DPD

City of Chicago
Lori E. Lightfoot, Mayor

4300 W. Roosevelt Road
Request for Proposals
Addenda

Department of Planning and Development
Maurice D. Cox, Commissioner
City Hall Room 1000
121 N. LaSalle St.
Chicago, IL 60602

October 29, 2020

Addenda

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D3. 916 S Kildare Ave - Remedial Action Plan Addendum ***NEW***

D4. 916 S Kildare Ave - Remedial Action Plan Addendum Approval ***NEW***

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E. PROVIDED UPON REQUEST

E1. Sample Redevelopment Agreement

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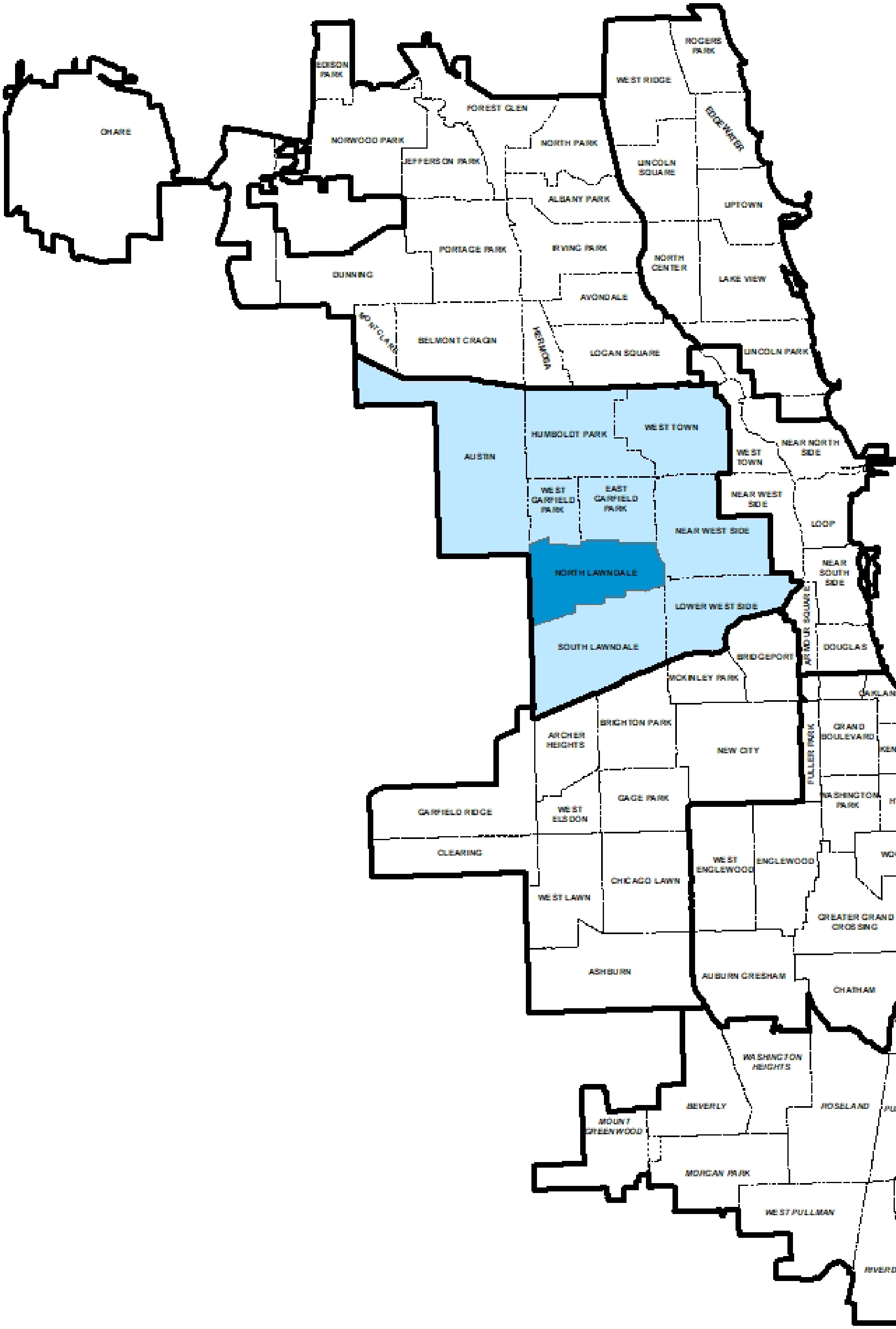
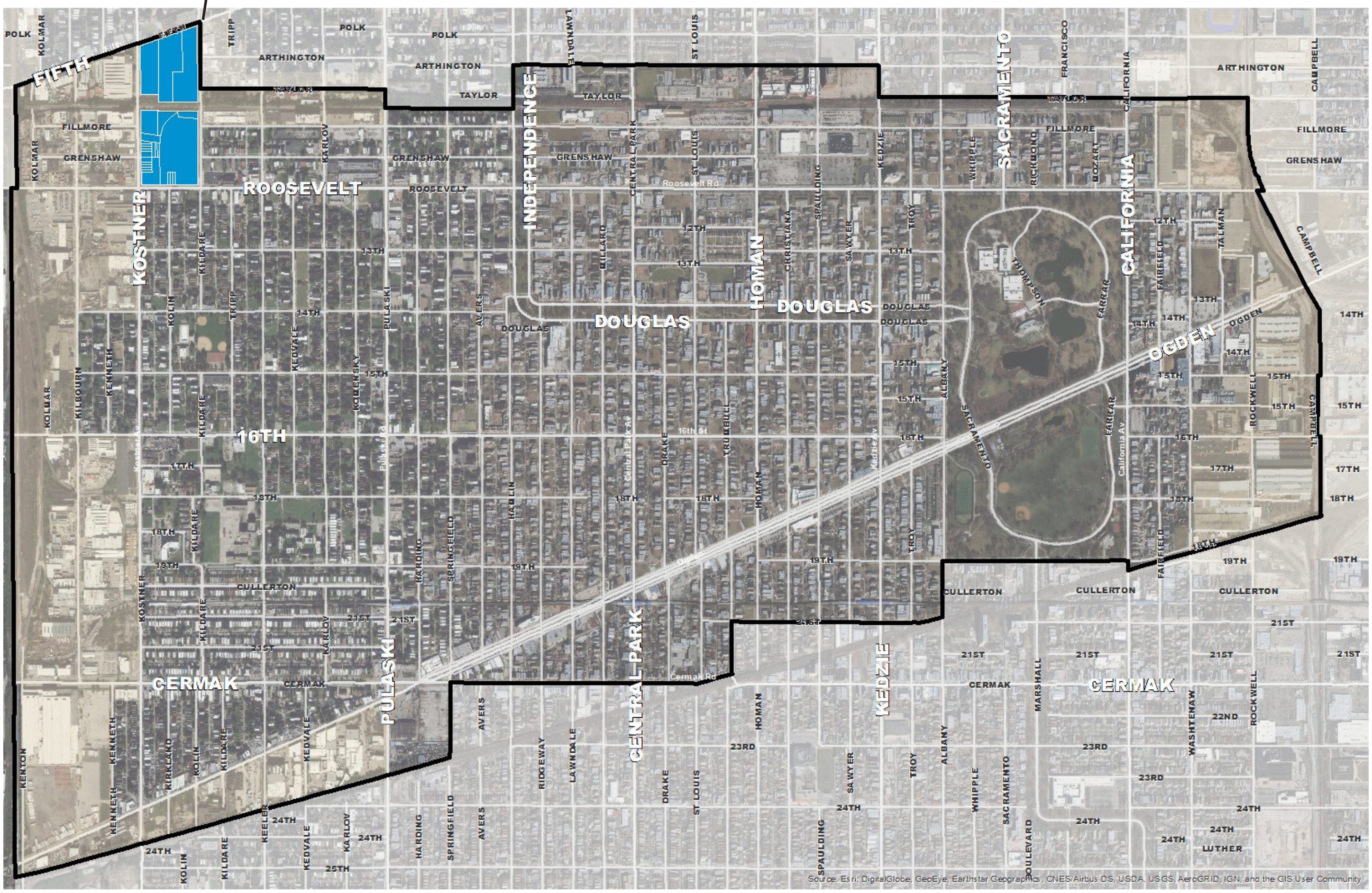
NEIGHBORHOOD LOCATION MAP

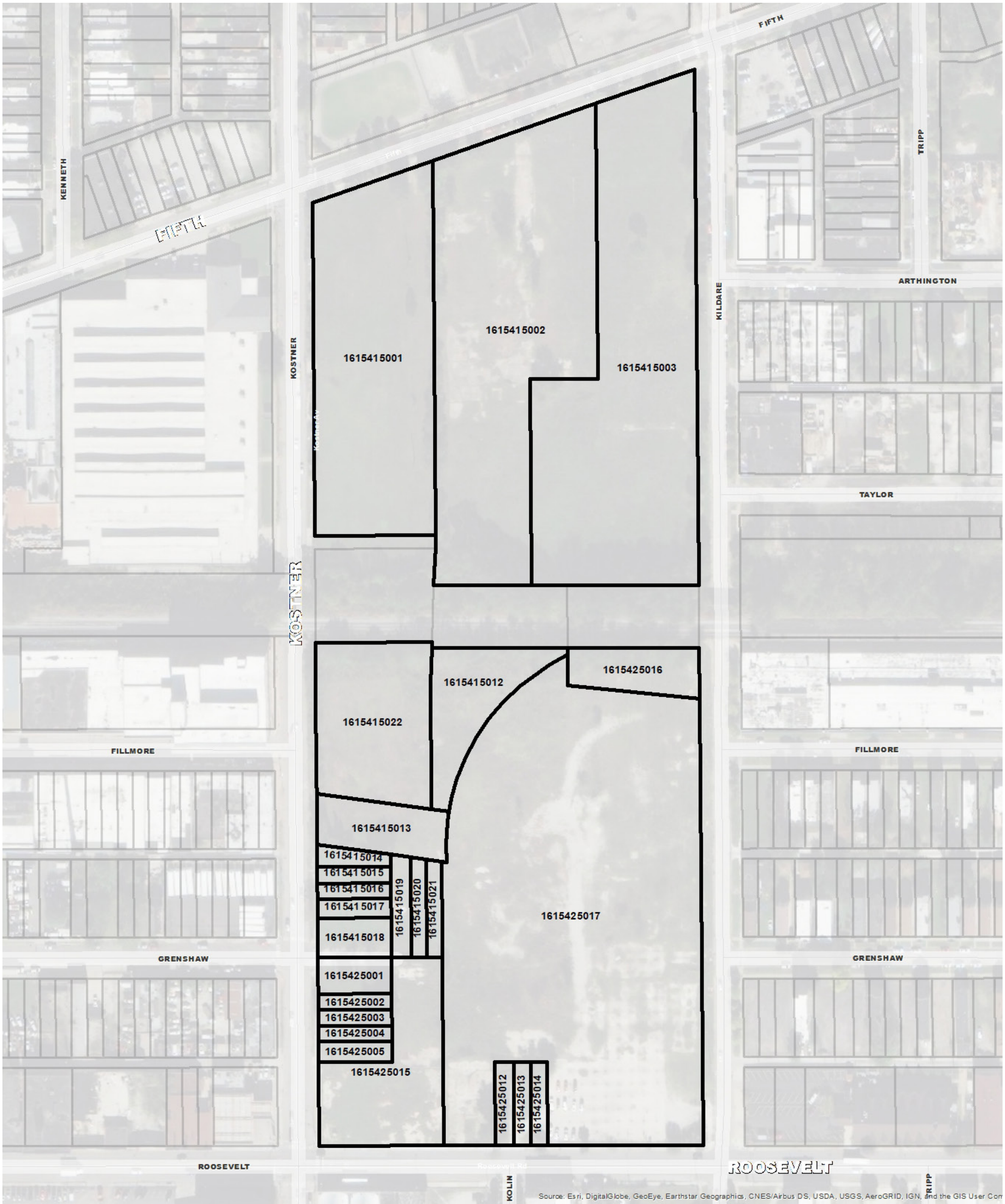


SITE LOCATION MAP

Roosevelt & Kostner Site



SITE AERIAL



FIFTH
FIFTH
KENNETH
KOSTNER
KOSTNER
KILDARE
TRIPP
ARTHINGTON
TAYLOR
FILLMORE
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GRENSHAW
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ROOSEVELT
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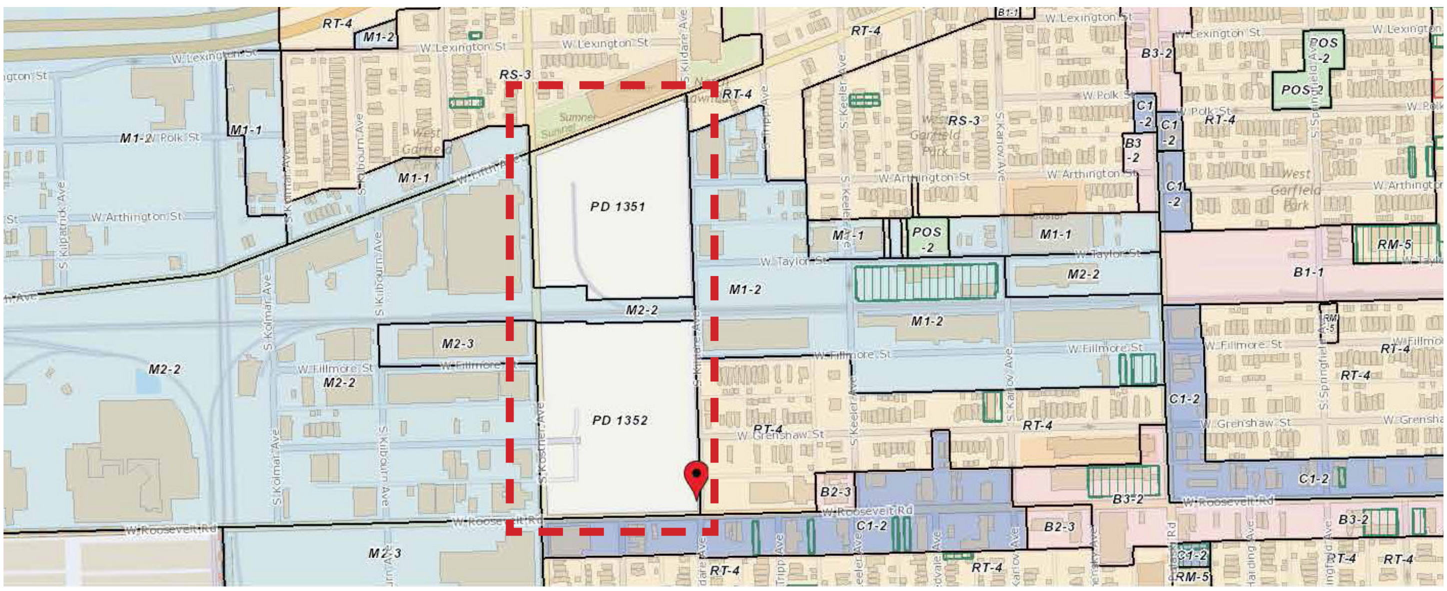
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Com

SITE PHOTOS

North property looking southeast from Fifth & Kostner Aves

North property looking southwest from Fifth & Kildare Aves

ZONING MAP



Laramie State Bank site

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DESIGN EXCELLENCE
Guiding Principles

DPD
Department of Planning and Development

Design Excellence - VISION & GOALS

Design Excellence celebrates the City of Chicago's unique architectural and urban design legacy, while also aspiring for a higher level of design in new development. The Guiding Principles laid out here are the attempt of the Department of Planning and Development, along with key stakeholders, to define what Design Excellence means for Chicago. A central tenet in the development of these Guiding Principles is that they answer a basic question:

How do we engender a culture that values design excellence in everyday life?

The answer to this question likely lies in the built and natural environment. As such, the Guiding Principles strive for inclusivity in the design process and the breadth of project-types to which they apply. They also seek to foster innovation, promote the creation of a sense of place, seek to push the envelope of sustainability best practices and encourage collaboration and engagement with the public and other city departments and agencies.

Guiding Principles - THEMES

To achieve the goals of Design Excellence, 10 Guiding Principles have been developed, spanning five key themes aimed at a comprehensive and robust response to the impact of the city's built environment on the people of Chicago:

EQUITY - Fair treatment, targeted support, and prosperity for all citizens

INNOVATION - Creative approaches to design and problem-solving

SENSE OF PLACE - Celebrating and strengthening the culture of our communities

SUSTAINABILITY - Committing to environmental, cultural, and financial longevity

COMMUNICATION - Fostering design appreciation and responding to community needs

THEME 1
EQUITY

PRIORITIZE INCLUSIVE DESIGN PROCESSES TO FOSTER EQUITABLE DEVELOPMENT

Cities that are created by everyone, provide for everyone. As such, projects that facilitate input from nearby property owners, community stakeholders and the City early on in their design process will develop local support and form a shared vision of design excellence for all stakeholders.

THEME 1
EQUITY

REVITALIZE CHICAGO'S NEIGHBORHOODS WHILE CELEBRATING THEIR AUTHENTICITY AND SINGULARITY

If Chicago's downtown is its heart, its 77 neighborhoods are its soul. The City will be intentional in its approach to revitalizing its neighborhoods by marshaling its own resources and leveraging private development within a design excellence framework that is place-based.

