachusetts RTK: Nickel metal Massachusetts spill list: Nickel metal New Jersey: Nickel metal New Jersey spill list: Nickel metal Louisiana spill reporting: Nickel metal California Director's List of Hazardous Substances: Nickel metal TSCA 8(b) inventory: Nickel metal

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R40- Possible risks of irreversible effects. R43- May cause sensitization by skin contact. S22- Do not breathe dust. S36- Wear suitable protective clothing.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

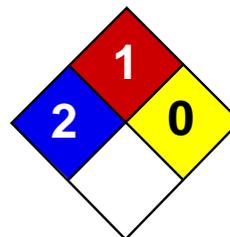
References: Not available.

Other Special Considerations: Not available.

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Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet

Selenium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Selenium

Catalog Codes: SLS2629

CAS#: 7782-49-2

RTECS: VS7700000

TSCA: TSCA 8(b) inventory: Selenium

CI#: Not available.

Synonym:

Chemical Name: Not available.

Chemical Formula: Se

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Selenium	7782-49-2	100

Toxicological Data on Ingredients: Selenium: ORAL (LD50): Acute: 6700 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Material in powder form, capable of creating a dust explosion.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label.

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.2 (mg/m³) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Solid metallic powder.)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 78.96 g/mole

Color: Not available.

pH (1% soln/water): Not applicable.

Boiling Point: 684.9°C (1264.8°F)

Melting Point: 217°C (422.6°F)

Critical Temperature: Not available.

Specific Gravity: 4.81 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 6700 mg/kg [Rat].

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans:

Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Passes through the placental barrier in animal. Excreted in maternal milk in human.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Selenium powder : UN2658 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: Selenium Massachusetts RTK: Selenium TSCA 8(b) inventory: Selenium SARA 313 toxic chemical notification and release reporting: Selenium CERCLA: Hazardous substances.: Selenium

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).

DSCL (EEC): R36- Irritating to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

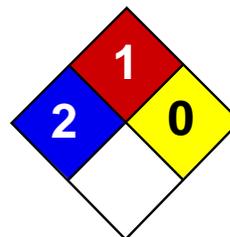
References: Not available.

Other Special Considerations: Not available.

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Last Updated: 05/21/2013 12:00 PM

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Health	2
Fire	1
Reactivity	0
Personal Protection	J

Material Safety Data Sheet

Silver MSDS

Section 1: Chemical Product and Company Identification

Product Name: Silver

Catalog Codes: SLS4222, SLS2005, SLS3427, SLS1210, SLS2632, SLS4054, SLS1837

CAS#: 7440-22-4

RTECS: VW3500000

TSCA: TSCA 8(b) inventory: Silver

CI#: Not applicable.

Synonym:

Chemical Formula: Ag

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

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1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Silver	7440-22-4	100

Toxicological Data on Ingredients: Silver: ORAL (LD50): Acute: 100 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of eye contact (irritant), of ingestion, of inhalation. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact: No known effect on skin contact, rinse with water for a few minutes.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Avoid contact with eyes In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label.

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Highly toxic or infectious materials should be stored in a separate locked safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Splash goggles. Lab coat.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.01 (mg/m³) from OSHA (PEL) TWA: 0.01 (mg/m³) from OSHA NIOSH Australia: TWA: 0.1 (mg/m³) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Solid metallic powder. Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 107.87 g/mole

Color: Not available.

pH (1% soln/water): Not applicable.

Boiling Point: 2212°C (4013.6°F)

Melting Point: 961°C (1761.8°F)

Critical Temperature: Not available.

Specific Gravity: 10.4 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Is not dispersed in cold water, hot water.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 100 mg/kg [Mouse].

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Very hazardous in case of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification:

Identification:

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Rhode Island RTK hazardous substances: Silver Pennsylvania RTK: Silver Minnesota: Silver Massachusetts RTK: Silver New Jersey: Silver TSCA 8(b) inventory: Silver TSCA 8(a) PAIR: Silver TSCA 8(d) H and S data reporting: Silver SARA 313 toxic chemical notification and release reporting: Silver: 1% CERCLA: Hazardous substances.: Silver: 1000 lbs. (453.6 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC): R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: j

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Not applicable. Lab coat. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

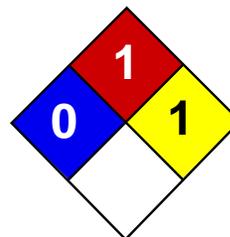
References: Not available.

Other Special Considerations: Not available.

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Health	1
Fire	1
Reactivity	1
Personal Protection	E

Material Safety Data Sheet

Zinc Metal MSDS

Section 1: Chemical Product and Company Identification

Product Name: Zinc Metal

Catalog Codes: SLZ1054, SLZ1159, SLZ1267, SLZ1099, SLZ1204

CAS#: 7440-66-6

RTECS: ZG8600000

TSCA: TSCA 8(b) inventory: Zinc Metal

CI#: Not applicable.