THEME 1
EQUITY

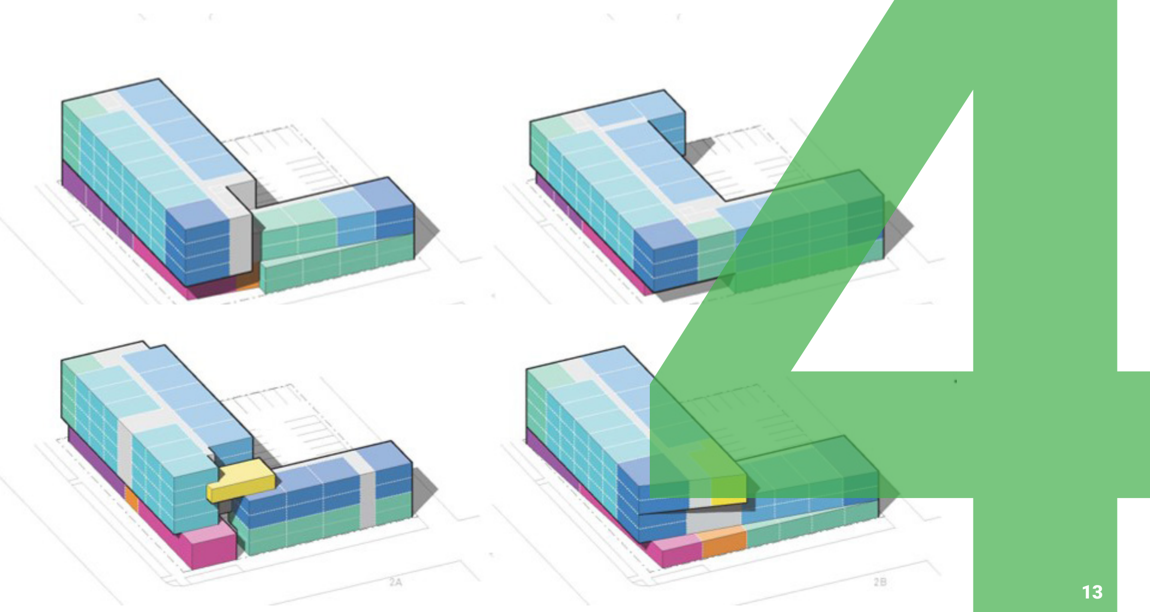
LEVERAGE THE ECONOMIC BENEFITS OF GOOD DESIGN

Good design has economic benefits beyond job creation. In times of limited resources, it is important to leverage every dollar invested. When development creates jobs, benefits the environment through sustainable best practices and creates places where people want to live, work and play, it benefits the entire City.

THEME 2
INNOVATION

ENCOURAGE DIVERSE DESIGN APPROACHES IN ORDER TO INSPIRE INNOVATION AND DESIGN EXCELLENCE

Chicago's architecture and urban design should reflect the dynamic nature of the city. Early collaboration with key stakeholders will yield a diversity of design approaches, which in turn will promote innovation, creativity and sustainable strategies constructed with high quality materials and state of the art construction methods.



THEME 2
INNOVATION

HONOR CHICAGO'S LEGACY OF ARCHITECTURAL INNOVATION BY PROMOTING CONTEMPORARY DESIGN

Chicago is a city with an abundance of historic building stock. The legacy of these assets is apparent throughout the city. As such, new development should seek to enrich the urban environment by respecting the authenticity of historic buildings rather than encouraging mimicry or replication of these buildings in the designs and details of new construction.

THEME 3
SENSE OF PLACE

STRIVE TO ENHANCE THE PUBLIC REALM. FOCUS ON THE PEDESTRIAN EXPERIENCE

Our streets are an asset to be prioritized and curated. New development should consider its cumulative effects on sunlight, comfort and quality of the public realm by maximizing solar access for streets, parks, and public open space. DPD will advocate for a high quality public realm that creates a safe, comfortable, accessible, vibrant, and attractive pedestrian environment.

THEME 3
SENSE OF PLACE

IMMERSE YOURSELF IN THE PLACES, PEOPLE AND CULTURES OF THE CITY

Responding to context appropriately, whether physical or cultural, is a critical part of design excellence. Designers are expected to understand the context that they are working in and provide responses that strengthen and reinforce the desirable urban features of the place as well as celebrate and preserve local culture.

THEME 4
SUSTAINABILITY

DEVELOP A HEALTHIER, MORE RESILIENT AND BEAUTIFUL CITY

Chicago's sustainable goals aim to construct healthier and more sustainable environments that use fewer resources, are more durable and cost effective, and promote well-being. New development is expected to seek opportunities at all phases of a project's evolution to optimize sustainability, resilience and health.

THEME 5
COMMUNICATION

COMMUNICATE THE VALUE OF DESIGN EXCELLENCE TO THE PUBLIC

Effective new tools and strategies can connect everyday Chicagoans to a better understanding of their city's architectural and urban design legacy. DPD will engage the public to make design accessible and democratic.

THEME 5
COMMUNICATION

SUPPORT DESIGN EXCELLENCE WITH CITY DEPARTMENTS AND SISTER AGENCIES

The City has an opportunity to lead by example when it comes to design excellence. DPD will encourage the efforts of other city departments and sister agencies to integrate design excellence into their projects that impact the built and natural environment.

City of Chicago
Lori E. Lightfoot, Mayor

Design Excellence
Neighborhood Design Guidelines

Department of Planning and Development
Maurice D. Cox, Commissioner
City Hall Room 1000
121 N. LaSalle St.
Chicago, IL 60602

DRAFT September 11, 2020

Forward

The concept of "design excellence" represents the City of Chicago's commitment to a high-quality built environment that celebrates and enhances the City's unique architectural and urban design legacy. This responsibility extends from downtown and throughout local neighborhoods.

The Chicago Department of Planning and Development engaged a Design Excellence Working Group to answer the question:

How do we engender a culture that values design excellence in everyday life?

From this question, several thematic principles emerged that collectively aspire to achieve design excellence for Chicago residents, businesses, and other local stakeholders.

The principles include commitments to:

- **Equity & Inclusion**
  Achieving fair treatment, targeted support, and prosperity for all citizens
- **Innovation**
  Implementing creative approaches to design and problem-solving
- **Sense of Place**
  Celebrating and strengthening the culture of our communities
- **Sustainability**
  Committing to environmental, cultural, and financial longevity
- **Communication**
  Fostering design appreciation and responding to community needs

Table of Contents

Introduction

Neighborhood Design Guidelines

A COMMITMENT TO EXCELLENCE

Developed under Mayor Lori E. Lightfoot by the Department of Planning and Development (DPD), the Neighborhood Design Guidelines provide specific recommendations to enhance the planning, review, and impact of development along the city's commercial corridors.

As a complement to other City design resources and regulations, the guidelines are adaptable to the unique context of individual neighborhoods, corridors, and blocks.

The guidelines are organized across six categories:

» **Sustainability**
Features that have long-term environmental, sociocultural, and human health impacts

» **Program**
Targeted uses that complement a property's surrounding context

» **Site Design**
Building orientation, layout, open space, parking, and service

» **Public Realm**
Improvements within and near the public right-of-way adjacent to the site

» **Massing**
Bulk, height, and form of a building

» **Façade**
Architectural expression of a building's exterior, including entrances and windows

Other City design resources and regulations that may apply to new development projects include the Zoning Ordinance, Landscape Ordinance, and the Complete Street Guide, among others.


THE CASK
· VINEGARS
TASTING ROOM
SPIRITS · WINES
Oils, Vinegars,
Wines, Spirits
& Liqueurs
SPICES

APPLICATION AND IMPLEMENTATION

The Neighborhood Design Guidelines are intended to be used for all public and private projects located along Chicago's commercial corridors. Projects that require the City's review and oversight should substantially correspond to their parameters, especially Planned Developments, Lakefront Protection Ordinance projects, and projects that receive City grants, funding, or other incentives.

In addition to facilitating formal City review processes and promoting successful project completions, the Neighborhood Design Guidelines are intended to promote design excellence, community pride, and enhancing the sense of place in local neighborhoods.

The Neighborhood Design Guidelines provide baseline guidance and reference for property owners, developers, designers, community groups, public agencies, and individuals. Construction projects must still adhere to any applicable City of Chicago, State of Illinois, or federal requirements, standards, and policies.

The Department of Planning and Development intends to gather feedback from property owners, developers, designers, and community members to continue to refine the guidelines' scope and content. Comments may be directed to DPD@cityofchicago.org.

Ultimately, the guidelines are expected to be presented to the Chicago Plan Commission for formal adoption.

Sustainability

Chicago has been a global leader in urban sustainability, which has emphasized the importance of designing and constructing healthier and more sustainable environments that use fewer resources, are more durable and efficient to maintain and operate, promote equity, and protect the environment and human health. The next generation of development must advance this continual improvement in a comprehensive and place-based way. Projects are expected to seek opportunities at all phases of development to optimize sustainability, resilience, environmental health, and human well-being. Note that these goals are addressed throughout the guidelines, not only in this section.

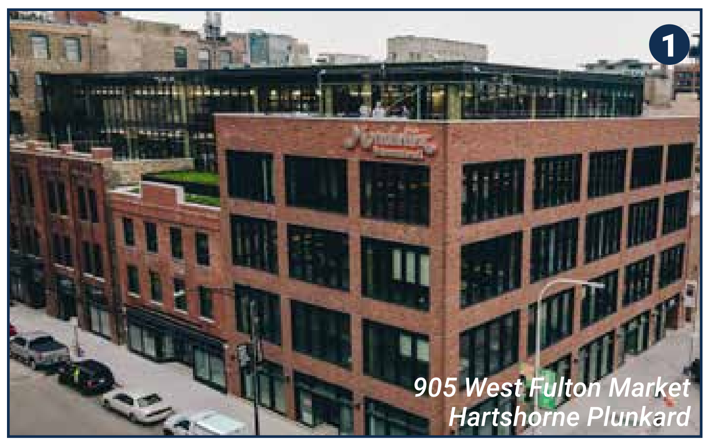
Sustainability

Site Selection

Choosing a site is a major factor for the sustainability and resilience of a particular development and neighborhood as a whole. It is important to provide sustainable development while also being mindful about how to do so using existing resources.

1. Consider opportunities for re-purposing existing buildings, rather than building new. This strategy often results in interesting design solutions, bolstering the neighborhood character and preserving historic structures.
2. When new construction is necessary, prioritize infill and transit-oriented sites to promote density, urban activity, and efficient mobility.

Former Triangle Motors automobile showroom



Adaptive reuse integrates two original building facades into the new mixed use development.

Transit proximity increases density, decreases parking, and promotes walkability, vibrancy, and street activity.

Adaptability

Buildings contain considerable embodied energy accumulated through the production, transport, and installation of building materials. Demolishing and replacing a building to accommodate a new use, while an extremely popular strategy, releases this embodied energy, detracting from a neighborhood's long-term sustainability.

1. Design buildings with a flexible approach to infrastructure delivery and interior systems (e.g. furniture, ceiling systems, and partitions), allowing the building to support multiple uses and users over time. For example, parking garages should be designed with ceiling heights, level floor plates, and other elements to allow for future conversion to other uses when parking demand decreases.

High ceiling heights allowed this vault to be repurposed for a temperature controlled room for barrel aging.

Flat floors and floor-to-floor heights allowed this parking garage to be repurposed as an incubator space.

Design Expression

Sustainable design elements can be celebrated through architectural expression, landscape features, and interpretive strategies.

1. Celebrate sustainable landscape design through native plantings, stormwater features, and urban agriculture.
2. When education or public engagement are central to the development program, create opportunities to highlight sustainable development features visibly and experientially through design expression.

Mercy Housing, Margot and Harold Schiff Residences
Murphy/Jahn Architects, Terry Guen Design Associates

Sustainable landscape with adaptive, drought-tolerant plants, which reduce irrigation and manage stormwater

Gary Comer Youth Center Green Roof
Hoerr Schaudt Landscape, John Ronan Architects
Scott Shigley Photography

In addition to ecological benefits, educational garden can teach students to grow their own organic produce.

Farm on Ogden
Booth Hansen, Drone Media Chicago Photography

Urban agriculture activities indoors and outdoors made visible along the street

Sustainable Design

Best Practices

Chicago's Sustainable Development Policy has advanced sustainable and resilient design throughout the city. It includes a variety of categories and choices of methods to meet the requirements.

While certain projects receiving City assistance are required to comply with this policy, all projects should consider and address each of these categories at each step of the design and development process.

Please refer to the Sustainable Development Policy for guidance on each of the topics listed here.

- » Health
- » Energy
- » Stormwater
- » Landscapes
- » Green Roofs
- » Water
- » Transportation
- » Solid Waste
- » Work Force
- » Wildlife

Program

Program suggests how a community will interact with, occupy, and use space. Indoor and outdoor programming should reinforce one another to improve the day-to-day life of both residents and the wider community.

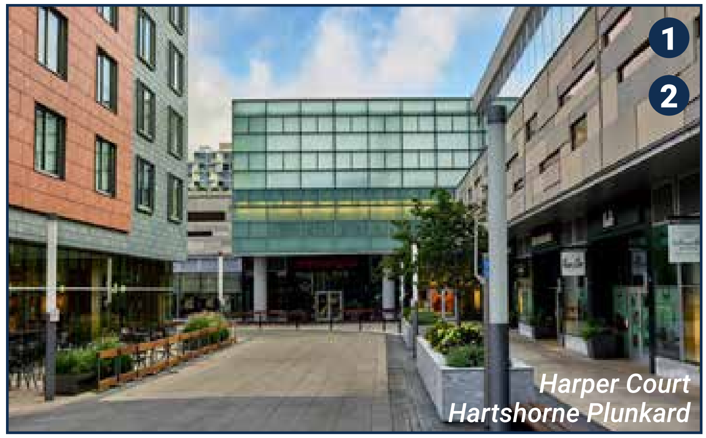
Program

Use Mix

The uses within a development should complement those on the surrounding block and neighborhood, either by clustering predominant uses or filling gaps in the existing use mix. Uses within a single building can also be mixed to further contribute to neighborhood vitality.

1. Along significant neighborhood corridors, developments should contribute to a mix of uses on the block (e.g. housing, food service, retail, community services, open space, etc.).

2. Along commercial corridors, the ground floor of buildings should contain active uses such as retail, food service, and social spaces. Providing residential space on upper floors to create mixed-use buildings is also a good way to promote an active street throughout the day and week.



Harper Court
Hartshorne Plunkard

A mix of commercial, hotel, and office uses brought needed neighborhood amenities as well as customers.

Vue 53
Valerio Dewalt Train

Active ground floor, easy resident access to upper floors, and hidden parking make complementary uses work.

Independence Library and Apartments
John Ronan Architects

Retail isn't the only way to create active uses - this library fronts the street with affordable housing above.

Context

The selection, organization, and expression of building and open space uses should contribute to the overall neighborhood program composition by promoting desirable uses and reducing the impact of undesirable uses.

1. Proposed uses should reflect and enhance existing desirable neighborhood uses and previous plan recommendations. This may include either introducing a needed use (e.g. grocery store or open space) that does not yet exist in the area or clustering like uses together (e.g. retail or food service) to bolster existing program.

2. Identify opportunities to provide spaces to support the larger community's needs and a diverse range of users. An example that would serve fledgling entrepreneurs would be to provide a small, flexible space for a "pop-up" retail, food, or events.

Adding a bar and event space created social activities and nightlife in a commercial corridor lacking those amenities.

Small, inexpensive storefronts have created new business opportunities for local entrepreneurs.

Cafe, incubator, and office space create opportunities for entrepreneurship within historically marginalized areas.

Site Design

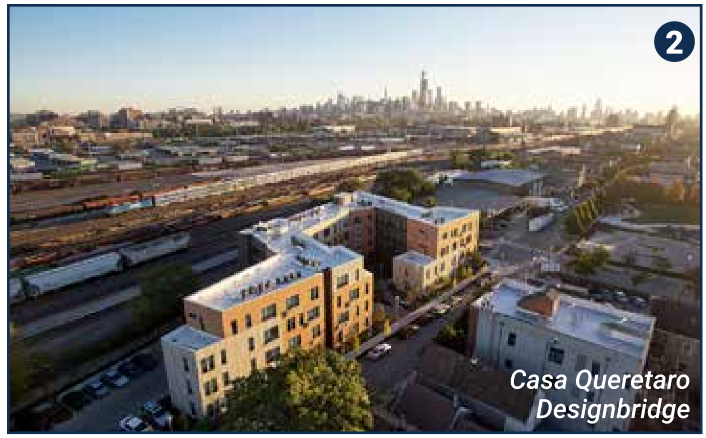
Site design describes the organization of buildings, open space, parking, and other related site uses. Good site design respects existing site features and responds to surrounding conditions such as adjacent properties, streets, and local climate.

Site Design

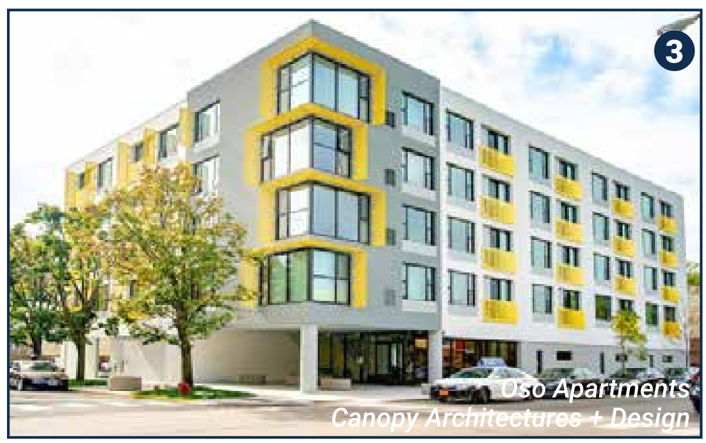
Orientation and Access

Sites should provide clear access points for various users, prioritizing pedestrian access and locating vehicular access in the rear of the site whenever possible.

1. Where possible, orient buildings so that the longest side with glazing faces south to take advantage of energy and lighting efficiency.
2. Consider adjacent land uses and views when orienting buildings. Positive views to adjacent features should be preserved while visually buffering detracting adjacent uses.
3. Primary pedestrian site access should be prioritized from the main street frontage. On corner sites, access should respond to both streets wherever possible. Public-facing uses should be accessed from major streets, while private uses (e.g. residential entries) should be accessed from side streets.
4. Pedestrian, bicycle, and vehicular conflicts should be minimized or eliminated, with vehicular site access provided via alleys whenever possible. In addition, parking and loading access should be combined to minimize driveways and allow adequate room for other site programming such as open space.
5. On large sites, encourage physical and visible porosity by breaking up development and encouraging through-site pedestrian routes.



A single-loaded corridor along the adjacent railroad shields residents from noise and provides views of the courtyard.



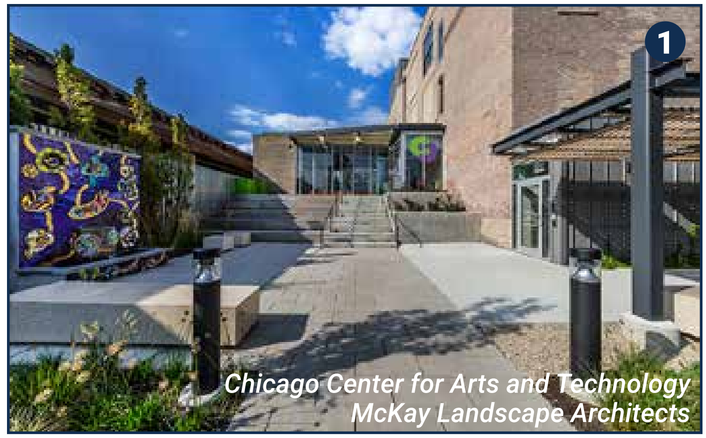
Setting back building entrances at corner sites address both the primary street and the side street.

Separating pedestrian and vehicular entrances with quality planting helps demarcate space and avoid conflicts.

Open Space

Open space is critical to the enjoyment of Chicago's neighborhoods and comes in many forms - from private yards to public parks. Whether open space is public or private, it should serve its users well by providing pleasant and usable space for recreation, gathering, and outdoor enjoyment.

1. Even when not required, open spaces that are accessible and inviting to the public should be created whenever possible.
2. Open space should be located to leverage interior building uses and blend interior and exterior spaces where active ground-level program such as retail, community space, or food service can expand the indoor uses outdoors in pleasant weather.
3. Open spaces should include elements such as inviting places to sit, plantings, protection from inclement elements, access to sunlight, quality lighting, and art.
4. Provide visual buffers between on-site open spaces and adjacent incompatible land uses and/or views.



Enlarged entry plazas can be inviting both to building users and the broader public.

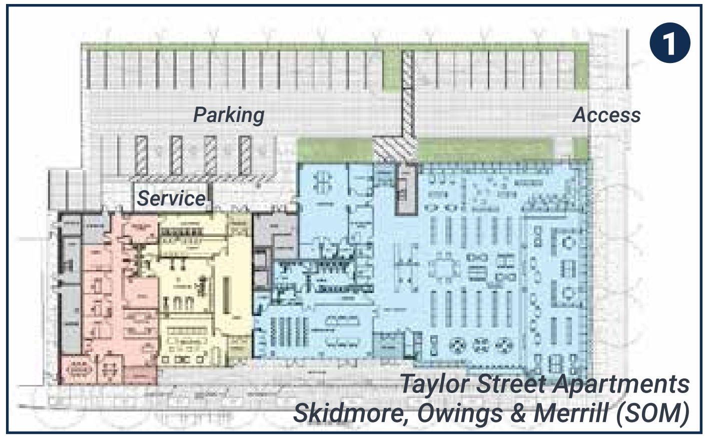
Well-placed open spaces take advantage of building glazing to blur the line between interior and exterior.

The creation of outdoor "rooms" through planting and paving design provide a variety of places to site and gather.

Parking and Service

Parking and service areas, such as utility, trash, and delivery areas, are necessary to the operations of a building and need to be thoughtfully integrated into the overall site design without detracting from programmatic spaces.

1. Parking and service (e.g. mechanical systems, trash, and loading areas) should be located at the rear of the site whenever possible and should be accessed via alleys or side streets when possible.
2. New public alleys should be provided (dedicated) on larger sites. Sites with multiple distinct buildings should centrally locate shared parking with minimal driveway entrances.
3. Structured parking and service should be screened from public view. Screening for surface parking and services should, at minimum, meet the requirements of the Landscape Ordinance. Wrapping parking and service uses with more active building uses, especially at the ground floor, is usually preferred.
4. Where concealing parking and loading with active building program is not appropriate, utilize landscape buffers and vegetative screening.



Parking and service in the rear, accessed via a side street, prevents conflicts and preserves the street wall.

Wrapping structured parking with program (e.g. offices) shields unpleasant views and expands usable space.

Multi-layered landscape buffer provides visual screening from parking and promotes a more pleasant streetscape

Public Realm

The impact of new development does not stop at the property line. Improvements to the adjacent public realm as outlined below should be addressed whenever possible with the goal of promoting safe, comfortable, functional, and vibrant neighborhoods.

Public Realm

Public Right-of-Way

Improvements to the public right-of-way may be necessary to accommodate changes in mobility needs, improve safety, and contribute to the identity of a development.

1. Any modifications to the public right-of-way must be approved by the Chicago Department of Transportation (CDOT) and should follow their guidelines and regulations. Several City resources are available to help identify strategies to improve streetscape sustainability and promote active transportation modes through the creation of complete streets.

2. Where existing sidewalks are too narrow to adequately support site uses (e.g. restaurant outdoor seating), identify ways to set the building back from the property line and expand pedestrian pavement within the site boundary, especially for projects that span a large portion of a block. Be mindful of impacts to the block's street wall in the process.

3. When designing existing or additional public realm space, consider options for activation and programming to promote vibrancy in the neighborhood.

Complete street system with generous pedestrian space, plantings, site furniture, and public art

Expanded public realm space for outdoor seating under building canopy, sheltered from the elements

Expanded public space into a parking stall (i.e. parklet) provides outdoor seating where sidewalks are narrow

Landscape

Comprehensive and well maintained landscape areas contribute to the sense of place and experience of the neighborhood. Vegetation, including trees, planting beds, and raised planters soften the hard edges of buildings and walkways while providing a cooling effect through shade and reduced solar gain. High-quality and coordinated landscape elements such as seating, lighting, and other site furnishings contribute to the sense of place and improve human comfort.

1. Plant a diverse selection of street trees within the parkway according to the Landscape Ordinance. Provide generous soil volumes for planting areas to allow for expanded root growth and improved tree health.

2. Where space allows, soften building edges with front yard plantings. Consider native plant palettes that go beyond lawns and hedges to include flowering shrubs, perennials, and groundcovers to provide multi-seasonal interest and habitat for migrating birds and pollinators.

3. Install pedestrian amenities such as seating, lighting, wind blocks, overhead canopies, and receptacles where there is high pedestrian traffic or active gathering areas. These elements should be located either within site boundaries or within the parkway and should not impede pedestrian travel.

Generous parkway plantings to promote a more pleasant pedestrian environment

Native planting design for the building's entry courtyard create a welcoming transition from the street

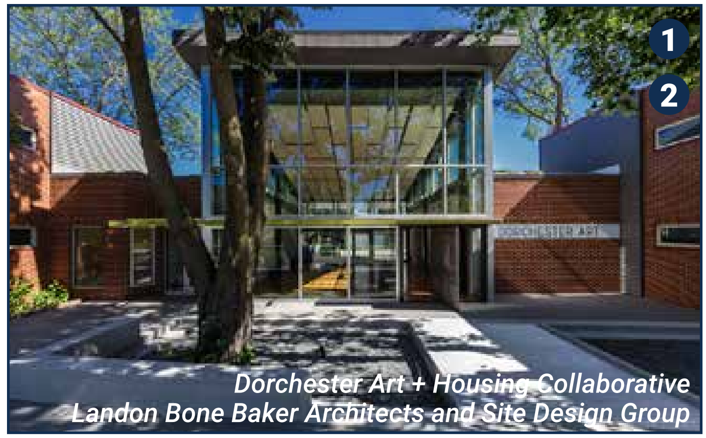
Sculptural amenities not only provide seating, but also invites people to use the elements creatively

Accessibility and Safety

Making public-facing spaces accessible to people of all abilities and identities is critical to promoting an equitable, safe, and comfortable neighborhood. In addition to accessibility requirements, include the following considerations as well.

1. Design welcoming and equitable entrances, such as integrating accessible routes artfully into main entries. Take care to use surface materials that are both accessible (e.g. navigable and durable materials, high contrast at thresholds, etc.) as well as thoughtfully woven into the overall design from the beginning.

2. Allow for an open visual field within the public realm for both safety and accessibility. Avoid posts or other physical elements within pedestrian passageways such as plazas or sidewalks. Avoid walls, panels, or dense eye-level vegetation that obstruct view from other areas of the site, street, or building.



Dorchester Art + Housing Collaborative
Landon Bone Baker Architects and Site Design Group

Ramps to the accessible entrance integrated into the landscape and lead to the main entry to the building

University of Chicago 58th Street Streetscape
Site Design Group

Elimination of vertical separation at the ground plane and open, framed view along the path for ease of navigation

Green Line Performing Arts Center
Morris Architects Planners, Hall+Merrick Photography

Accessible building entrance on the ground level with ability to connect indoor and outdoor space seamlessly

3. Protect the public realm and open spaces from sound pollution, which requires locating venting and noisy equipment away from occupied outdoor spaces.

4. In areas with high pedestrian activity and potential conflicts with program in the public realm (e.g. outdoor seating), take care to refrain from impeding pedestrian movement. Door swings and other obstacles should be avoided in the pedestrian way. Opportunities to clearly delineate the walkway may include carefully placed planters, furniture, and light fencing. Take care not to block visual access to the space.

5. Feelings of comfort and safety are unique to each neighborhood and should be considered within that specific context. Identify what types of elements are required or discouraged to promote the wellbeing of neighbors occupying and moving through the public realm.

Promontory Restaurant
Range Design + Architecture

Planter box separates pedestrians and outdoor dining to keep the narrow walkway clear

Pedestrian Lighting at Lakeshore East Park
Site Design Group

Lighting illuminates pathways, reduces dark niches, and contributes artful design to the public realm

Fiesta Boricua Mural, Humboldt Park
Gamaliel Ramirez

Integrating community-driven art into the public realm demonstrates the space is cared for and watched over

Massing

Massing refers to the height, bulk, and apparent density of a building. While baseline density standards are set by the underlying zoning, the guidelines presented here serve to promote consistency with the adjacent context by reinforcing desirable urban features from the neighborhood.

Massing

Height

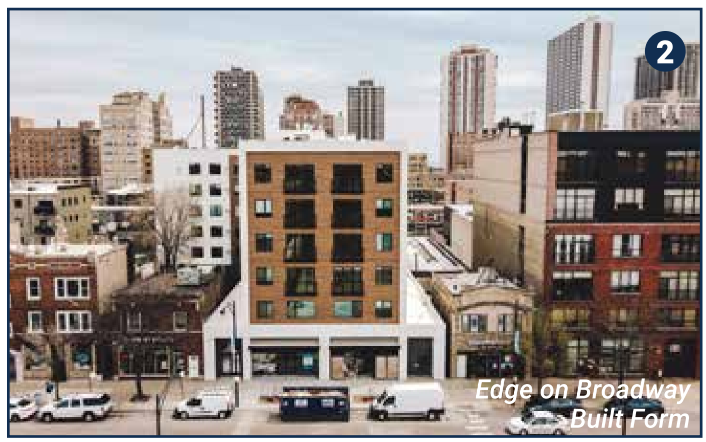
Building height is often the first concern for neighbors of new development. While zoning addresses overall height limits, the guidelines presented here provide recommendations for ensuring new development responds to surrounding conditions and existing buildings.

1. Determine street-facing building height based on adjacent and surrounding building heights to provide variety and visual interest within a unified street character.

2. Where a building is taller than surrounding developments, building height should transition by stepping down to better relate to adjacent buildings.

Ace Hotel
GREC Architects and Commune Design, Tom Harris

The hotel is massed to read as three buildings, one incorporates an historic brick face.



Edge on Broadway
Built Form

The tallest portion of the building transitions on each side to respond to the neighboring two story buildings.

Black Ensemble Theater
Morris Architects Planners

Building height varies to invite pedestrian access.

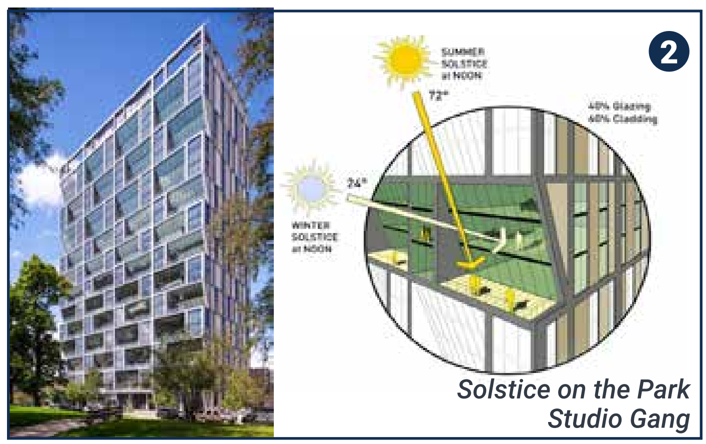
Access to Light and Air

Access to light and air are important for wellness, dignity, and energy efficiency, especially for residential and office uses. Building massing should be arranged to support maximizing light and air for building occupants and neighbors.

1. Conduct shadow studies of massing options to determine if proposed structures will create significant changes to surrounding spaces and examine alternatives if they are negatively impacted.
2. When creating massing options, investigate several variations that maximize natural light and determine if elements of these can be integrated into the final design.
3. Identify opportunities for outdoor space, including porches, balconies, and roof decks, that are designed in a way that is consistent with surrounding buildings and sensitive to the public realm, such as on top of a stepback.

Chinatown Public Library
Wight & Company,Jon Miller © Hedrich

Sun and Shadow Studies



Solstice on the Park
Studio Gang

Massing design maximizes sunlight throughout the year.

600 W. Chicago
Von Weise Associates,Steve Hall

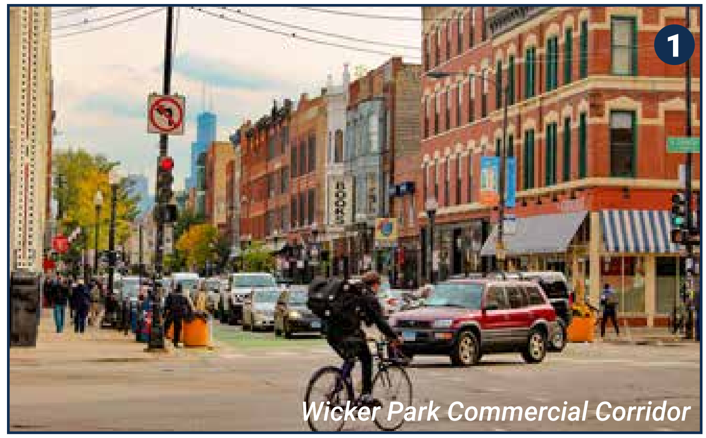
Roof deck covered lounge space for residents to enjoy away from the public realm

Street Wall

The rhythm of building faces along an urban corridor is known as the street wall. Continuity of the street wall helps to define the public realm, while large openings in the street wall caused by vacant parcels, deep site setbacks, or single-story buildings can detract from neighborhood character.

1. Where a street wall exists, its continuity must be reinforced with the new development or other active use, such as a vibrant plaza. Inactive gaps between buildings interrupt the street wall.

2. Buildings located at major intersections should reinforce the architectural definition of the corners of the block by building to the corner. Strategies for strengthening the corner can include adding an architectural feature, special façade treatment, primary building entrance, or other variation in massing.



Low first floor retail vacancy creates vibrant, walkable commercial corridors

Outdoor seating for restaurant helps maintain active uses along the street wall featuring planters and string lighting

Operable glass panels provide natural light and integrate with the brick to offer a defining feature at the corner

3 For buildings three stories and above, provide clear differentiation between the base, middle, and top of buildings to promote legibility and interest in the building's form from the street. Use this structure to promote continuity with the surrounding buildings, public realm, and open spaces at each level, with the highest degree of continuity at the base.

4 When creating buildings taller than three floors, especially if taller than surrounding buildings, set back the face of upper floors several feet behind lower floors. This encourages human-scaled design by responding to adjacent building height, street width, and pedestrian experience. Leverage these tower setbacks to optimize views and natural light.

Building mass steps back into three different tiers that are connected through the elevator shaft

Dynamic building with a pedestrian-oriented base and housing that pushes back for privacy and light

Bulk of building sets back along the lower density and traffic street for enhanced pedestrian experience

Façade

Façades are the exterior “faces” of a building. Primary façades along active streets should contribute to a vibrant streetscape, create visual interest, accentuate entrances, and reflect internal uses. Secondary façades require less visual interest but should still respect and contribute to the neighborhood character.

Façade

Windows and Doors

Building openings (i.e. windows and doors) serve as the interface between the exterior and interior of a building, creating architectural rhythm and expression.

1. Clearly identify building entrances as seen from the street using elements such as architectural details, awnings, or canopy structures.
2. Arrange window openings to promote design interest and employ strategies such as pattern, shape, color, material, and depth to reinforce the style of the building and how it responds to the surrounding context.
3. On ground floor frontages, introduce transparency and visual interest to contribute to the street's vitality. For retail, ground floor frontages should be primarily clear, non-reflective windows that allow views of indoor commercial space or product display.
4. For spaces inviting the public indoors (e.g. retail, restaurants, community uses, etc.), identify opportunities to increase permeability between the sidewalk and the indoors. This may include strategies such as doors that can stay open in nice weather and making indoor activities visible from outside.