Synonym: Zinc Metal Sheets; Zinc Metal Shot; Zinc Metal Strips

Chemical Name: Zinc Metal

Chemical Formula: Zn

Contact Information:

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Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Zinc Metal	7440-66-6	100

Toxicological Data on Ingredients: Zinc Metal LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 480°C (896°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances:

Slightly flammable to flammable in presence of open flames and sparks, of heat, of oxidizing materials, of acids, of alkalis, of moisture. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

Flammable solid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards:

Zinc + NaOH causes ignition. Oxidation of zinc by potassium proceeds with incandescence. Residues from zinc dust /acetic acid reduction operations may ignite after long delay if discarded into waste bins with paper. Incandescent reaction when Zinc and Arsenic or Tellurium, or Selenium are combined. When hydrazine mononitrate is heated in contact with zinc, a flaming decomposition occurs at temperatures a little above its melting point. Contact with acids and alkali hydroxides (sodium hydroxide, potassium hydroxide, calcium hydroxide, etc.) results in evolution of hydrogen with sufficient heat of reaction to ignite the hydrogen gas. Zinc foil ignites if traces of moisture are present. It is water reactive and produces flammable gases on contact with water. It may ignite on contact with water or moist air.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Flammable solid that, in contact with water, emits flammable gases. Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Cover with dry earth, sand or other non-combustible material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not breathe dust. Keep away from incompatibles such as oxidizing agents, acids, alkalis, moisture.

Storage:

Keep container tightly closed. Keep container in a cool, well-ventilated area. Keep from any possible contact with water. Do not allow water to get into container because of violent reaction.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid. Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 65.39 g/mole

Color: Bluish-grey

pH (1% soln/water): Not applicable.

Boiling Point: 907°C (1664.6°F)

Melting Point: 419°C (786.2°F)

Critical Temperature: Not available.

Specific Gravity: Not available.

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water, methanol, diethyl ether, n-octanol, acetone.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials, moisture

Incompatibility with various substances:

Reactive with oxidizing agents, acids, alkalis. Slightly reactive to reactive with moisture. The product may react violently with water to emit flammable but non toxic gases.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Incompatible with acids, halogenated hydrocarbons, NH_4NO_3 , barium oxide, $\text{Ba}(\text{NO}_3)_2$, Cadmium, CS_2 , chlorates, Cl_2 , CrO_3 , F_2 , Hydroxylamine, $\text{Pb}(\text{N}_3)_2$, MnCl_2 , HNO_3 , performic acid, KClO_3 , KNO_3 , N_2O_2 , Selenium, NaClO_3 , Na_2O_2 , Sulfur, Te, water, $(\text{NH}_4)_2\text{S}$, As_2O_3 , CS_2 , CaCl_2 , chlorinated rubber, catalytic metals, halocarbons, o-nitroanisole, nitrobenzene, nonmetals, oxidants, paint primer base, pentacarbonoyliron, transition metal halides, seleninyl bromide, HCl , H_2SO_4 , $(\text{Mg} + \text{Ba}(\text{NO}_3)_2 + \text{BaO}_2)$, (ethyl acetoacetate +tribromoneopentyl alcohol. Contact with Alkali Hydroxides(Sodium Hydroxide, Potassium Hydroxide, Calcium Hydroxide, etc) results in evolution of hydrogen. Ammonium nitrate + zinc + water causes a violent reaction with evolution of steam and zinc oxide. May react with water.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: May cause skin irritation. Dermal exposure to zinc may produce leg pains, fatigue, anorexia and weight loss. Eyes: May cause eye irritation. Ingestion: May be harmful if swallowed. May cause digestive tract irritation with tightness in throat, nausea, vomiting, diarrhea, loss of appetite, malaise, abdominal pain. fever, and chills. May affect behavior/central nervous system and autonomic nervous system with ataxia, lethargy, staggering gait, mild derrangement in cerebellar function, lightheadness, dizziness, irritability, muscular stiffness, and pain. May also affect blood. Inhalation: Inhalation of zinc dust or fumes may cause respiratory tract and mucous membrane irritation with cough and chest pain. It can also cause "metal fume fever", a flu-like condition characterized appearance of chills, headached fever, maliase, fatigue, sweating, extreme thirst, aches in the legs and chest, and difficulty in breathing. A sweet taste may also be be present in metal fume fever, as well as a dry throat, aches, nausea, and vomiting, and pale grey cyanosis. The toxicological properties of this substance have not been fully investisgated.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: Not available.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:

New York release reporting list: Zinc Metal Rhode Island RTK hazardous substances: Zinc Metal Pennsylvania RTK: Zinc Metal Florida: Zinc Metal Michigan critical material: Zinc Metal Massachusetts RTK: Zinc Metal New Jersey: Zinc Metal California Director's List of Hazardous Substances: Zinc Metal TSCA 8(b) inventory: Zinc Metal TSCA 12(b) one time export: Zinc Metal SARA 313 toxic chemical notification and release reporting: Zinc Metal CERCLA: Hazardous substances.: Zinc Metal: 1000 lbs. (453.6 kg)

Other Regulations: EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not Available

DSCL (EEC):

R15- Contact with water liberates extremely flammable gases. R17- Spontaneously flammable in air. S7/8- Keep container tightly closed and dry.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 1