Hello Baby Storefront
Perkins+Will, Steinkamp Photography

Storefront has a well integrated awning and playful graphics along the transparent glass facade

Wicker Park Mixed Use
Silvestro Design Operations

Geometrical window details provide depth and visual interest along the street wall

KLEO Art Residences
Juan Moreno Gabriel Architects

Glass garage doors allow for transparency and easy access into art and community spaces

Materials

High-quality building materials promote pride of place and respond to neighborhood character. Appropriate materials balance aesthetics with functional qualities such as durability, cost-effectiveness, and sustainability.

1. All façades that are visible to the public should be treated with materials, finishes, and architectural details that are of high-quality, durable, and appropriate for use on the primary street-facing façade.

Loyola Flex Lab
Smith Group

The facade utilizes glass and brick materials native to the surrounding neighborhood in a modern way

Hotel EMC2
KOO LLC

Stainless Steel in three colors are used to create a colorful,sculptural, and inviting entrance

Carter G. Woodson Library,Washington Heights
EXP Architects

New terra cotta rainscreen curtain wall replaced a hazardous uninsulated brick facade that was falling apart

Ground Floor

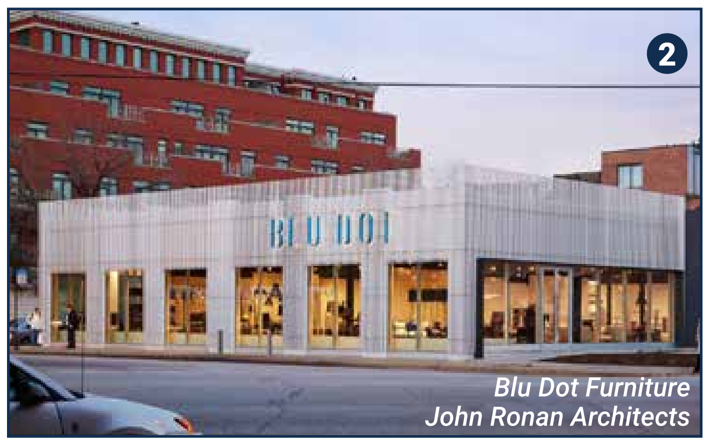
Active and interesting building ground floors add vibrancy to the public realm when properly expressed through the design of a building's façade.

1. Provide street-level spaces within buildings that are designed to accommodate active uses visible to pedestrians.

2. Use transparent materials, lighting, and other design elements such as art to create human-scale visual interest, especially along sidewalks and open spaces.

3. Long façades should be broken up with vertical elements and articulation of the street wall as well as proportioned to enhance existing patterns along the street.

Welcoming atmosphere in a corner cafe across from a train stop



Custom Screen Made of Aluminum Tubing transforms a dull strip mall into a unique retail space

Undulating facade was designed to reduce glare from oncoming traffic for a better resident experience

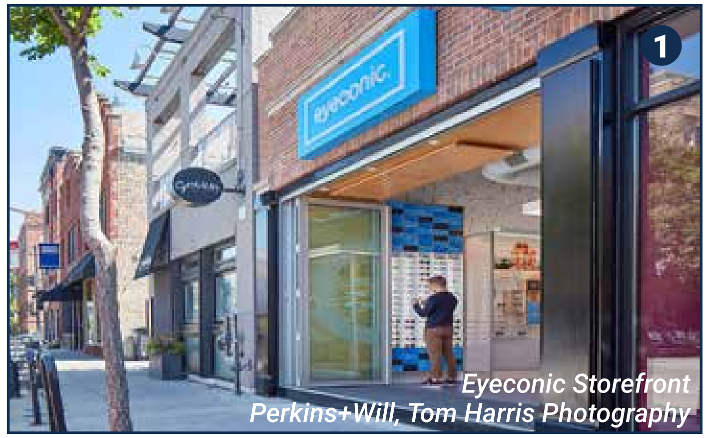
Signage and Security

Building signage is a critical form of communication for building occupants, but care must be taken to ensure that signage is integrated into the overall building design and reflects neighborhood character.

In addition, security features should continue to serve their primary function while integrating with the overall façade design.

1. Commercial developments should avoid sign clutter, especially when it obstructs views of interior spaces and activities. Signage should be used to contribute to the neighborhood character and identity by using color, style, and architectural integration appropriate to the context.

2. Security gate and shutter visibility should be minimized, and whenever possible, be interior-mounted and integrated into the storefront design.



Mounted signage is easy to read, clean, and unobstructive to permeable retail space

Window Emblems allow for branding that does not impact transparency and light

Interior mounted collapsible security gates are a discrete way to secure retail space

Acknowledgments

DESIGN EXCELLENCE WORKING GROUP

The Department of Planning and Development wants to thank the following individuals for their guidance, support, review, and contributions to these guidelines and other Design Excellence initiatives:

- Andre Brumfield, Gensler
- Kim Dowdell, HOK
- Casey Jones, Perkins + Will
- Reed Kroloff, Illinois Institute of Technology
- Juan Moreno, JGMA
- Lynn Osmond, Chicago Architecture Center
- Emmanuel Pratt, Sweet Water Foundation
- Domenic Salpietra, HOK
- Jaime Torres Carmona, Canopy Architecture and Design
- Ann Thompson, Related Midwest
- Doug Voigt, SOM
- Ernest Wong, Site Design Group

DPD WORK GROUP

The Department of Planning and Development's internal team who produced these guidelines included:

- Eleanor Gorkski, First Deputy Commissioner
- Jim Harbin, Deputy Commissioner
- Gerardo Garcia, Design Review Lead
- Jasmine Gunn
- Katharyn Hurd
- Ethan Lassiter
- Carmen Martinez
- Luke Mich

INVEST SOUTH/WEST PRE-QUALIFIED LIST OF DESIGN SERVICES FIRMS

CHICAGO ARCHITECTURE CENTER

PRITZKER TRAUBERT FOUNDATION

AIA Chicago

Image: Aerial view of Chicago South Side, Bronzeville, by Kashif Ahmed

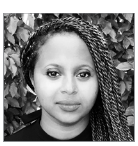
Jury Co-Chair: Lynn Osmond
President & CEO,
Chicago Architecture Center

Jury Co-Chair: Reed Kroloff
Dean & The Rowe Family College of
Architecture Endowed Chair,
IIT College of Architecture

Juror: Allison Grace Williams, FAIA
Principal, AGWms_Studio

Juror: Gerardo Garcia
Design Review Lead, City of Chicago
Department of Planning and Development

Juror: Bill Williams
Principal, KMW Communities



Juror: Sara Zewde
Founding Principal, Studio Zewde

Juror: Philip Enquist, FAIA
Consulting Partner, SOM

This summer the City of Chicago invited the Chicago Architecture Center to organize an open Request for Qualifications (RFQ) to identify Chicago design firms to be considered for upcoming projects connected to Mayor Lori E. Lightfoot's INVEST South/West neighborhood improvement initiative. The massive $750 million reinvestment in the urban fabric of Chicago's South and West Side communities will focus on small- and mid-scale projects along commercial corridors and heavily trafficked intersections. The Pre-Qualified List of Design Services Firms we announce here is part of a broader initiative by the City's Department of Planning and Development to advance design excellence in all new projects across the city, from skyline-defining investments downtown to civic and commercial investments in neighborhoods and residential districts.

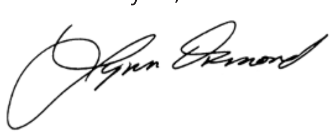
The following document is a resource packet for developers who may wish to respond to a series of upcoming Requests for Proposals issued under the INVEST South/West initiative. We provide here an introduction to all the Pre-Qualified design teams and their primary contact information and encourage developers to explore the work of these firms. Some are large, some are small; some are venerable, some are new. For the burgeoning designers, we encourage partnership with established firms to lend wisdom and add capacity to their efforts, and, at the same time, encourage larger firms to see the opportunity to mentor and help elevate fresh design voices. Above all, the teams assembled here share the Planning Department's abiding commitment to high-quality design.

The open-call RFQ yielded nearly 200 responses from across greater Chicago. A jury of respected design and development experts (including San Francisco-based architect and consultant Allison Grace Williams; Chicago developer Bill Williams; Chicago-based urban designer Phil Enquist; New York-based landscape architect Sara Zewde; and Planning Department Design Review Lead Gerardo Garcia) narrowed that list to the 32 you see here today. We are excited to promote this inaugural list and proud that it reflects the diversity of the city at large.

- 56% of selected teams are women-owned firms
- 63% of selected teams include a female lead designer
- 44% of selected teams are minority-owned firms
- 47% of selected teams include a lead designer of color

The depth and breadth of firms responding demonstrates the local design industry's passionate interest in strengthening our hometown, and it is sure to impel the City to refresh this list from time to time to always keep on the lookout for top talent. We hope this resource inspires developers to respond to INVEST South/West opportunities with some of the very best design talent Chicago has to offer.

Thank you,



LYNN OSMOND
President & CEO
Chicago Architecture Center
Jury Co-Chair

Thank you,

REED KROLOFF
Dean & The Rowe Family College
of Architecture Endowed Chair
IIT College of Architecture
Jury Co-Chair

BRININSTOOL + LYNCH

BROOK ARCHITECTURE

BUILT FORM

CANOPY + WOODHOUSE TINUCCI + FLOATING MUSEUM

CURIOSO + INFORM STUDIO

DAAM

SELECTED LIST OF 32 LOCAL DESIGN SERVICE FIRMS AND TEAMS

DMAC ARCHITECTURE

GARRISON + BONDER + HENDERSON + WILLIAMS + HKS

INTERACTIVE DESIGN ARCHITECTS

JGMA + BEEHYYVE

KOO LLC

KRUECK + SEXTON ARCHITECTS

KWONG VON GLINOW + UB STUDIO + ROBERT BURNIER

LANDON BONE BAKER ARCHITECTS + CIVIC PROJECTS ARCHITECTURE

MIR COLLECTIVE + MKB ARCHITECTS

NORMAN KELLEY

PORT URBANISM + FUTURE FIRM + BORDERLESS STUDIO WITH DAVID BROWN

PAUL PREISSNER ARCHITECTS

VLADIMIR RADUTNY ARCHITECTS

JOHN RONAN ARCHITECTS

ROSS BARNEY ARCHITECTS

SITE DESIGN GROUP, LTD.

SKIDMORE, OWINGS & MERRILL

ADRIAN SMITH + GORDON GILL ARCHITECTURE

STUDIO DWELL + BROOKS + SCARPA

STUDIO GANG

TEAM A + WILL DUBOSE DESIGN

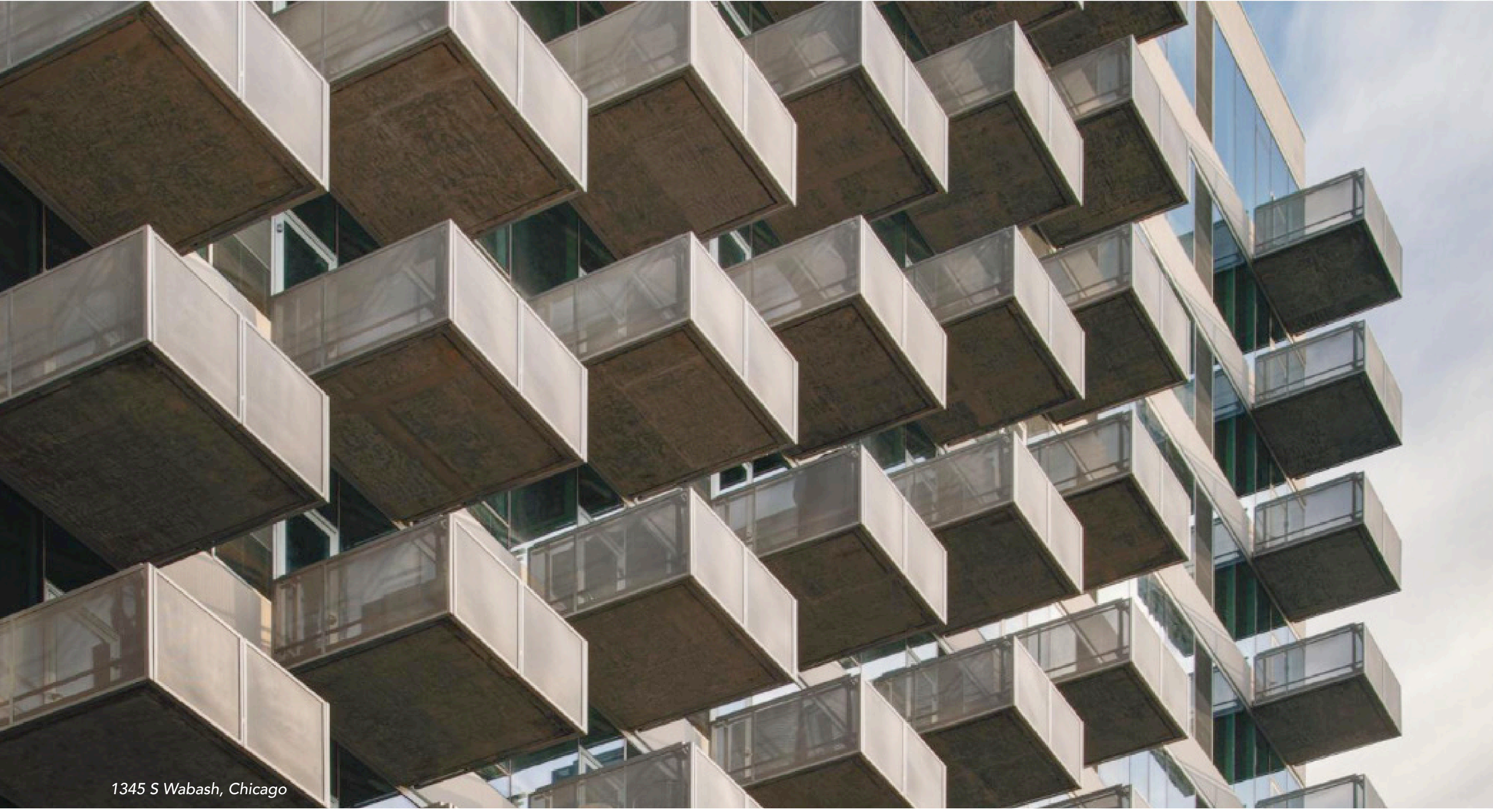
URBANLAB

URBANWORKS

VALERIO DEWALT TRAIN + LATENT DESIGN

VIA CHICAGO ARCHITECTS + DISEÑADORES + COULD BE ARCHITECTURE + CHICAGO MOBILE MAKERS

WHEELER KEARNS ARCHITECTS



1345 S Wabash, Chicago

BRININSTOOL + LYNCH

Brininstool + Lynch has been providing architectural services in Chicago for over 30 years. With award-winning projects ranging in every scale and scope, we have the ability to address nearly any conceivable project situation. We pride ourselves in finding economical and environmentally responsible solutions to complex construction problems, while not sacrificing quality or service.

Our interest in supporting the INVEST South/West initiative is seated in a deep belief that architecture can and should play a role in enriching communities across the city of Chicago. As a part of a larger mission, architects can ensure that safe, cost-effective, and durable buildings are not just a luxury, but an accessible necessity in underserved communities. Our work with local developers, skilled contractors, and community leaders has given us insights into completing ethical projects of all sizes and scales, even in the most complex situations. Much of our success has benefitted from these long-term relationships with thoughtful professionals at every step of the building process.

It is clear that the next few years will be formative for Chicago's South and West Sides, as political, social, and cultural shifts refocus efforts on realizing a more equitable future for the city's residents. We hope in our small part, we can provide the support to those that have been working tirelessly for decades across the city's underserved communities. We look to their lead and are listening to their needs as the basis for our involvement in this great task.