Reactivity: 1

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 0

Flammability: 1

Reactivity: 1

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Appendix E

MUNICIPAL SETTING DESIGNATION APPLICATION

13501 INDUSTRIAL ROAD HOUSTON, TEXAS

PROPERTIES OF CHEMICALS of CONCERN IN DESIGNATED GROUNDWATER

The following COCs have been detected in the groundwater at the Designated Property. COCs in **bold** have been identified at concentrations above the applicable residential ingestion PCL, or the method quantitation limit exceeds the ingestion PCL for that analyte. The other COCs were identified at concentrations below the applicable ingestion PCL:

- Arsenic
- Chromium
- Mercury
- Barium
- Lead
- **Selenium**
- Cadmium
- **Manganese**
- Silver

Soil and groundwater analytical data tables are presented in **Tables 1** through **3** (presented in **Appendix F**). The analytical data tables present the concentrations of COCs that are above the ingestion PCL in comparison to their respective ingestion and non-ingestion PCLs.

Figure 6 and **Figure 10** (previously presented in **Appendix C**) depict the horizontal extent of the groundwater and soil ingestion PCLE zones for arsenic, **Figure 7** and **Figure 15** depict the horizontal extent of the groundwater and soil ingestion PCLE zones for manganese, and **Figure 8** and **Figure 18** depict the horizontal extent of the groundwater and soil ingestion PCLE zones for selenium.

Appendix F

MUNICIPAL SETTING DESIGNATION APPLICATION

13501 INDUSTRIAL ROAD HOUSTON, TEXAS

COC TABLES

Twenty-one soil borings and 17 sludge/soil samples were advanced across the Designated Property (refer to **Figure 4** in **Appendix C**). Soil samples collected from the soil borings were submitted for analysis of priority pollutant metals, barium, and manganese. The sludge soil samples were submitted for analysis of arsenic, cadmium, chromium, manganese, and selenium using SPLP. The attached soil and sludge analytical data tables, **Table 1** and **Table 2**, contain the concentrations of each COC detected in soil and the respective critical PCLs both with and without an MSD. Antimony, arsenic, barium, beryllium, cadmium, lead, manganese, mercury, nickel, selenium, silver, and zinc were detected at concentrations exceeding their respective critical PCL for residential land use. The aforementioned metals also exceed critical PCLs for commercial/industrial properties with the exception of nickel. Additionally, arsenic, cadmium, and manganese were detected at concentrations exceeding their respective leachable ingestion PCLs in the sludge samples.

The attached groundwater analytical data table, **Table 3**, contains the concentrations of each COC in groundwater and their respective critical PCLs both with and without an MSD. No COCs were detected in groundwater exceeding the non-ingestion PCLs.

The table below reflects COCs identified in groundwater at the Designated Property, the Tier 1 residential ingestion and non-ingestion PCLs, and the maximum concentrations identified. Maximum detections are signified in **bold**, and exceedances of the applicable PCL are **underlined**. Arsenic, manganese, and selenium were the only COCs with PCL exceedances in groundwater. All concentrations are in mg/L.

Appendix F

COCs Identified in Groundwater at the Designated Property

Groundwater			
COC	^{GW}GW_{Ing} Ingestion Pathway	^{Air}GW_{Inh-V} Non-ingestion Pathway	Maximum Concentration
Arsenic	0.010	--	<u>0.38</u>
Barium	2.0	--	0.066
Cadmium	0.0050	--	0.004
Chromium	0.1	--	0.055
Lead	0.015	--	0.006
Manganese	1.1	--	<u>1.4</u>
Mercury	0.002	7.3	0.00011
Selenium	0.05	--	<u>0.35</u>
Silver	0.12	--	0.0092
All concentrations are in mg/L			