Jennifer Park
AIA
Principal
Brininstool + Lynch

Pablo Diaz
Project Manager
Brininstool + Lynch

Team Contact: Jennifer Park, Principal   T: 917.674.1996   E: jen@brininstool-lynch.com   brininstool-lynch.com

CPS Central Office Relocation, Chicago

BROOK ARCHITECTURE

RaMona Westbrook
AIA, LEED AP
President
Brook Architecture

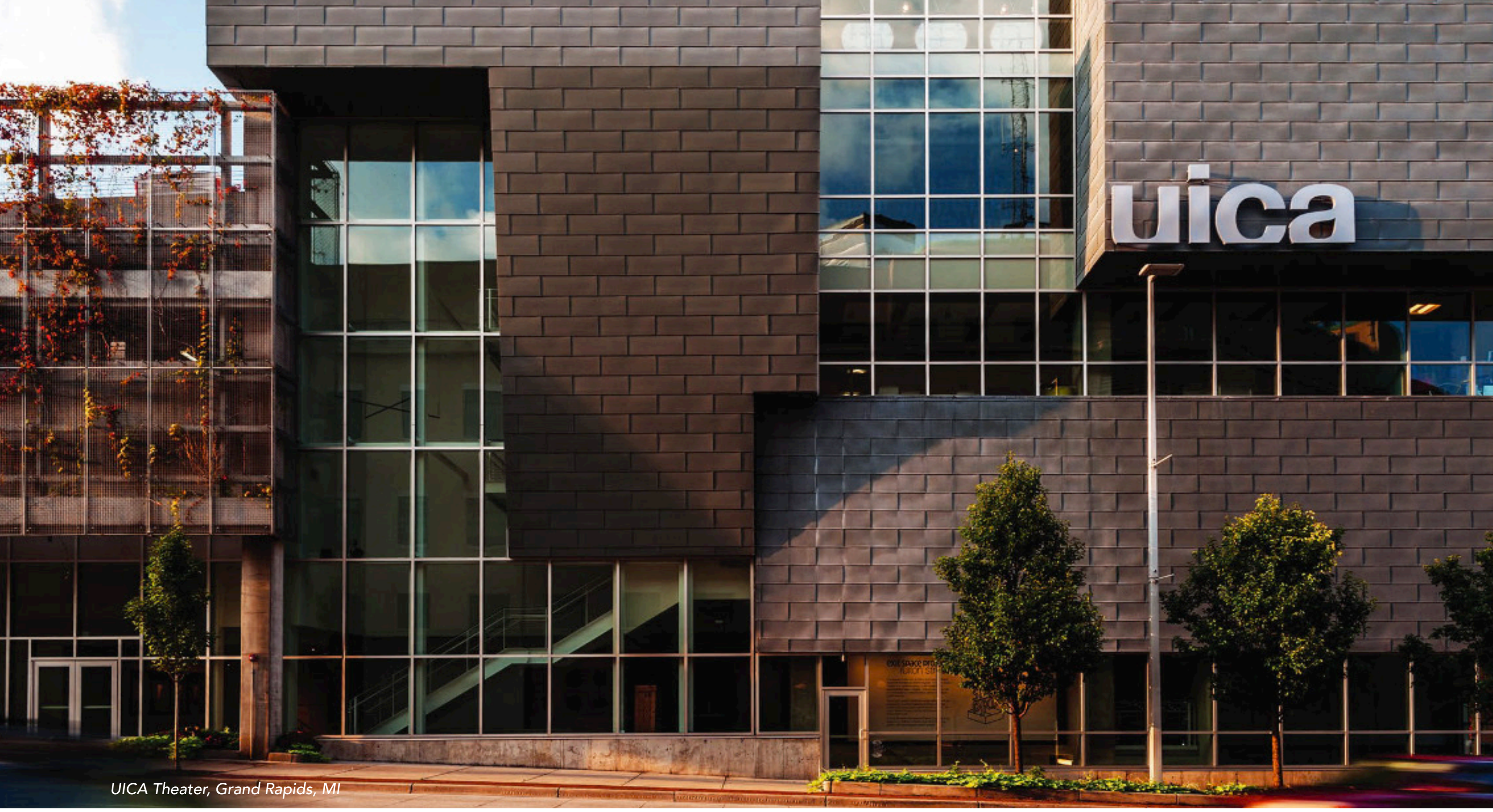
Kelly Williams
AIA
Vice President
Brook Architecture

Brook Architecture Incorporated is a full-service architecture firm founded on the principle that diverse experiences are valuable and bring great value to a design solution. The firm name is inspired by a Langston Hughes poem, The Negro Speaks of Rivers, where the speaker, after reflecting upon the many rivers he has traversed, proclaims “my soul has grown deep like the rivers.” Initially my underlying intent in starting the firm was to make opportunities for the disenfranchised to become licensed architects. Along the way, 25 years later, I have observed the profound impact the built environment has on the quality of life for the people with whom I live, work, and play, and I have dedicated my practice to transforming those environments.

One of my proudest achievements has been witnessing minority employees become licensed architects while working for me or seeing them secure their license soon after leaving Brook Architecture. I feel as though I am doing my part to diversify a profession that serves everyone but suffers from the under-representation of minorities. I believe diversity will improve the quality of our built environment.

When considering a project, we ask questions and listen; not every project is for us to do. We are selective about the projects we take and we look for projects (and clients) that allow us to utilize our expertise but also offer an opportunity to expand our knowledge base. This balanced approach allows us to carefully push the boundaries of design while confidently building upon past successes.

Team Contact: RaMona Westbrook, President T: 312.217.0632 E: rwestbrook@brookarchitecture.com brookarchitecture.com



UICA Theater, Grand Rapids, MI

BUILT FORM

Built Form is a medium-sized studio based in Chicago with smaller satellite offices in North Carolina and Florida. At our scale, the principles, as well as our staff can form close working relations with our clients and consultants, ensuring a more personal investment into each project. Currently our office make-up is approximately 50% women and 25% minority staff, and as we grow our diversity will continue to reflect the city we live in. We started the firm with the Ministry Center in East Garfield Park and a multi-family project in Milwaukee. Sixteen years later we have the same balance of community-based projects in Chicago and mixed-use projects around the country.

As a licensed firm in Illinois and several other states, we pride ourselves on our technical abilities as well as our design abilities to ensure a successful project. We see the embracing of accessible design, sustainability, and the latest building technologies as the only way forward, so it's part of our office culture to embrace these aspects of architecture.

Every project has different goals to be executed within a different context, so we start with a significant amount of listening and research before determining a specific design methodology. Some projects lend themselves more to a strategy than a methodology. We look to the research to find cultural and historical references that can inform architectural metaphors. We are always aware of the physical context, but many of our projects are developed from the inside-out through sections and plans. The intent is to create spatially meaningful work that allows for creative solutions that fit within the context of their communities.

Arden Freeman
AIA
Principal
Built Form

Robert Bistry
AIA, LEED NC+B
Principal
Built Form

Team Contact: Arden Freeman, Principal T: 773.805.7056 E: afreeman@built-form.net built-form.net

OSO Apartments, Chicago

CANOPY + WOODHOUSE TINUCCI + FLOATING MUSEUM

The INVEST South/West neighborhood improvement initiative is a 'once in a lifetime' opportunity that can redefine the limits on activity, integration, diversity, and inclusion in the public realm; creating new civic hubs in some of the oldest parts of our city that for too long have been ignored and underserved.

For this project, we have specifically assembled a unique, cross–disciplinary team, focused on providing the local neighbors and regional users a tailored approach and solutions that will address all needs in transformative new forms of public/private projects. From the large-scale resolution of restored public park realms to the precise details required for high-performance community centers, and from the essential need for housing and shelter to the exciting potentials for gathering, we stress design that is site- and program-driven, we promote sustainability as an everyday connection of the community to the environment, and we support the creation of a public space that harmonizes landscape and building.

We are in full support of INVEST South/West's mission and requirements. We are excited by the promise of this initiative, and we look forward to contributing to improving our city through inclusion, collaboration, and meaningful design.

Jaime Torres Carmona
AIA, LEED AP
Principal
Canopy

Andy Tinucci
AIA, LEED AP
Principal
Woodhouse Tinucci

Avery Young
Co-Director
Floating Museum

Team Contact: Jaime Torres Carmona, Principal T: 312.763.8005 E: jtorres@canopy-chicago.com canopy-chicago.com


The Wheelhouse Hotel, Chicago

CURIOSO + INFORM STUDIO

At Curioso + INFORM, we design with community in mind. We know that good design puts people first. So, we listen to the stories echoing around a block or reverberating in a building. We get into the minutia, roll up our sleeves, and leap with gusto into the intensity of each project's unique ecosystem. Far from adhering to a signature aesthetic, we discover design solutions that respect and resonate with each unique circumstance.

We do this because our goal is to create experiences with the power to transform. We aim to work on projects that are as much felt in a community as they are seen. We know that good design has the ability and the potential to impact more than just those who directly engage with it. In fact, we believe it's actually quite like grassroots community building.

Curioso + INFORM have collaborated for the past two years on a 3.76 acre, $300M mixed-use development in Midtown Detroit comprising student housing, multi-family living, a public plaza, and a hotel. INFORM serves as the Master Architect and Curioso as the Interior Design studio. As a team, we make each other better. Our shared "Project to Purpose" vision means that our commitment to the work is aligned and passionate.


Nina Grondin
Managing Principal
Curioso


Daniel Pierce
Design Principal
Curioso


Michael Guthrie
Design Principal
INFORM Studio


Gina Van Tine
Managing Principal
INFORM Studio

Team Contact: Nina Grondin, Managing Principal T: 781.964.6462 E: nina@curioso.us curioso.us

Rail Yard Warehouse Lofts, Green Bay, WI

DAAM

DAAM, also known as DAAM Projects, is an award-winning professional design firm founded on the principles of collaboration and cross-disciplinary practice in the areas of Design, Architecture, Art, and Making. Our mission is to advance creative thinking-and-doing in the built environment through a "hands-on" interactive approach to design. From neighborhood plans to building designs to custom joinery and details, the DAAM team is committed to providing our clients, partners, and community with innovative, resilient, and beautiful solutions to meet each project's set of unique challenges.

DAAM believes that Design, Architecture, Art, and Making are opportunities. They are a real means of creating asset value while providing essential resources to individuals, communities, neighborhoods, and cities. We believe INVEST South/West presents an occasion to elevate Chicago's South and West Side neighborhoods through these creative means. We are excited to leverage our team's collective expertise and seize these opportunities to integrate new buildings and placemaking strategies into the historically rich and architecturally dynamic sites along the selected corridors.

We believe our experience in successfully designing public, institutional, and academic buildings and social spaces for private, public, and non-profit clients positions us to actively engage with our city's South and West Side communities and translate their needs into built form. We are adept at synthesizing difficult site constraints, complex construction logistics, and contemporary project delivery methods into thoughtful pieces of architecture.

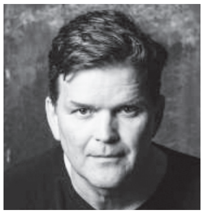
Elyse Agnello
AIA, NCARB
Principal
DAAM

Alexander Shelly
AIA, NCARB
Principal
DAAM

Team Contact: Elyse Agnello, Principal T: 312.278.1070 E: eagnello@daamprojects.com daamprojects.com

Midtown Athletic Club and Hotel, Chicago

DMAC ARCHITECTURE



Dwayne MacEwen
AIA, NCARB
Principal
DMAC Architecture

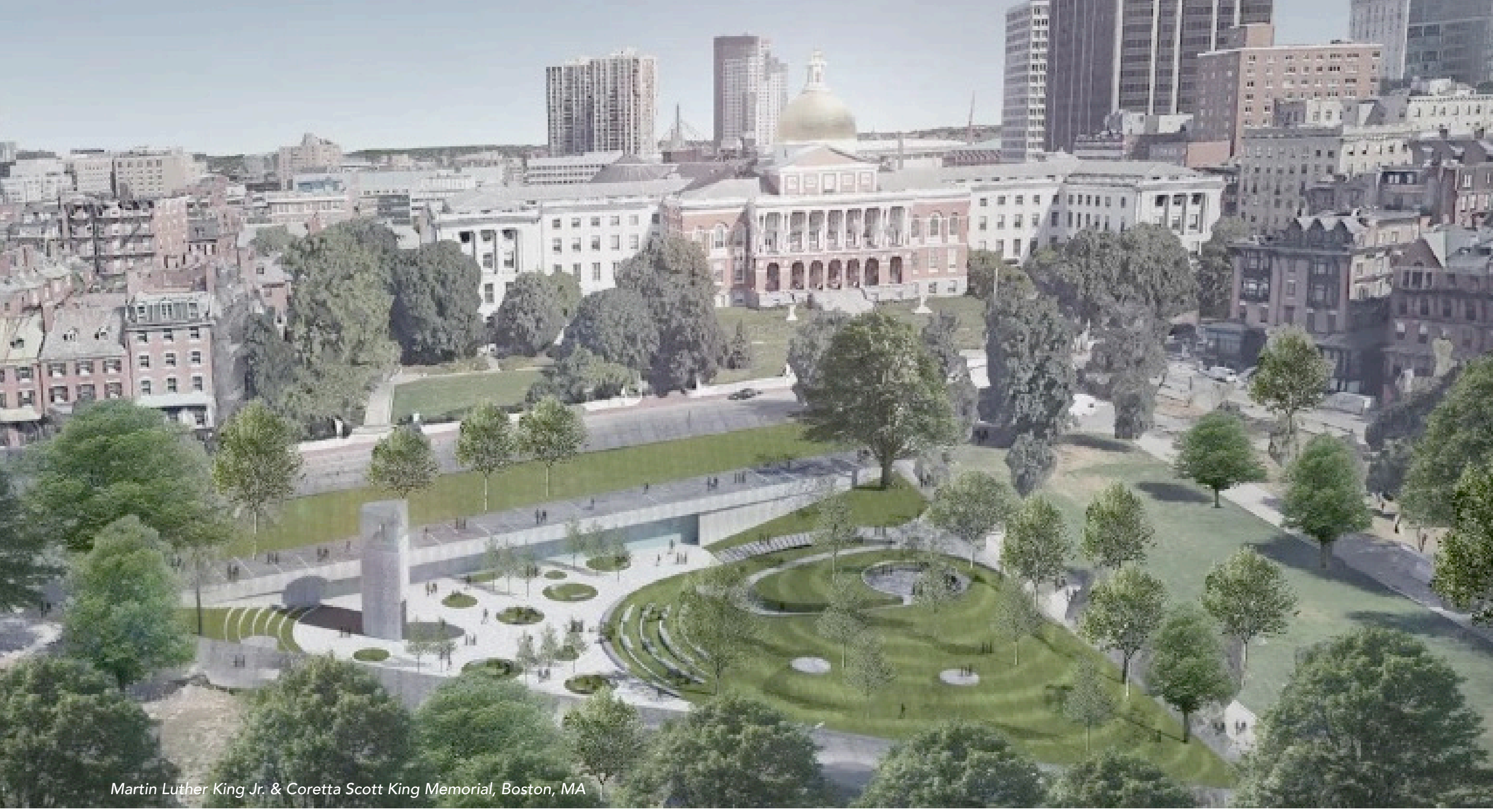
Kavitha Marudadu
AIA, LEED AP, NCARB
Associate Principal
DMAC Architecture

DMAC Architecture is a Chicago-based studio with 25 years of experience in architecture, interior design, and product design. Our staff experience spans multiple typologies and scales across commercial, hospitality, retail, and residential. In the last three years alone, we have produced over 1,000,000 square feet of commercial space. With every project, DMAC understands the audience matters; the space matters; the experience matters. We look for the stories that express our client's vision and transcend time. Our designs cater to the human experience with memorable spaces and cohesive details.

As with all of our clients, we understand working with INVEST South/West calls for research, engagement, dialogue, and partnership with all stakeholders. We understand that each neighborhood comes with its own history, challenges, and opportunities. We seek out these stories to remember, learn from, and reimagine an environment that is relevant, sustainable, and engaging.

What sets DMAC apart is our process-driven approach. We are a studio with all hands on deck. There are no departments. Our designs are rooted in their buildability. Everyone in the office spends time working on the job site, building side-by-side with contractors and learning by doing. Unlike most architectural offices, we also have a full workshop within our studio which makes it easy to mock-up and test design ideas. This ability for tactile visualization helps facilitate "what if" explorations, key discussions with clients and collaborators, and ultimately design decisions for the best results.

Team Contact: Dwayne MacEwen, Principal T: 312.498.3597 E: dmacewen@dmacarch.com dmacarch.com



Martin Luther King Jr. & Coretta Scott King Memorial, Boston, MA

GARRISON + BONDER + HENDERSON + WILLIAMS + HKS

As architects, landscape architects, community members, and cultural agents, we design experiences that leave traces across the city. We believe our work should reveal history and memories to anchor our streetscapes and neighborhoods. In this sense, our disciplines work at the intersection of culture, history, and memory. Because design excellence comprises ethically motivated purpose and economic responsibility, we recognize that design for cities is a public and practical art.

We believe in a sustainable approach to our work and projects. Issues of sustainability are woven into our design ideas—from the level of site planning to that of the techniques of architectural systems. Throughout our work, we will connect with the communities, the organizations, and the people who live in the neighborhoods that our designs will serve. Our stakeholders are numerous, and we will be inclusive of all.

We intend to create opportunities for Chicago's citizens through our work. We will take stock of neighborhood legacies and histories to create new experiences and new collective memories. Through design excellence, we hope to ameliorate the present and assist in crafting a better future. Ultimately, we intend for our design to be rooted in community engagement and grounded in justice, equity, diversity, and inclusion.

Darrell Garrison
PLA, ASLA
President
Planning Resources

Julian Bonder
Principal
Julian Bonder + Associates

Ron Henderson
ASLA, AIA
Founding Principal
L+A Landscape Architecture

Douglas Williams
Ph.D., ASLA, NOMA, LEED Ass., ASALH, BMRC, EDRA, Ikenobo, MANRRS

Anthony Montalto
AIA
Principal
HKS

Team Contact: Darrell Garrison, President T: 630.668.3788 E: dgarrison@planres.com planres.com

Engine Company 16, Chicago

INTERACTIVE DESIGN ARCHITECTS

Dina Griffin, FAIA NOMA, IIDA, NCARB
President
Interactive Design Architects

Established in 1992, Interactive Design Architects (IDEA) carefully selected its name to reflect the firm's collaborative ideals and, today, our name continues to serve as the guiding principal of our work.

Years of experience has confirmed that success hinges not only on the design or building process, but on thoughtful listening and attention to the demands of a client's culture. IDEA has been fortunate to have been able to collaborate with such a wide range of institutions in creating significant enhancements to neighborhoods and communities throughout the Chicago area and beyond, from the renovation of a rectory building into accessible, multi-unit housing; to our 10-year collaboration with the Renzo Piano Building Workshop as Architect of Record for the Modern Wing at the Art Institute of Chicago; to our current work on the Obama Presidential Center as Associate Architect (with Tod Williams Billie Tsien Architects I Partners) in the Jackson Park community. We have completed over 100 significant governmental projects, including libraries, fire stations, and schools in neighborhoods across the city. IDEA provides experience with local governmental and civic bodies as well as effective leadership in coordination of complex consultant teams and stakeholder engagement. IDEA also provides key guidance and leadership on projects with issues relating to local historic preservation concerns.

Dina Griffin, President of IDEA, was born and raised on the South Side of Chicago and has a deep love for the city. Each of our Chicago projects demonstrates our conviction that even greater things can be accomplished in every neighborhood.

Team Contact: Dina Griffin, President T: 312.988.0239 E: dgriffin@idea8.com idea8.com

Acero (UNO) Soccer Academy, Chicago

JGMA + BEEHYYVE

JGMA profoundly believes that architecture has an innate ability to transform people and place. The focus of our work has been in Chicago's diverse communities where each of the typologies that we work on faces similar challenges of public architecture and its representational character. We proudly work in community areas that are unaccustomed to receiving architecture of quality; places where people feel forgotten; neighborhoods where neighbors feel like they are not cared for.