**TABLE 1
SOIL ANALYTICAL DATA SUMMARY - METALS**

*Densimix Holding Corporation
13501 Industrial Road
Houston, Texas*

Sample ID ¹	Date Collected	Depth (feet)	pH	Total Metals (mg/kg) ²														
				Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Copper	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
Representative Concentration										43				53				
SB-1	9/19/2012	12	---	1.9	260	910	1.5	61	40	73	110	94,000	0.24	96	26	19	<20 O	3,700
SB-2	9/19/2012	8	8.1	<1.6 O	6.0	2,600	2.0	0.44	32	24	38	7,700	0.039	24	0.52 J	0.73	<2.0 O	96
	9/19/2012	12	---	---	5.7	---	---	<0.040	---	---	31 B	820	---	---	---	---	---	---
SB-3	9/19/2012	8	7.9	<0.66 O	7.2	400	2.4	0.093 J	26	12	19	420	0.0018 J	28	<0.32	<0.16	<0.40	45
	9/19/2012	12	---	---	4.3	---	---	<0.040	---	---	36 B	460	---	---	---	---	---	---
SB-4	9/19/2012	12	---	<0.33	6.4	210	1.1	0.59	27	11	20	710	0.0012 J	17	<0.32	<0.16	<0.80 O	77
SB-5	9/19/2012	8	8.0	<0.33	8.2	720	1.2	0.21 J	15	22	44	2,200	0.014 J	12	0.68 J	<0.16	<2.0 O	66
	9/19/2012	12	---	---	4.9	---	---	<0.040	---	---	29 B	240	---	---	---	---	---	---
SB-6	9/20/2012	8	8.5	1.5	3.6 J	260	1.3	<2.0 O	20	7.4	20	280	0.0076 J	11	<1.6 O	<0.82 O	<2.0 O	29
	9/20/2012	12	---	---	5.5	---	---	<0.040	---	---	31 B	460	---	---	---	---	---	---
	9/20/2012	16	---	---	2.0	---	---	<0.040	---	---	24 B	150	---	---	---	---	---	---
SB-7	9/20/2012	8	---	1.1 J	9.0	260	0.9	1.2 J	18	8.3	34	3,100	0.040	9.5	2.2 J	<0.82 O	<2.0 O	120
	9/20/2012	12	---	---	3.4	---	---	<0.040	---	---	26 B	240	---	---	---	---	---	---
	9/20/2012	16	---	---	9.1	---	---	<0.040	---	---	49 B	1,100	---	---	---	---	---	---
SB-8	9/20/2012	16	---	8.0	57	180	1.3	7.8	33	31	230	6,700	0.046	31	<1.6 O	<0.82 O	<2.0 O	550
SB-9	9/20/2012	16	---	---	13	---	---	3.8	---	---	400 B	3,000	---	---	---	---	---	---
SB-10	9/20/2012	12	---	---	5.9	---	---	<0.040	---	---	46 B	1,100	---	---	---	---	---	---
	9/20/2012	16	---	---	12	---	---	<0.040	---	---	60 B	1,500	---	---	---	---	---	---
SB-11	9/20/2012	2	---	---	250	---	---	57	---	---	850 B	130,000	---	---	---	---	---	---
	9/20/2012	6	---	---	6.2	---	---	<0.040	---	---	29 B	590	---	---	---	---	---	---
	9/20/2012	12	---	---	6.9	---	---	<0.040	---	---	36 B	1,300	---	---	---	---	---	---
TotSoilComb Tier 1 Residential PCL ³				15	24	8,100	3.8	52	27,000	550	500	3,400	2.1	840	310	97	6.3	9,900
GWSoilIng Tier 1 Residential PCL ⁴				2.7	2.5	220	0.92	0.75	1,200	520	1.5	580	0.0039	79	1.1	0.24	0.87	1,200
TotSoilComb Tier 1 Commercial PCL ⁵				310	200	12,000	250	850	75,000	39,000	1,600	24,000	3.3	8,600	4,900	2,300	78	250,000
GWSoilIng Tier 1 Commercial PCL ⁶				2.7	2.5	220	0.92	0.75	1,200	520	1.5	5,100	0.0039	230	1.1	0.71	0.87	3,500
Texas Specific Background Value				1	5.9	300	1.5	-	30	15	15	300	0.04	10	0.3	-	-	30
3-Phase Partition Model, Soil PCL Protective of GW to SW				145	---	---	16	---	---	19	---	---	---	---	28	---	---	182

Notes:

¹Samples collected by W&M and analyzed by ESC Laboratory Sciences in Mount Juliet, Tennessee.

²Metals analyzed by U.S. Environmental Protection Agency (EPA) EPA Method 6010B or 7471.

³Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program (TRRP) Tier 1 Protective Concentration Level (PCL), TotSoilComb pathway, residential land use, Class 1 groundwater, 30-acre source area (Municipal Setting Designation [MSD] Adjusted PCL).

⁴TCEQ TRRP Tier 1 PCL, ^{GW}SoilIng pathway, residential land use, Class 1 groundwater, 30-acre source area.

⁵TCEQ TRRP Tier 1 PCL, ^{TotSoilComb} pathway, commercial land use, Class 1 groundwater, 30-acre source area.

⁶TCEQ TRRP Tier 1 PCL, ^{GW}SoilIng pathway, commercial land use, Class 1 groundwater, 30-acre source area.

Bold PCL values indicate exceedances of the MSD ingestion PCL.

Highlighted PCL values indicate exceedances of the MSD adjusted (non-ingestion) PCL.

(O) Indicates sample was diluted due to matrix interferences that impaired the ability to make an accurate analytical determination.

(J) Indicates the estimated value is below the lowest calibration point. Confidence correlates with concentration.

(J3) Indicates the associated batch QC was outside the established quality control range for precision.

(J5) Indicates sample matrix interfered with the ability to make an accurate determination; spike value was high.

(J6) Indicates sample matrix interfered with the ability to make an accurate determination; spike value was low.

(P1) Indicates the RPD value is not applicable for sample concentrations less than 5 times the reporting limit.

(V) Indicates the sample concentration was too high to evaluate accurate spike recoveries.

(B) The indicated compound was found in the associated method blank as well as the laboratory sample.

(<) Indicates the value was not detected above the Sample Quantitative Limit (SQL).

(---) Not applicable/not analyzed.