We believe that every design scenario is unique and that each project be approached with a solution tailored for that community. Through the amplification of culture, empowering of community members, and creating appropriate vibrancy, our design solutions aim to become beacons of the true dynamic nature of places. We intend to reflect and project the values and personalities embodied in those who will ultimately utilize these spaces daily.

When more architects and designers collaborate and add community-centered designs to their repertoire, our communities thrive. That is why JGMA and Beehyyve have declared our commitment to collaboration. Led by Deon Lucas, Beehyyve is an organization of up-and-coming architects of color who are equally committed to creating change and becoming role models to the youth and future architects of Chicago. This collaboration also aligns with our respective core missions of creating a black and brown coalition that unites disparate communities of color into one design-focused partnership who have worked in a multitude of scales and complexities.

Juan Moreno
AIA
President
JGMA

Deon P. Lucas
Principal Architect
BEEHYYVE

Team Contact: Juan Moreno, President T: 773.294.1056 E: juan@jgma.com jgma.com


Altgeld Family Resource Center, Chicago

KOO LLC

Jackie Koo
AIA, NOMA,
LEED AP
Principal
Koo LLC

Dan Rappel
AIA
Principal
Koo LLC

KOO is a minority woman-owned Architecture, Interior Design, and Urban Planning firm founded by Jackie Koo in 2005. The firm's first constructed project was the 27-story the Wit Hotel at the corner of State and Lake Streets in the Loop, adjacent to the elevated train. This hospitality project popularized the hotel rooftop bar and is a project type for which KOO is well-known.

Over the past 15 years, KOO has grown into an award-winning firm that has garnered notable public-facing commissions such as the Navy Pier Hotel and the UIC Performing Arts Center. In addition to these well-known projects, KOO has had a long-term commitment to providing its services to the public sector, including the Chicago Housing Authority, Chicago Public Schools, City Colleges, and Cook County as well as various not-for-profit institutions.

KOO does not work in a particular style, but rather aims to elicit the project's identity based on the owner's vision, user's needs, analysis of the program, and research. Based on this information, the office charettes the problem and experiments with functional and aesthetic solutions. All members of the office are encouraged to participate.

In 2015, we promoted Dan Rappel, KOO's Director of Sustainable Design, to Principal. Jackie and Dan work together to provide substantial Principal level involvement on all projects and redundancy for our clients. KOO combines the flexibility and creativity of a boutique firm with the sophisticated technical, project management, and QA/QC processes of a corporate firm.

Team Contact: Jackie Koo, Principal T: 312.235.0923 E: office@kooarchitecture.com kooarchitecture.com

CME Center, Chicago

KRUECK + SEXTON ARCHITECTS

For over forty years, our firm has been fortunate to work with an inspiring array of clients, from homeowners and developers to schools and governments. In our commitment to design excellence, we have pushed the boundaries of architectural design and sought to create a legacy of visually and functionally enduring projects. Along the way we have grown, refined our process, and adapted to meet new challenges and opportunities.

While we rely on gathered knowledge and experience to get our projects built, we believe that what actually makes a good designer is not familiarity but curiosity. Six years ago, when we started work on I Grow Chicago's Peace Campus in West Englewood, we began our collaboration by surrendering our preconceptions, an admittedly painful process of unlearning, but one that allowed us to appreciate the complexities of our task and our City as we never imagined. This ethos of listening and learning pervades our firm's philosophy, and questioning assumptions allows us to discover and realize a project's hidden, transformative potential.

As we seek to expand the impact and equitability of our work throughout Chicago's West and South Sides, we recognize that one of the great prospects of this initiative lies in reciprocal education, and that our value as designers is augmented by what we might share along the way. Taking Mayor Lightfoot's vision and concerns as our own, we offer this engagement a design vision and deep experience managing a wide variety of project types, as well as insights from across our diverse body of work. We are drawn to this initiative's complexity and look forward to taking great pride in delivering inspiring yet practical and maintainable architectural solutions.

Mark Sexton, FAIA
LEED AP
Co-Managing Partner
Krueck + Sexton

Tom Jacobs
AIA, LEED BD+C
Co-Managing Partner
Krueck + Sexton

Sara Lundgren
AIA, LEED AP
Partner
Krueck + Sexton

Juan Villafañe
AIA, LEED AP
Partner
Krueck + Sexton

Mariusz Klemens
AIA
Design Architect
Krueck + Sexton

Team Contact: Mark Sexton, Principal | T: 312.374.1421 | E: msexton@ksarch.com | ksarch.com

Greenhouse Green House, Chicago

KWONG VON GLINOW + UB STUDIO + ROBERT BURNIER

Alison Von Glinow
AIA
Founding Partner
Kwong Von Glinow

Lap Chi Kwong
Founding Partner
Kwong Von Glinow

Chantelle Brewer
AIA
Founding Partner
UB Studio

Robert Burnier
Visual Artist

Kwong Von Glinow, UB Studio, and Robert Buriner are very excited to form a design team Joint Venture for the INVEST South/West initiative. We are thrilled about this opportunity.

Each of the 10 neighborhoods in the INVEST South/West initiative has its own identity and characteristics—its own unique fine grain. The charm of each neighborhood lies in its layered histories and cherished cultural treasures that are built into the grain of daily life within each community. Our team's approach to projects within these neighborhoods will begin by listening for yet unexpressed opportunities already embedded within the community fabric.

Our primary objective for the potential projects is two-fold: 1) finding an appropriate spatial solution for the community, and 2) acting as a stimulator that encourages cross-neighborhood engagement. Key to delivering a project that meets these objectives to serve the community is understanding and listening to the needs of the constituents and crafting experiences that foster a sustainable vibrant neighborhood. As such, cross-neighborhood engagement is equally important as the individual neighborhood itself as a way to create a "Chicago together."

We believe our Architect + Artist collaborative joint venture is a considerate and effective team formation for the INVEST South/West initiative. We meet the criteria that we have defined to form a joint venture partnership that will bring design excellence through a diversity of voices: (1) most importantly, a shared value of design; (2) equal and respected voices to contribute to the projects; (3) a cross-disciplinary approach between art and architecture; and (4) specialized expertise and experience to deliver high-quality projects.

Team Contact: Alison Von Glinow, Founding Partner T: 847.431.2222 E: alison@kwongvonglinow.com kwongvonglinow.com

Chicago Center for Arts and Technology, Chicago

LANDON BONE BAKER ARCHITECTS + CIVIC PROJECTS ARCHITECTURE

Catherine Baker, FAIA
Principal
Landon Bone Baker Architects

Monica Chadha
AIA, LEED AP
Founder
Civic Projects

Combined with our commitment to quality design and architecture, our collaborative practice creates projects that are deeply embedded in their context and communities. The members of both Landon Bone Baker Architects and Civic Projects Architecture act as team players on the firm level, including associate architects, engineers, and technical consultants. We bring these two teams together to work on development as a whole.

A unique community-based approach distinguishes our team from others. We understand the value of working closely with City officials, neighborhood organizations, CDCs, and developers of affordable and mixed-income housing to create the best possible solutions. We respond to the specific context, program, budget, and community concerns of each project while integrating green and health initiatives through engaged participation. Our goal is to design comfortable, attractive, secure, and livable environments that help keep residents rooted in their communities. Operating under the philosophy that cities must have comprehensive, sophisticated, and progressive urban developments, we continue to develop creative and cost-conscious solutions that reflect the clients' program, site, historical issues, energy usage, and budget constraints.

We understand and deeply believe in each project's potential to catalyze community activity and strengthen local bonds. We bring this mindset to all our projects, no matter what the scale.

Team Contact: Catherine Baker, Principal T: 312.212.0772 E: cbaker@landonbonebaker.com landonbonebaker.com

The Publishing House Bed and Breakfast, Chicago

MIR COLLECTIVE + MKB ARCHITECTS

Our interest in this project is both heartfelt and directly derived from the reason we formed Mir Collective in 2017. Working together in productive leadership and collaboration roles at Studio Gang Architects over the course of 15 years has provided us with unique and invaluable experience. It also gave us the opportunity to be part of a range of project types and client relationships accompanied by the chance to define what gives us personal and professional energy in architecture. Mir Collective creates architecture that values innovation and positive public impact in the shaping of spaces and cities. Our design process embraces diverse collaboration, local knowledge, and rigorous research.

Continuing in the tradition of some of our early work toward directly contributing to community-led efforts affecting real and positive change, we emphasize local impact and community engagement in design. We are seeking ways to bring our knowledge and abilities to communities like those at the heart of INVEST South/West.

Along with our partner, MKB Architects, we will bring to this program a rigorous commitment to design excellence, an appreciation for community knowledge and voices, and the eager energy of a new voice in the Chicago design community. To augment our desire to realize world-class design projects, we will apply our years of practical experience in project management, cost management, and technical expertise to benefit our clients and their vision.


Kara Boyd
AIA
Principal
MIR Collective


Jeana Ripple
AIA, LEED AP
Principal
MIR Collective


Todd Zima
AIA
Principal
MIR Collective


Jack Kelley
AIA
Principal
MKB Architects


Geraldine Kelley
AIA
Principal
MKB Architects

Team Contact: Kara Boyd, Principal T: 773.697.7630 E: kboyd@MIRCollective.com MIRCollective.com

Notre, Chicago

NORMAN KELLEY

Carrie Norman
RA AIA
Partner
Norman Kelley

Thomas Kelley
Partner
Norman Kelley

Since beginning our architecture and design practice eight years ago from the living room of our tiny Pilsen neighborhood apartment, we have been committed to expanding Chicago's legacy of innovative architecture and design within the halls of academia as educators, as well as on the streets of our adopted city as architects. During this time, we have appreciated the fact that our city's history of architectural innovation has been lost on many of the South and West Side neighborhoods and their constituents. For example, we understand the questionable importance of Louis Sullivan or John Root to a mother living in Auburn Gresham focused on feeding her children. To that end, we believe that good architecture, when done honestly and with conviction, should belong to all.

Norman Kelley was originally founded to examine architecture's limits between two- and three-dimensions. In doing so, our work varies in scale and medium from site-specific drawings, furniture objects, to habitable interiors. And while we operate at the intersection of architectural practice and education, all of our work is highly contextual, or site sensitive. We are influenced by our surroundings. We amplify our love of Chicago with our deep knowledge of its architectural history. We believe that knowing your immediate surroundings is the best recipe for good architecture. Since our inception, our work has focused its attention on adaptive reuse within old buildings with convoluted histories.

We look forward to the opportunity of collaborating on this unparalleled initiative towards helping improve the quality of life for all Chicagoans, especially those who have been historically marginalized.

Team Contact: Thomas Kelley, Partner T: 312.374.1039 E: tk@normankelley.us normankelley.us

Northcenter Town Square, Chicago

PORT URBANISM + FUTURE FIRM + BORDERLESS STUDIO WITH DAVID BROWN

PORT + Future Firm + Borderless Studio is a multidisciplinary Chicago-based collaboration, with expertise in architecture, landscape architecture, and city design. Together with designer David Brown, we represent the capacity of a large practice—paired with deep community relationships, nimble professional approaches, and the delivery of exceptional solutions to complex challenges.

Our collaboration is built on shared values which dovetail with the mission of INVEST South/West. Collectively, we prioritize design excellence—from a park bench, to a new building, to a master plan. Our approach is process-driven, focusing on inclusive collaboration and deep research, that results in unexpected approaches to complex challenges. These values come together around the ongoing effort to build a more vibrant, equitable Chicago.

Our partnership for INVEST South/West—where urban design, architecture, landscape, and community engagement will be inextricably linked—was formed to allow our team to conceptualize and develop the big, early ideas together. Past collaborations on projects across scales, as well as ongoing teaching relationships, provide an experience for joint project delivery.

Andrew Moddrell
AIA
Partner
Port Urbanism

Christopher Marcinkoski, AIA
Partner
Port Urbanism

Ann Lui
AIA
Principal
Future Firm

Craig Reschke
AIA
Principal
Future Firm

Paola Aguirre Serrano
Principal
Borderless Studio

Dennis Milam
AIA
Principal
Borderless Studio

David Brown
The Available City

Team Contact: Andrew Moddrell, Partner | T: 312.519.1103 | E: moddrell@porturbanism.com | portfutureborderless.com

Apartment Building Renovation, Chicago

PAUL PREISSNER ARCHITECTS

Paul Preissner
AIA
President
Paul Preissner
Architects

Paul Preissner Architects is an ideas workshop where imagination and crude experimentation are used to create unique social spaces characterized by weird juxtapositions, plain materials, and an economy of form. We have explored thoughts on the problem of housing and houses, furniture and installations, libraries, community centers, museums, schools, stores, and also some other things over 10+ years in practice. Work from the office is included in the permanent collection of the Art Institute of Chicago, has frequently been exhibited internationally, and is widely published. I participated in both the 2015 and 2017 Chicago Architecture Biennial, and am the commissioner and co-curator of the US Pavilion for the 17th International Architecture Exhibition—la Biennale di Venezia, 2021.

I began the office after having worked for nearly a decade in offices such as Peter Eisenman Architects (working on the Arizona Cardinals NFL Stadium, the Memorial to the Murdered Jews of Europe, and the City of Culture in Galicia), Woods-Zapata (serving as project architect on the renovation of Soldier Field), and Skidmore, Owings & Merrill. The studio was established to explore architecture and its practice alongside my intellectual research into the discipline which I carry out primarily at the University of Illinois at Chicago, where I am an Associate Professor with Tenure.

The office is structured as an open ideas laboratory. While the office is given overall creative direction and from myself, each person involved in a project (including the clients) are encouraged and free to participate within the full scope of the process, resulting in work which is unconventional, if sometimes only slightly. For the office, architecture can be more than bland utility, but also needn't beg for one's attention.

Team Contact: Paul Preissner, President T: 312.593.4177 E: preissner@paulpreissner.com paulpreissner.com

2016 West Rice, Chicago

VLADIMIR RADUTNY ARCHITECTS

Vladimir Radutny
AIA, LEED AP
Principal
Vladimir Radutny

Fanny Hothan
Associate
Vladimir Radutny
Architects

Ryan Sarros
Project Architect
Vladimir Radutny
Architects

My interest in this initiative stems from having lived the majority of my life in Chicago and my utmost admiration for the city which I call home. On September 18, 1989, my family and I arrived here with four suitcases and $150 to our names. We had fled the former Soviet Union as refugees alongside hundreds of thousands of families. Like many immigrants to the United States before us and after, we were seeking a better life and greater prospects, knowing that this country was built for those who desired equal opportunities and freedoms.

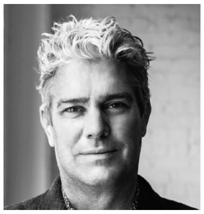
Thirty-one years later, I find myself reflecting on our environment and I am saddened by the turmoil, anger, and confusion that we sense while living in this country today. A place which should allow one's dreams and hopes to come true if they work hard for it, yet falls short in providing access to those ideals. This reality is deeply rooted in Chicago's urban context, where in some neighborhoods the premise of an optimistic future has been systematically removed and the dream my family had is not equally achievable. Having seen first-hand the dire need for improvement in these areas, my team and I decided that we would like to be part of this vital initiative and to contribute in the rebirth of the South and West Sides of Chicago.

Since its inception in 2008, our Architecture + Design practice has focused on innovative design solutions that challenge the conventional interpretations of space, function, and material use. Our firm has a wide scope of experience, ranging from large-scale commercial and institutional work to intricate residential projects within and outside Chicago. Our qualifications are strengthened by our team's diverse personal and professional experiences. Together, we can use imagination and design excellence to exceed expectations and make a true difference.

Team Contact: Vladimir Radutny, Principal T: 312.329.1400 E: vladimir@radutny.com radutny.com

Independence Library and Apartments, Chicago

JOHN RONAN ARCHITECTS


John Ronan, FAIA
Founding Principal
John Ronan
Architects

Since its founding in 1999, John Ronan Architects has been dedicated to the pursuit of an authentic architecture rooted in time and place. We reject the vacuous formalism and subjective self-expression which characterizes much of contemporary architecture in favor of an architecture which explores character and atmosphere, and which privileges human experience over arbitrary shape making.

The firm has a studio culture and its working method is research-based and collaborative. We treat the Owner as our collaborator, rather than our "client," and strive to make each project a unique response to its special needs, resulting in a design which reflects and shapes the culture of the organization it serves. We don't repeat ideas from project to project and our work doesn't all look the same.

Our work is known for its conceptual innovation, exploration of materiality, and a rigorous attention to detail, and we have a reputation for our ability to create innovative and sophisticated architecture within strict budget constraints. Our objective is to create a transcendent piece of architecture without sacrificing functionality, and we never ask the Owner to sacrifice their needs to serve the architecture.

The firm portfolio now includes projects across a wide variety of project types and scales, from residential homes to high-rise office buildings, and competes at the highest level. In 2016, the office was named one of seven international finalists for the Obama Presidential Center, and, in 2018, named one of six international finalist firms for the UCD Future Campus project in Dublin. Despite the large scale of these projects, Founding Principal John Ronan controls the size of the firm to no more than twenty people in order to allow his intimate involvement in each project, and to ensure the compelling and memorable design response to each commission, regardless of size or type, that the firm is known for.

Team Contact: John Ronan, Founding Principal T: 312.951.6600 E: ronan@jrarch.com jrarch.com

Chicago Riverwalk, Chicago

ROSS BARNEY ARCHITECTS

Carol Ross Barney
FAIA, Hon. ASLA
Design Principal
Ross Barney Architects

Eric Martin
AIA
Principal-in-Charge
Ross Barney Architects

Ross Barney Architects is an architecture, urban design, and landscape architecture studio. Established in 1981 by Carol Ross Barney, the studio enjoys a reputation of creating innovative, environmentally responsible, user-focused architecture and civic spaces. From community to campus buildings for premier academic and research institutions, to high profile urban parks and ground-breaking transit stations that connect vibrant neighborhoods, Ross Barney Architects has produced distinctive structures that have become community icons.