**TABLE 1
SOIL ANALYTICAL DATA SUMMARY - METALS**

*Densimix Holding Corporation
13501 Industrial Road
Houston, Texas*

Sample ID ¹	Date Collected	Depth (feet)	pH	Total Metals (mg/kg) ²															
				Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Copper	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Zinc	
Representative Concentration										43				53					
SB-12	9/20/2012	6	---	---	6.4	---	---	<0.040	---	---	29 B	200	---	---	---	---	---	---	
	9/20/2012	12	---	---	3.9	---	---	<0.040	---	---	25 B	180	---	---	---	---	---	---	
SB-13	9/20/2012	8	---	---	14	---	---	1.0	---	---	73 B	2,100	---	---	---	---	---	---	
SB-14	9/20/2012	6	---	---	4.0	---	---	<0.040	---	---	33 B	130 J6, J5, J3	---	---	---	---	---	---	
	9/20/2012	12	---	---	<1.6 O	---	---	<0.040	---	---	8.9 B	160	---	---	---	---	---	---	
MW-01	10/10/2012	18	---	---	10	---	---	<0.040	---	---	36	360	---	---	---	---	---	---	
	10/10/2012	28	---	---	0.66 J	---	---	<0.040	---	---	14	25	---	---	---	---	---	---	
DUP-03 (MW-01)	10/10/2012	18	---	---	2.20	---	---	<0.040	---	---	19	190	---	---	---	---	---	---	
MW-02	10/11/2012	18	---	---	8.5	---	---	<0.040	---	---	18	390	---	---	---	---	---	---	
	10/11/2012	23	---	---	7.0	---	---	<0.040	---	---	14	380	---	---	---	---	---	---	
MW-03	10/10/2012	18	---	---	5.4	---	---	<0.040	---	---	28	230	---	---	---	---	---	---	
	10/10/2012	27	---	---	4.0	---	---	<0.040	---	---	28	420	---	---	---	---	---	---	
MW-04	10/10/2012	18	---	---	4.2	---	---	<0.040	---	---	28	250	---	---	---	---	---	---	
	10/10/2012	28	---	---	5.8	---	---	<0.040	---	---	32	230	---	---	---	---	---	---	
MW-05	10/11/2012	18	---	---	6.0	---	---	<0.040 O	---	---	5.1	300	---	---	---	---	---	---	
	10/11/2012	26	---	---	5.4	---	---	0.093 J	---	---	17	290	---	---	---	---	---	---	
MW-06	2/7/2013	2	---	---	1.0	70	---	0.14 J	12	---	12	39	0.0098	---	0.72	<0.19 O	---	---	
MW-07	2/7/2013	9	---	---	2.3	77	---	0.20 J	20	---	20	370	0.0076	---	1.5	<0.21 O	---	---	
DUP (MW-07)	2/7/2013	9	---	---	2.9 JP1	160 J3J5	---	0.16 J	18	---	24	220 J3J5	0.018 J	---	<1.2 O	<0.21 O	---	---	
TotSoilComb Tier 1 Residential PCL ³				15	24	8,100	3.8	52	27,000	550	500	3,400	2.1	840	310	97	6.3	9,900	
GWSoilIng Tier 1 Residential PCL ⁴				2.7	2.5	220	0.92	0.75	1,200	520	1.5	580	0.0039	79	1.1	0.24	0.87	1,200	
TotSoilComb Tier 1 Commercial PCL ⁵				310	200	12,000	250	850	75,000	39,000	1,600	24,000	3.3	8,600	4,900	2,300	78	250,000	
GWSoilIng Tier 1 Commercial PCL ⁶				2.7	2.5	220	0.92	0.75	1,200	520	1.5	5,100	0.0039	230	1.1	0.71	0.87	3,500	
Texas Specific Background Value				1	5.9	300	1.5	-	30	15	15	300	0.04	10	0.3	-	-	30	
3-Phase Partition Model, Soil PCL Protective of GW to SW				145	---	---	16	---	---	19	---	---	---	---	28	---	---	---	182

Notes:

¹Samples collected by W&M and analyzed by ESC Laboratory Sciences in Mount Juliet, Tennessee.

²Metals analyzed by U.S. Environmental Protection Agency (EPA) EPA Method 6010B or 7471.

³Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program (TRRP) Tier 1 Protective Concentration Level (PCL), TotSoilComb pathway, residential land use, Class 1 groundwater, 30-acre source area (Municipal Setting Designation [MSD] Adjusted PCL).

⁴TCEQ TRRP Tier 1 PCL, ^{GW}SoilIng pathway, residential land use, Class 1 groundwater, 30-acre source area.

⁵TCEQ TRRP Tier 1 PCL, ^{TotSoilComb} pathway, commercial land use, Class 1 groundwater, 30-acre source area.

⁶TCEQ TRRP Tier 1 PCL, ^{GW}SoilIng pathway, commercial land use, Class 1 groundwater, 30-acre source area.

Bold PCL values indicate exceedances of the MSD ingestion PCL.

Highlighted PCL values indicate exceedances of the MSD adjusted (non-ingestion) PCL.

(O) Indicates sample was diluted due to matrix interferences that impaired the ability to make an accurate analytical determination.

(J) Indicates the estimated value is below the lowest calibration point. Confidence correlates with concentration.

(J3) Indicates the associated batch QC was outside the established quality control range for precision.

(J5) Indicates sample matrix interfered with the ability to make an accurate determination; spike value was high.