By operating on the principle that the design process must examine the broadest range of options to create excellence, the studio has adopted an extraordinarily collaborative and holistic approach, engaging the client, user, and community. This goes beyond aesthetics to allow a building or project to grow out of its place, history, and function.

The studio's ideas and projects have been recognized by organizations from around the world. Most recently, Fast Company named Ross Barney Architects one of the World's Most Innovative companies. With over 200 national and international awards, the studio's work has been exhibited in Chicago, New York, Washington D.C., and San Francisco. Beyond achievements and accolades, the studio's biggest asset has been an ability to deliver on the aspirations of a diverse set of clients who serve the public good.

Team Contact: Carol Ross Barney, Design Principal T: 312.897.1750 E: crb@r-barc.com r-barc.com


Dorchester Art and Housing Collaborative, Chicago

SITE DESIGN GROUP, LTD.


Ernest Wong
PLA, FASLA, APA
Principal in Charge
site


Hana Ishikawa
AIA, ASLA Affiliate
Design Principal
site

Founded in 1990, site design group, ltd. (*site*) is a nationally award-winning landscape architecture, urban design, and architecture firm based in Chicago, Illinois. A corporation licensed in the State of Illinois, the firm is led by four principals, Ernest Wong, Robert Sit, Bradley McCauley, and Hana Ishikawa. As landscape architects, urban designers, planners, arborists, architects, and creative thinkers, we are a staff of 30 diverse and innovative professionals. We are enlivened by our surroundings and strive to produce creative spaces that inspire, restore, and bring communities together.

site is often engaged to collaborate and coordinate efforts with architects, engineers, and other design professionals. Effective communication with the design team and client ensures successful coordination of projects from concept through construction.

As designers, creative thinkers, and engaged citizens, we understand the value of exterior environments that create a sense of place. Successful placemaking leads to the long-term care and use of these spaces by the public. At *site*, this is our goal in all we do: to create spaces that are valued and sustained by the communities they reside within in order to maintain long-term relevance and use.

Using functional systems coupled with "out of the box" strategies, we work diligently with our clients to create spaces that excite and engage users, improve the pedestrian experience, strengthen community ties, conserve and enhance the site's unique natural features, and push the boundaries of innovation and resiliency.

Team Contact: Jenna Jones, Marketing + Communications T: 312.427.7240 E: marketing@site-design.com site-design.com

Taylor Street Apartments and Little Italy Branch Library, Chicago

SKIDMORE, OWINGS & MERRILL

Adam Semel
AIA, NCARB
Managing Partner
SOM

Tiara Hughes
NOMA
Project Manager
SOM

Since our founding here 84 years ago, SOM has collaborated successfully with the City of Chicago to advance its international commercial and cultural stature and to continuously improve the quality of life of all Chicagoans. We are passionately committed to understanding and responding to the specific needs of each neighborhood in Chicago, and we are thrilled by the prospect of collaborating with a community of stakeholders on projects on the South and West Sides of our home city.

Design excellence is in our DNA, and we will bring the highest level of expertise to the projects procured through the INVEST South/West Initiative. While perhaps better known for the architecture of 35 towers that shape Chicago's world-renowned skyline, we have recently designed several projects and led studies and master plans on the South and West Sides of the city. SOM has been the City's strategic planning partner for generations, and the go-to for pro bono counseling on projects such as Amazon HQ2 and international relations to support Chicago as a global city.

In sum, we work at every scale to make Chicago better for the people who live here, including our Chicago staff, who volunteer to rapid-rehab the homes of westside and southside seniors, advocate for sustainable Building Code revisions, lead the Chicago Central Area Committee's equity-focused neighborhood thinking, and mentor disadvantaged minority high school kids in design and construction career opportunities. Since the 1933 Century of Progress World's Fair, we have worked with every Chicago mayor to realize this great city's potential, and we are dedicated to fulfilling Mayor Lightfoot's vision for the INVEST South/West Initiative to the best of our ability.

Team Contact: Adam Semel, Managing Partner | T: 312.360.4179 | E: adam.semel@som.com | som.com

Pullman National Monument, Chicago

ADRIAN SMITH + GORDON GILL ARCHITECTURE

Adrian Smith + Gordon Gill Architecture (AS+GG) celebrates the values, vision, and leadership of Mayor Lori E. Lightfoot and her Administration's commitment to making real change in Chicago. AS+GG is a Chicago-based, internationally recognized, award-winning architecture firm founded in 2006 by partners Adrian Smith, Gordon Gill, and Robert Forest with 80 employees based in Chicago. AS+GG is committed to Chicago and it is our home.

AS+GG is dedicated to the design of high-performance, energy-efficient, and sustainable architecture on an international scale. We approach each project, regardless of size, with an understanding that architecture has a unique power to influence civic life. We strive to create designs that aid society, advance modern technology, sustain the environment, and inspire those around us to improve our world. Our firm is dedicated to the creation of new paradigms for sustainable development.

AS+GG services include architecture, urban design, sustainability, interior design, and project management. We utilize a holistic, integrated design approach that emphasizes symbiotic relationships with the natural environment—a philosophy we term "Global Environmental Contextualism." This approach represents a fundamental change in the design process, in which "Form Follows Performance." It is predicated on the understanding that everything within the built and natural environment is connected, and that a building's design should stem from an understanding of its role within that context—locally, regionally, and globally.

Adrian Smith, FAIA
RIBA
Partner
Adrian Smith + Gordon Gill Architecture

Gordon Gill, FAIA
OAA
Partner
Adrian Smith + Gordon Gill Architecture

Robert Forest, FAIA
RIBA, OAA, LEED AP
Management Partner
Adrian Smith + Gordon Gill Architecture

Team Contact: Robert Forest, Management Partner T: 312.920.1888 E: robertforest@smithgill.com smithgill.com

CAM Museum, Raleigh NC

STUDIO DWELL + BROOKS + SCARPA

This is a partnership of Chicago-based Studio Dwell and Brooks + Scarpa. The reason for our collaboration is simple. We have a history of working together, [we] like each other, and have had previous success with joint venture projects in nearby Evanston and Detroit. By working together as a team, we are collectively better in all aspects of design, budget control, project management, service to our clients, and project delivery. Principal, project leader, and Chicago native, Mark Peters, AIA has been practicing architecture in Chicago for 28 years, having founded Studio Dwell in 2004. While Studio Dwell has received numerous awards and accolades for their work, it has largely been in the area of single and multi-family residential and mixed-use projects. Partnering with Brooks + Scarpa rounds out the experience and design excellence that is required for the INVEST South/West initiative.

While Brooks + Scarpa and Studio Dwell share similar multi-family residential and mixed-use project experience, Brooks + Scarpa has deep experience and a proven track record with historic renovation, adaptive re-use, commercial, retail, and cultural projects in under-funded neighborhoods stretching back almost three decades. Together we have a long history of design excellence within under-served communities.

Last year, Studio Dwell and Brooks + Scarpa completed a project together in nearby Evanston. We are currently working together on another mixed-use project in downtown Detroit. Both firms have a long history of working with other architecture firms in creative collaborations nationally and worldwide.

Mark Peters
AIA
Principal
Studio Dwell
Architects

Lawrence Scarpa, FAIA
Principal
Brooks + Scarpa

Team Contact: Mark Peters, Principal   T: 773.489.9200   E: mpeters@studiodwell.com   studiodwell.com

Chicago River Boathouses, Chicago

STUDIO GANG

Jeanne Gang, FAIA Int. FRIBA, LEED AP Founding Principal, Partner Studio Gang

Juliane Wolf RA Design Principal, Partner Studio Gang

Studio Gang creates places that connect people to each other, to their communities, and to the environment. Founded in 1997 and led by Jeanne Gang, Studio Gang is an architecture and urban design practice headquartered in Chicago with offices in New York, San Francisco, and Paris.

Working as a collective of more than 120 architects, designers, and planners, we create innovative projects that bring about measurable positive change for their users, communities, and natural ecology—a mission we refer to as "actionable idealism."

We collaborate closely with our clients, engineers, and outside specialists from a wide range of fields. These collaborations help us synthesize big, creative ideas and ground them in solution-oriented problem solving. Guided by this approach, our studio has produced some of today's most compelling work; named one of Fast Company's Most Innovative Companies in 2020, 2019, and 2018, Studio Gang has been internationally honored, published, and exhibited.

Even as we have organically expanded our practice across the country and beyond, working in Chicago continues to hold a special significance and to shape our understanding of what architecture can—and must necessarily—achieve for the communities it serves. We hope that, through our participation in INVEST South/West projects, we may have the opportunity to realize transformational projects that will serve as crucial community assets and stimulate further development.

Team Contact: Josh Ellman, Principal T: 773.384.1212 E: jellman@studiogang.com studiogang.com

By the Hand Club for Kids, Chicago

TEAM A + WILL DUBOSE DESIGN

Jason Nuttelman
AIA, LEED AP
Principal
Team A

Joe Buehler
AIA, LEED AP
Principal
Team A

Will DuBose
Design Principal
Will DuBose Design

Our team sees the INVEST South/West initiative as a truly exciting opportunity for our great city. By creating a compelling dialogue about the role of design and architecture within the diverse and culturally rich neighborhoods of Chicago, thoughtful development is possible by putting these communities first. Understanding the importance of this unprecedented community improvement initiative, TEAM A will be partnering with Will DuBose Design. Mr. DuBose grew up in the Auburn Gresham neighborhood, attended Whitney Young High School, received his architectural degree from the University of Michigan, and is leading a successful architectural practice in New York City. However, with deep ties to Chicago, Mr. DuBose has been looking for opportunities to return home.

Together, our focus is to inspire the communities of our city through transformative architecture and design. We profoundly believe that architecture has an innate ability to transform people and place. Our focus of work has been in Chicago's diverse communities where we look to challenge paradigms and project types in which the exploration of design has been forgotten. We proudly work in community areas that are unaccustomed to receiving architecture of quality; places where people feel forgotten; neighborhoods where neighbors feel like they are not cared for.

Our team of designers always tests and researches ideas for the sake of making innovative, appropriate, and unique solutions for the betterment of people's lives. We pride ourselves on employing high design principles to empower and instill all communities with a democratic sense of dignity and pride.

Team Contact: Jason Nuttelman, Principal T: 312.927.3007 E: jason@teama.com teama.com

Morgan Live + Work, Chicago

URBANLAB

Martin Felsen, FAIA
Principal
UrbanLab

Sarah Dunn
NCARB
Principal
UrbanLab

Founded in 2000 by Martin Felsen and Sarah Dunn, UrbanLab is an architecture and urban design firm headquartered in Chicago. UrbanLab's projects span scales, from large, urban designs to small, residential projects and exhibitions. Our primary interest is in forward-looking projects that speculate on a more resilient and resourceful tomorrow. UrbanLab has proven experience assembling and managing multi-faceted groups of specialists and stakeholders to bring highly complex projects to a successful conclusion.

Our office works across scales and silos of knowledge. At the largest scales, UrbanLab has worked with mayors, elected officials, and City departments to realize long-range planning and sustainability goals. For example, with the former Mayor of the City of Chicago, we collaborated on several city-wide resiliency plans to "green the streets" to save water and energy, and bring healthy food and jobs to struggling communities. Pieces of these long-range plans are being realized today in Chicago as "complete streets." UrbanLab's built work includes public spaces, mixed-use commercial and residential buildings, cultural complexes, restaurants, art galleries, housing, houses, a bridge, recreational landscapes, and large resilient infrastructural plans.

We bring invention and collaboration to each design project. We view challenges as opportunities to create memorable buildings and places that are both beautiful and surprising. We routinely assemble talented multidisciplinary teams with the highest levels of expertise and experience to realize architecture and urban design projects. Our design process is characterized by deep inquiry and collaborative exchange; design work is informed by intensive research and an experimental approach. We strive to design innovative, environmentally responsible solutions, and create spaces that establish healthy connections between people and their environments.

Team Contact: Martin Felsen, Principal T: 312.638.9100 E: felsen@urbanlab.com urbanlab.com


Galewood Elementary School, Chicago

URBANWORKS


Patricia Saldaña Natke, FAIA ALA, NCARB Design Principal UrbanWorks


Robert Natke AIA, NCARB, LEED AP BD+C Principal UrbanWorks


Maria Pellot AIA, AICP, LEED AP BD+C Associate Principal UrbanWorks

UrbanWorks is an internationally recognized Chicago architectural firm committed to producing the highest quality designs that meet complex social and environmental concerns for civic, community-based, private, and commercial sector clients. UrbanWorks approaches projects with a keen aesthetic eye and functional expertise; effectively balancing complex user programs with tight budgets, aggressive construction schedules, accessibility, and sustainability concerns to create successful projects that meet contemporary community needs.

The firm's designs span all scales, with recent projects reflecting larger and more complex programs that reflect new institutional requirements and concerns in the 21st century. Collaboration is critical to any architectural endeavor, and UrbanWorks has an outstanding track record developing and leading successful design efforts with engineers, architects, and clients.

We believe that good design should be available to all, regardless of race, gender, ethnicity, or socioeconomic level, and that the city is the primary locus for this project. We believe that architecture is directly connected to people: people define the space; people set the proportion; and architecture becomes enduring when it provides a vibrant canvas for our hopes and dreams. Ultimately, architecture is a cultural production that reflects each of the forces behind its creation, and UrbanWorks believes that it is our responsibility to capture the best of these impulses.

Team Contact: Patricia Natke, Design Principal T: 312.202.1200 E: pnatke@urbanworksarchitecture.com urbanworksarchitecture.com

Vue53, Chicago

VALERIO DEWALT TRAIN + LATENT DESIGN

Joe Valerio, FAIA
Founding Principal
Valerio Dewalt Train

Katherine Darnstadt
AIA, LEED AP
Founding Principal
Latent Design, M/WBE

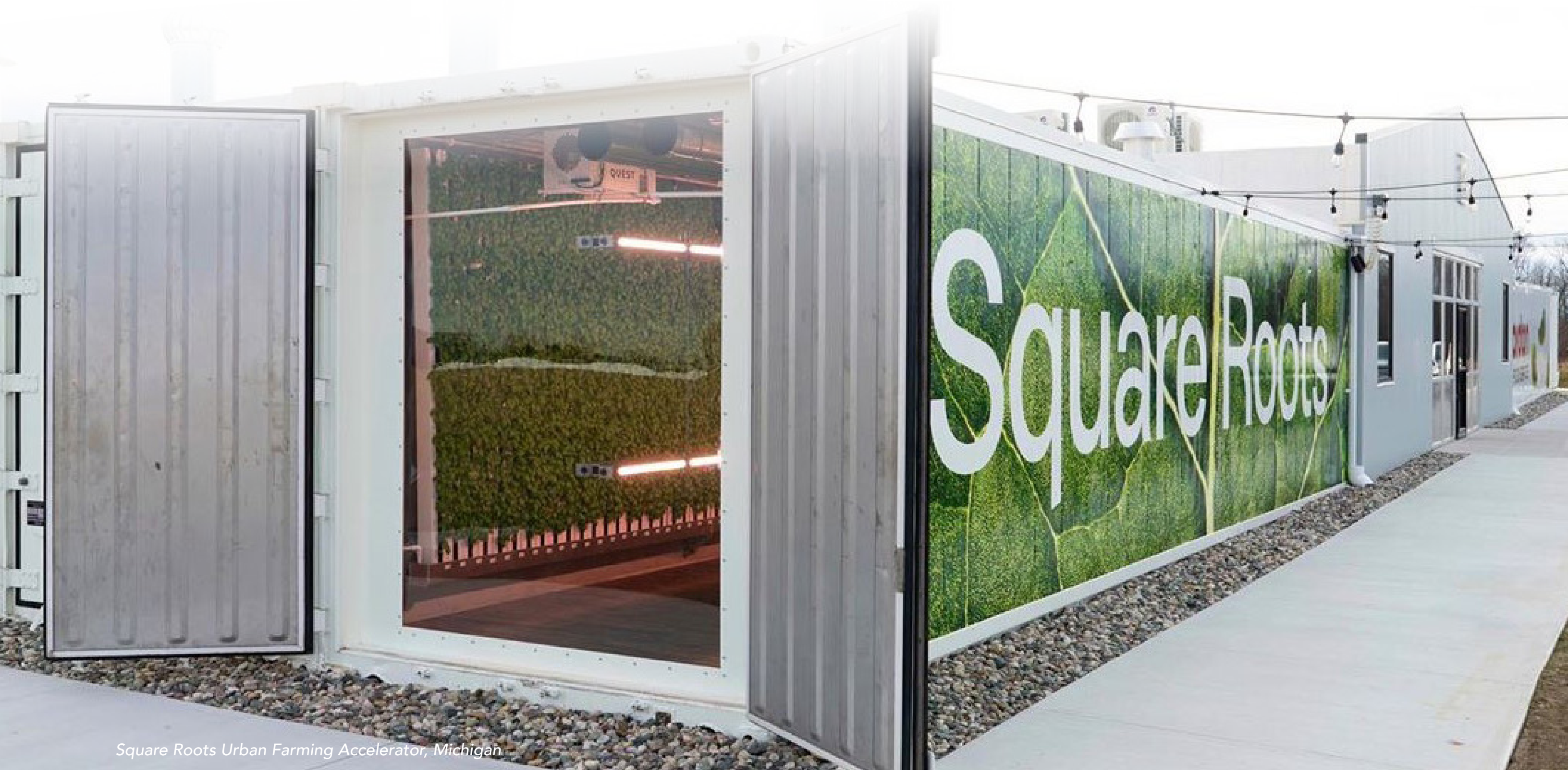
Valerio Dewalt Train and Latent Design have formed a dynamic partnership delivering design excellence, innovation, and community-based participatory design. Both firms were birthed right here in Chicago and are passionate about our city's future.