(J6) Indicates sample matrix interfered with the ability to make an accurate determination; spike value was low.

(P1) Indicates the RPD value is not applicable for sample concentrations less than 5 times the reporting limit.

(V) Indicates the sample concentration was too high to evaluate accurate spike recoveries.

(B) The indicated compound was found in the associated method blank as well as the laboratory sample.

(<) Indicates the value was not detected above the Sample Quantitative Limit (SQL).

(---) Not applicable/not analyzed.

**TABLE 2
SOIL ANALYTICAL DATA SUMMARY - SPLP METALS**

*Densimix Holding Corporation
13501 Industrial Rd.
Houston, Texas*

Sample ID ¹	Sludge Type ²	Laboratory ³	Date Collected	SPLP Metals ⁴ (mg/L)				
				Arsenic	Cadmium	Chromium	Manganese	Selenium
B-1C	Composite	ESC	3/13/2013	0.63	0.0039	0.0064	3.1	0.0012
B-2C	Composite	ESC	3/13/2013	0.54	0.032	0.0084	20	0.007
B-3C	Composite	ESC	3/13/2013	1.1	0.034	0.0071	24	0.011
B-4C	Composite	ESC	3/13/2013	0.35	0.042	0.0090	25	0.0027
B-5C	Composite	ESC	3/13/2013	0.12	0.0012	0.0048	0.76	0.0012
B-6C	Composite	ESC	3/13/2013	0.46	0.051	0.0048	21	0.0024
B-7C	Composite	ESC	3/13/2013	1.3	0.056	0.0085	25	0.0040
B-8C	Composite	ESC	3/13/2013	1.2	0.035	0.0043	16	0.0085
B-9C	Composite	ESC	3/13/2013	5	0.054	0.0053	23	0.022
B-10C	Composite	ESC	3/13/2013	2.6	0.034	0.0028	13	0.013
B-11C	Composite	ESC	3/13/2013	2.7	0.026	0.0044	14	0.016
B-12C	Composite	ESC	3/13/2013	1.8 V	0.00052 P1	0.0065	0.93 V	0.014
B-14 (3'-4')	Gel	Oxidor	5/30/2013	2.07	0.042	0.061	45.5	0.013
B-14 (3'-4')	Gel	ESC	5/30/2013	0.61	0.054	0.031	220.0	0.0047
B-14 (11'-12')	Gel	Oxidor	5/30/2013	1.48	0.041	0.007	24.8	0.023
B-14 (11'-12')	Gel	ESC	5/30/2013	1.1	0.049	0.012	29.0	0.015
B-15 (10.5'-11.5')	Gel	Oxidor	5/30/2013	1.5	0.072	0.015	60.2	0.039
B-15 (10.5'-11.5')	Gel	ESC	5/30/2013	0.97	0.031	0.015	22.0	0.018
B-18 (6.5'-7.5')	Gel	Oxidor	5/30/2013	1.07	0.082	0.008	44.7	0.018
B-18 (6.5'-7.5')	Gel	ESC	5/30/2013	0.61	0.14	0.0082	30	0.042
DUP-01 [B-18 (6.5-7.5)]	Gel	Oxidor	5/30/2013	6.33	0.154	0.022	95.3	0.031
DUP-01 [B-18 (6.5-7.5)]	Gel	ESC	5/30/2013	3	0.086	0.004	15	0.024
B-18 (16.5'-17.5')	Gel	Oxidor	5/30/2013	5.51	0.098	0.009	39	0.057
B-18 (16.5'-17.5')	Gel	ESC	5/30/2013	4.4	0.074	0.0068	35	0.019
DUP-02 [B-18 (16.5-17.5)]	Gel	Oxidor	5/30/2013	5.33	0.091	0.008	36.2	0.045
DUP-02 [B-18 (16.5-17.5)]	Gel	ESC	5/30/2013	3.8	0.19	0.015	130	0.011
B-15 (3'-4')	Non-gel	Oxidor	5/30/2013	0.63	0.073	0.040	70.7	0.031
B-15 (3'-4')	Non-gel	ESC	5/30/2013	0.041	0.08	0.016	36.0	0.0037
B-16 (2'-3')	Non-gel	Oxidor	5/30/2013	1.44	0.014	0.007	14.7	0.005
B-16 (2'-3')	Non-gel	ESC	5/30/2013	0.95	0.03	0.013	8.7	0.002
B-16 (4'-5')	Non-gel	Oxidor	5/30/2013	0.069	0.005	0.079	3.6	0.057
B-16 (4'-5')	Non-gel	ESC	5/30/2013	0.74	0.056	0.0083	16.0	0.0013
B-17 (3'-4')	Non-gel	Oxidor	5/30/2013	0.47	0.002	0.041	3.17	0.013
B-17 (3'-4')	Non-gel	ESC	5/30/2013	0.56	0.0037	0.029	2.1	0.0065
B-17 (6'-7')	Non-gel	Oxidor	5/30/2013	0.289	0.005	0.031	4.64	0.026
B-17 (6'-7')	Non-gel	ESC	5/30/2013	0.22	0.0051	0.028	3.2	0.016
^{GW} GW _{Ing} Tier 1 Residential PCL ⁵				0.01	0.005	0.1	1.1	0.05
^{GW} GW _{Ing} Tier 1 Commercial PCL ⁶				0.01	0.005	0.1	10	0.05

Notes:

¹Samples collected by W&M .

²Type of sludge samples, Composite, Gel=Gelatinous, and Non-gel=none gelatinous.

³Samples analyzed by ESC Laboratory Sciences (Mount Juliet, TN) or Oxidor Laboratory (Plano, Texas).

⁴Metals analyzed by U.S. Environmental Protection Agency (EPA) EPA Method 6020.

⁵Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program (TRRP) Tier 1 Protective Concentration Level (PCL), groundwater ingestion pathway, residential land use, Class 1 groundwater, 0.5-acre source area.

⁶TCEQ TRRP Tier 1 PCL , groundwater ingestion pathway, commercial/industrial land use, Class 1 groundwater, 0.5-acre source area.

(P1) Indicates the RPD value is not applicable for sample concentrations less than 5 times the reporting limit.

(V) Indicates the sample concentration was too high to evaluate accurate spike recoveries.

**TABLE 3
GROUNDWATER ANALYTICAL DATA SUMMARY - METALS**

*Densimix Holding Corporation
13501 Industrial Road
Houston, Texas*

Sample ID ¹	Date Collected	Metals ²								
		Arsenic	Barium	Cadmium	Chromium	Lead	Manganese	Selenium	Silver	Mercury
MW-01	10/15/2012	0.024	-	<0.0050	-	<0.0050	0.99	-	-	-
	12/12/2012	0.032	0.042	0.0016	0.0036	<0.00024	0.85	0.011	0.0092	<0.000049
	2/11/2013	0.027	0.030	0.0020	0.0012 J	<0.00024	0.74	0.010	<0.00031	<0.000049
	5/31/2013	0.029	0.034	0.0022	0.0084	<0.00024	0.54	0.035	<0.00031	<0.000049
	8/26/2013	0.018	0.034	0.00071 P1	0.00094 J	0.00025 JP1	0.54 V	0.014	0.00085JP1	<0.000049
DUP (MW-01)	10/15/2012	0.013 J	-	<0.0050	-	<0.0050	1.0	-	-	-
	12/12/2012	0.032	0.042	0.0015	0.0069	<0.00024	0.86	0.012	<0.00031	<0.000049
	2/11/2013	0.031	0.029	0.0020	0.0012 J	<0.00024	0.77	0.010	<0.00031	<0.000049
	5/31/2013	0.022	0.034	0.0021	0.0085	0.00031 J	0.44	0.032	<0.00031	<0.000049
	8/26/2013	0.018	0.031	0.00067	<0.00054	<0.00024	0.50	0.013	<0.00031	<0.000049
MW-02 (POE)	10/15/2012	0.024	-	<0.0050	-	0.060	0.24	-	-	-
	12/12/2012	0.03	0.062	<0.00016	0.0110	0.00046 J	0.17	0.027	<0.00031	0.000089 J
	2/11/2013	0.023	0.033	<0.00016	0.0027	<0.00024	0.12	0.021	<0.00031	0.000073 J
	5/31/2013	0.014	0.038	<0.00016	0.0130	0.00026 J	0.045	0.069	<0.00031	0.00014 J
	8/26/2013	0.0064	0.031	<0.00016	0.0044	<0.00024	0.038	0.026	0.0018	0.000080 J
MW-03	10/15/2012	0.035	-	<0.0050	-	<0.0050	0.45	-	-	-
	12/12/2012	0.03	0.027	<0.00016	0.0045	<0.00024	0.75	0.017	<0.00031	<0.000049
	2/11/2013	0.023	0.022	0.00048 J	0.00086 J	<0.00024	1.4	0.011	<0.00031	<0.000049
	5/31/2013	0.013	0.028	0.00051	0.0073	0.00026 J	1.2	0.052	<0.00031	<0.000049
	8/26/2013	0.0079	0.060	0.00022 J	0.0018 J	<0.00024	0.59	0.017	0.00043 J	<0.000049
MW-04	10/15/2012	0.11	-	<0.0050	-	<0.0050	0.40	-	-	-
	12/12/2012	0.38	0.024	0.004	0.0044	<0.00024	0.02	0.03	<0.00031	<0.000049
	2/11/2013	0.15	0.030	0.0011	0.049	<0.00024	0.15	0.35	<0.00031	<0.000049
	5/31/2013	0.31	0.022	0.0028	0.0089	<0.012 O	0.016	0.096	<0.00031	<0.000049
	8/26/2013	0.39	0.017	0.0024	<0.00054	<0.00024	0.015	0.029	<0.00031	<0.000049
MW-05	10/15/2012	<0.0066	-	<0.0050	-	0.0024 J	0.92	-	-	-
	12/12/2012	0.023	0.058	<0.00016	0.0072	<0.00024	0.85	0.09	<0.00031	<0.000049
	2/11/2013	0.016	0.034	<0.00016	0.0032	<0.00024 V	0.60	0.013	<0.00031	<0.000049
	5/31/2013	0.012	0.045	<0.00016	0.005	<0.00024	0.22	0.056	<0.00031	<0.000049 J
	8/26/2013	0.0034	0.037	<0.00016	0.0018 J	0.0011	0.43	0.013	<0.00031	<0.000049
MW-06	2/11/2013	0.0068	0.066	<0.00016	0.055	<0.00024	0.42	0.0060	<0.00031	<0.000049
	5/31/2013	0.0074	0.042	0.00019 J	0.0098	0.00027 J	0.07	0.0210	<0.00031	<0.000049
	8/26/2013	0.0032	0.031	<0.00016	0.0012 J	<0.00024	0.15	0.0050	<0.00031	<0.000049
MW-07	2/11/2013	0.018	0.036	0.00065	0.00020 J	<0.00024	0.71	0.016	<0.00031	<0.000049
	5/31/2013	0.0092	0.033	0.00037 J	0.0092	0.00045 J	0.14	0.046	<0.00031	0.00011
	8/26/2013	0.0038	0.028	<0.00016	0.0051	0.00026 J	0.063	0.017	<0.00031	0.00011 J
GW _{ing} Tier 1 Residential PCL (Ingestion) ³		0.01	2	0.005	0.1	0.015	1.1	0.05	0.12	0.002
AirGW _{inh-v} Tier 1 Residential PCL (Non-Ingestion) ⁴		---	---	---	---	---	---	---	---	7.3
Ecological Benchmark ⁵		0.078	25	0.01	0.0496 (Hex)	0.0053	0.120 F	0.136	0.00019	0.0011
Aquatic Life SW RBEL (Marine) ⁶		0.078	25	0.00875	0.0496 (Hex)	0.0053/ 0.035 DF	0.100 BC / 0.7 DF	0.136	0.0002 FI / 0.0013 DF	0.0011
Human Health SW RBEL (Fish Only) ⁷		0.01	2 WF	0.005 WF	0.502 (Hex)	0.00383/ 0.026 DF	0.1/ 0.7 DF	4.2	NA	0.000021 / 0.00014 DF

¹Samples collected by W&M Environmental Group, Inc. and analyzed by ESC Lab Sciences in Mt. Juliet, Tennessee.

²Metals analyzed by U.S. Environmental Protection Agency (EPA) Method 6020 or EPA Method 7471.

³Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program (TRRP) Tier 1 Protective Concentration Level (PCL), groundwater ingestion pathway, residential land use, Class 1 groundwater, 0.5-acre source area.

⁴TCEQ TRRP Tier 1 PCL, groundwater to air inhalation pathway, residential land use, Class 1 groundwater, 0.5-acre source area.

⁵TCEQ Ecological Benchmark from 2006 Update to Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas RG-263 (Revised).

⁶Aquatic Life Surface Water Risk-Based Exposure Levels (RBELs - saltwater, chronic) from the TCEQ last updated January 2011, unless otherwise noted.

⁷Human Health Surface Water RBELs (saltwater, chronic) from the TCEQ last updated January 2011, unless otherwise noted.

Dilution Factor (DF) values written after slash (/) and annotated with DF represent the regulatory value adjusted by use of the DF factor (0.15).

(J) Indicates the estimated value is below the lowest calibration point. Confidence correlates with concentration.

(J3) Indicates the associated batch QC was outside the established quality control range for precision.

(J6) Indicates the sample matrix interfered with the ability to make any accurate determination; spike value is low.

(BC) In absence of Aquatic Life Surface Water RBEL, values from the National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables.

(SQuiRTs) are proposed - from British Columbia Water Quality Guidelines.

(F) Freshwater value listed in absence of marine value.

(POE) Point of Exposure - groundwater monitoring well nearest to the down gradient surface water (Greens Bayou) where complete exposure pathway anticipated.

(WF) Water supply and fish consumption value listed in absence of fish only value.

NA - Regulatory value not available.

Hex - indicates value for hexavalent chromium in absence of total chromium value.

Bold PCL values indicate the Residential Assessment Level (RAL) and critical PCL (cPCL) for each chemical of concern (COC).

Bold concentration indicates values exceeding the RAL/cPCL.

All values in milligrams per liter (mg/L).

Appendix G

MUNICIPAL SETTING DESIGNATION APPLICATION

13501 INDUSTRIAL ROAD
HOUSTON, TEXAS

STATEMENT REGARDING PLUME STABILITY

Based upon the investigations completed to date, the groundwater plumes for arsenic, manganese, and selenium appear to be stable. This conclusion is based upon the fact that arsenic concentrations have remained stable over the past five groundwater monitoring events, and manganese and selenium appear to be localized in two monitoring wells at the Designated Property. These characteristics are evident in the localized PCLE zones for manganese and selenium in groundwater, which has been fully delineated (**Figure 7** and **Figure 8** in **Appendix C**). The arsenic plume is fully delineated and roughly encompasses 9.5 acres, of which 6.0 acres are on the Designated Property and 3.5 acres are on the adjacent Womble Company, Inc., property to the northeast and east (**Figure 6** in **Appendix C**).

Concentrations of the specified COCs do not exceed their respective TRRP Tier 1 residential assessment level with an MSD in any of the groundwater samples from the Designated Property.