We are committed to diversity and inclusion through our design process and team and have been inspired by the Chicago Department of Planning and Development's Mentor-Protege Program. We recognize the importance of nurturing emerging firms and have partnered with Latent Design, an architecture, urbanism, and interiors firm leveraging civic innovation and social impact to design more equitable spaces to live, work, and play. Latent Design and Valerio Dewalt Train believe that good design begins with research and dedication to the collaborative process. We question everything to reach an understanding between the city, client, and community.

We have a surplus of passion for building and an intrinsic curiosity for discovery. Our commitment to good design is focused on innovation, affordability, sustainability, and equity. This has been recognized by our peers in the form of dozens of awards, including national AIA honor awards and by a robust list of repeat clients, including Google, University of Chicago, Mayo Clinic, and Heartland Alliance.

Valerio Dewalt Train and Latent Design have the experience to challenge existing systems. We see our continued relationship as a collaboration of design excellence and dedicated civic engagement.

Team Contact: Joe Valerio, Founding Principal T: 312.260.7300 E: jvalerio@buildordie.com buildordie.com



Square Roots Urban Farming Accelerator, Michigan

VIA CHICAGO ARCHITECTS + DISEÑADORES + COULD BE ARCHITECTURE + CHICAGO MOBILE MAKERS

Cristina Gallo
AIA
President
Via Chicago Architects + Diseñadores

Marty Sandberg
AIA
Principal
Via Chicago Architects + Diseñadores

Joseph Altshuler
LEED AP
Principal
Could Be Architecture

Zack Morrison
Principal
Could Be Architecture

Maya Bird-Murphy
Founder
Chicago Mobile Makers

The collaborative of Via Chicago and Could Be Architecture offers an exciting, right-sized alternative to Chicago's "big guys" and legacy firms. Together with our programming and outreach partner Chicago Mobile Makers—a nonprofit organization that empowers Chicago youth to become advocates in their own communities—we're the right crew at the right time.

Our authentically local, hands-on team presents a radically approachable conduit for bridging the gap between Chicago's talented architects and the communities who would benefit most from their design efforts. In an era of social upheaval and professional reckoning, we bring a genuine M/WBE design firm straight to the head of the table—one led by a young Colombian immigrant with the design skills and public-private experience to captain such an effort, rather than just "ticking the box" as the minority partner for a larger, corporate firm. Our firms may be small in size, but we offer an impressive track record of navigating the technical obstacles that are inevitable with public-private development. Simply put, we get things done. Safe streets, meaningful jobs, local food—the core needs of a community must be addressed before any high-minded proposals can even be considered.

We are excited, cautiously, by the renewed attention [City of Chicago] is giving to these South and West Side corridors, and wholeheartedly agree with the tremendous potential of these streets to become renewed economic hubs for our generation and beyond. Please give our community-focused, right-size team serious consideration when you decide who should earn the City's "stamp of approval" for working with our long-overlooked South and West Side communities.

Team Contact: Cristina Gallo, President T: 312.879.9828 E: cristina@viachicagoarchitects.com viachicagoarchitects.com

Inspiration Kitchens, Chicago

WHEELER KEARNS ARCHITECTS

Wheeler Kearns is a collective practice of architects. We work with people who seek to enrich their lives in a space that embodies their purpose, energy, and vision. At Wheeler Kearns, each team member equally shares the roles of designer, technician, and manager. Through our weekly studio pin-ups and internal review, we make sure all of the best ideas from all staff members are being contributed to every project. This ensures we produce the highest quality work for our clients and support their unique missions.

When a space we design resonates with your deepest intentions, it has a lasting and powerful impact. We devote all our energies to understanding our client's core purpose and the transformation they seek. We want to see the challenge through their eyes. Doing this guides us to what we call the 'emotional center' of a project: the heart around which an entire project revolves. We return to that central idea as we craft concepts, help our clients make decisions, and refine our responses. Every design decision evolves from that 'emotional center.' The result is a space that responds uniquely to your mission, even as you balance aspiration with budget.

As a practice that focuses on an empathy-filled process more than a specific project type, style, or scale, our portfolio is diverse and richly varied. Our work is consistently recognized for excellence: we have received 28 Design Excellence Awards from AIA Chicago. Notably, we have twice been named by a national jury as AIA Chicago's Firm of the Year. This award honors sustained, outstanding achievement and excellence in a body of work produced by a firm over time.


Dan Wheeler, FAIA
Principal
Wheeler Kearns


Joy Meek
AIA, LEED AP
Principal
Wheeler Kearns


Chris-Annmarie Spencer
AIA, NOMA
Principal
Wheeler Kearns


Larry Kearns, FAIA
LEED AP
Principal
Wheeler Kearns


Jon Heinert
AIA
Principal
Wheeler Kearns


Mark Weber
AIA
Principal
Wheeler Kearns

Team Contact: Dan Wheeler, Principal | T: 312.374.3561 | E: dan@wkarch.com | wkarch.com

COMMUNITY WEALTH BUILDING MODEL

One of the core areas of evaluation criteria for proposals is *Promotion of Short- and Long-term Community Wealth Building*. The City is seeking development partners who demonstrate the ability to deploy innovative models of building community wealth and equity.

As you complete your proposal, please consider how your plans will leverage community collaboration and support, empower Black and/or Latinx partners, contribute to new jobs for local residents, and build on your track record of economic development in the South and West Sides.

These efforts can take many forms, including forming partnerships with Black and/or Latinx partners as part of the financing, development, or construction of a project. In addition, there are creative models that use real estate to generate community wealth and equity. As reference, we have provided examples of the latter below:

Evergreen Cooperatives (Cleveland, OH): http://www.evgoh.com/

Evergreen Cooperatives is a non-profit holding company responsible for incubating for-profit green industry cooperatives, providing business services, and aggregating financing and land acquisition. Supported by Cleveland's Greater University Circle Initiative, it links the procurement needs of Cleveland's "eds and meds" anchor institutions to the city's needs for workforce and economic development. For example, it constructed a greenhouse to create produce and herbs and supply to local establishments. Employees are part owners, sharing in the profits of this venture.

East Portland Community Investment Trust (Portland, OR): http://investcit.com/

The East Portland Community Investment Trust (CIT) offers a long-term path to collective, communal ownership of real estate for investors starting from $10-$100 per month. It is located in a high-poverty census tract and leases 29,000 sq. ft. of commercial retail space to around 25 tenants. Investors are exclusively residents from nearby zip codes, have a no-loss guarantee, and are enrolled in general investment and financial planning classes as part of the program. 68% percent of investors are first-time, 62% are women, and 49% were born outside the US, and the financial literacy class program has graduated more than 300 students in under three years.

Chicago Department of Housing Multi-Family Housing Financing Overview

One of the Department of Housing's chief responsibilities is to work with private developers to increase the supply of affordable housing in every Chicago neighborhood through a litany of targeted programs. The DOH assists developers with multi-family financing by providing public funds and other subsidies that are necessary to pay a portion of the project-specific costs of rehabilitating or constructing affordable rental apartments within the City.

This document provides an overview of affordable housing financing programs offered by DOH as well as the Department's funding priorities. All information regarding DOH policies and procedures, application instructions, and underwriting and architectural guidelines can be found on the Department's website linked here, including, but not limited to:

- Multi-Family Funding Application Instructions
- Architectural and Technical Standards Manual
- DOH Proforma

For affordable housing developments that contemplate use of City financing, we strongly encourage you to review DOH's policies and request an intake meeting with DOH management and staff before submitting a funding application. Please use the linked intake form, found here.

Funding Sources

Financing programs currently administered by DOH include low-income housing tax credits, federal, state and local funds awarded in the form of first and second mortgage loans, city land and private activity and tax-exempt bonds.

Illinois Affordable Housing Tax Credits (IAHTC): A $0.50 State of Illinois income tax credit for every $1 that is donated to an eligible affordable housing development. DOH allocates 24.5% of the amount of credits authorized by the State. Developers apply through DOH's Multifamily Financial Assistance Application or the Stand Alone IAHTC application if only applying for IAHTCs. Successful applicants receive a conditional tax credit reservation letter based on the amount of the donation and determination that the undertaking is compatible with the goals of the Department.

Low Income Housing Tax Credit Program (LIHTC): A federal tax credit issued via a competitive funding round in accordance with DOH's LIHTC Qualified Allocation Plan (QAP). The QAP is published biennially to help direct federal affordable housing resources to where it is most needed. Applicants fill out DOH's Multifamily Financial Assistance application for the credits upon the release of the QAP and announcement by DOH that applications are being accepted for the LIHTC funding round.

Community Development Block Grant (CDBG): Funds assist both non-profit and for-profit developers in rehabilitating and developing affordable rental housing. 51% of all units within the project must be occupied by low-and moderate-income households unless the project meets a specific exception to reduce the cost of construction. The annual City of Chicago Action Plan, administered by the Office of Budget and Management and approved by the U.S. Department of Housing and Urban Development, determines the annual Multi-Family Loan Program allocation.

HOME Investment Partnerships Program (HOME): Funds support loans for construction of affordable multi-family housing. HOME allows assistance to be targeted toward particular units. Projects assisted with HOME target very low-income households. The annual City of Chicago Action Plan, administered by the Office of Budget and Management and approved by the U.S. Department of Housing and Urban Development, determines the annual Multi-Family Loan Program allocation.

Tax Increment Financing (TIF): Funds collected from Tax Increment Financing districts provide grants to developers. Developers applying for TIF assistance are required to submit a supplemental TIF application that identifies the TIF district, Parcel Index Numbers, demonstrates need, budget of TIF eligible expenses, performance measures and increment projections.

Affordable Housing Opportunity Fund (AHOF): Funds collected from Density Bonus and ARO in-lieu donations are administered by DOH. Fifty percent of each contribution is utilized for the construction or rehabilitation of affordable units and subject to the appropriation by the City Council.

Multi-family Mortgage Revenue Bonds: Provides bond financing, through the City's tax-exempt bonding authority, for developers who build or rehabilitate large housing developments for low- and moderate-income renters and generates private equity investment.

Funding Priorities

In addition to meeting DOH policies and underwriting guidelines, DOH evaluates requests for City financing based on the compatibility of the request with departmental funding goals and priorities. The department's funding goals and priorities are classified in the Qualified Allocation Plan (QAP) under three Priority Tracts: Opportunity Areas, Redevelopment Areas, and Transitioning Areas. The Priority Tracts are subject to evolve or shift at the release of the biennial QAP. Summary descriptions of the conditions associated with each Priority Tract under the current QAP follow.

I. Opportunity Areas
Priority will be given to projects which provide housing units in high income/high cost, opportunity areas and contemplates the preservation of existing housing stock through rehabilitation and adaptive reuse. Additional consideration will be given for projects that include very low-income units, housing units for tenant populations with special housing needs, including accessible units, SRO units, permanent supportive housing, reentry housing and units for Homeless individuals and/or families.

II. Redevelopment Areas
Priority will be given to projects in existing Redevelopment Areas, which "contribute to a concerted community revitalization plan". Preferably these projects will be developed to include a mix of uses providing housing as well as first floor retail/commercial to address needed

neighborhood amenities. Additional consideration will be given to projects that promote income diversity with units accessible to a range of household incomes, from 0-30% AMI up to and including market rate units.

III. Transitioning Areas

Priority will be given to projects located in areas undergoing rapid economic and demographic change, and the resulting loss of affordable housing units stock. Preferably these projects will include units that are obligated to serve qualified tenants for the longest periods beyond the minimum requirement as stipulated by the funding source. Additional consideration will be given for projects that include very low-income units, housing units for tenant populations with special housing needs, including accessible units, SRO units, permanent supportive housing, reentry housing and units for Homeless individuals and/or families.

TABLE OF INCOME LIMITS
Effective April 1, 2020

Household Size	10% Area Median Income	15% Area Median Income	20% Area Median Income	30% Area Median Income	Extremely Low Income Limit	40% Area Median Income	Very Low Income Limit (50% Area Median Income)	60% Area Median Income	65% Area Median Income	Low Income Limit (80% Area Median Income)	90% Area Median Income	95% Area Median Income	100% Area Median Income	115% Area Median Income	120% Area Median Income	140% Area Median Income	150% Area Median Income
1 person	$6,370	$9,555	$12,740	$19,150	$19,150	$25,480	$31,850	$38,220	$41,405	$51,000	$57,330	$60,515	$63,700	$73,255	$76,440	$89,180	$95,550
2 persons	$7,280	$10,920	$14,560	$21,850	$21,850	$29,120	$36,400	$43,680	$47,320	$58,250	$65,520	$69,160	$72,800	$83,720	$87,360	$101,920	$109,200
3 persons	$8,190	$12,285	$16,380	$24,600	$24,600	$32,760	$40,950	$49,140	$53,235	$65,550	$73,710	$77,805	$81,900	$94,185	$98,280	$114,660	$122,850
4 persons	$9,100	$13,650	$18,200	$27,300	$27,300	$36,400	$45,500	$54,600	$59,150	$72,800	$81,900	$86,450	$91,000	$104,650	$109,200	$127,400	$136,500
5 persons	$9,830	$14,745	$19,660	$29,500	$30,680	$39,320	$49,150	$58,980	$63,895	$78,650	$88,470	$93,385	$98,300	$113,045	$117,960	$137,620	$147,450
6 persons	$10,560	$15,840	$21,120	$31,700	$35,160	$42,240	$52,800	$63,360	$68,640	$84,450	$95,040	$100,320	$105,600	$121,440	$126,720	$147,840	$158,400
7 persons	$11,290	$16,935	$22,580	$33,900	$39,640	$45,160	$56,450	$67,740	$73,385	$90,300	$101,610	$107,255	$112,900	$129,835	$135,480	$158,060	$169,350
8 persons	$12,020	$18,030	$24,040	$36,050	$44,120	$48,080	$60,100	$72,120	$78,130	$96,100	$108,180	$114,190	$120,200	$138,230	$144,240	$168,280	$180,300
9 persons	$12,740	$19,110	$25,480	$38,220	$48,600	$50,960	$63,700	$76,440	$82,810	$101,950	$114,660	$121,030	$127,400	$146,510	$152,880	$178,360	$191,100
10 persons	$13,470	$20,205	$26,940	$40,404	$53,080	$53,880	$67,350	$80,820	$87,555	$107,750	$121,230	$127,965	$134,700	$154,905	$161,640	$188,580	$202,050

NOTES:
•Income limits are for the Chicago-Naperville-Joliet, IL HUD Metro FMR Area.
•Effective until superseded.
•Low, Very Low, Extremely Low Income and 30% AMI limits are as published by HUD.
•Income limits at all other income levels are calculated per HUD methodology, based on Very Low Income (50% AMI) limit.

CITY OF CHICAGO
MAXIMUM AFFORDABLE MONTHLY RENTS 2020

Maximum Monthly Gross Rents (maximum rents when tenants pay no utilities/landlord pays all utilities):

Number of Bedrooms	10% AMI	15% AMI	20% AMI	30% AMI	40% AMI	50% AMI (Low HOME Rent Limit)*	60% AMI	High HOME Rent Limit*	65% AMI	80% AMI	100% AMI	120% AMI	HUD Fair Market Rent*
0	$159	$239	$319	$479	$637	$796	$956	$956	$994	$1,275	$1,593	$1,911	$956
1	$171	$256	$341	$513	$683	$853	$1,024	$1,076	$1,066	$1,366	$1,706	$2,048	$1,076
2	$205	$307	$410	$615	$819	$1,023	$1,229	$1,248	$1,282	$1,639	$2,048	$2,457	$1,248
3	$237	$355	$473	$725	$947	$1,183	$1,420	$1,504	$1,472	$1,893	$2,366	$2,840	$1,585
4	$264	$396	$528	$879	$1,056	$1,320	$1,584	$1,659	$1,623	$1,707	$2,640	$3,168	$1,888
5	$291	$437	$583	$1,047	$1,166	$1,456	$1,748	$1,811	$1,771	$2,330	$2,914	$3,497	$2,171

Maximum rents when tenants pay for cooking gas and other electric (not heat):

	Number of Bedrooms	10% AMI	15% AMI	20% AMI	30% AMI	40% AMI	50% AMI (Low HOME Rent Limit)*	60% AMI	High HOME Rent Limit*	65% AMI	80% AMI	100% AMI	120% AMI	HUD Fair Market Rent*
Single-family	0	$114	$194	$274	$434	$592	$751	$911	$911	$949	$1,230	$1,548	$1,866	$911
	1	$114	$199	$284	$456	$626	$796	$967	$1,019	$1,009	$1,309	$1,649	$1,991	$1,019
	2	$136	$238	$341	$546	$750	$954	$1,160	$1,179	$1,213	$1,570	$1,979	$2,388	$1,179
	3	$156	$274	$392	$644	$866	$1,102	$1,339	$1,423	$1,391	$1,812	$2,285	$2,759	$1,504
	4	$170	$302	$434	$785	$962	$1,226	$1,490	$1,565	$1,529	$1,613	$2,546	$3,074	$1,794
	5	$185	$331	$477	$941	$1,060	$1,350	$1,642	$1,705	$1,665	$2,224	$2,808	$3,391	$2,065
Low-rise/Duplex/ Row House	0	$127	$207	$287	$447	$605	$764	$924	$924	$962	$1,243	$1,561	$1,879	$924
	1	$126	$211	$296	$468	$638	$808	$979	$1,031	$1,021	$1,321	$1,661	$2,003	$1,031
	2	$149	$251	$354	$559	$763	$967	$1,173	$1,192	$1,226	$1,583	$1,992	$2,401	$1,192
	3	$169	$287	$405	$657	$879	$1,115	$1,352	$1,436	$1,404	$1,825	$2,298	$2,772	$1,517
	4	$183	$315	$447	$798	$975	$1,239	$1,503	$1,578	$1,542	$1,626	$2,559	$3,087	$1,807
	5	$199	$345	$491	$955	$1,074	$1,364	$1,656	$1,719	$1,679	$2,238	$2,822	$3,405	$2,079
High-rise	0	$126	$206	$286	$446	$604	$763	$923	$923	$961	$1,242	$1,560	$1,878	$923
	1	$128	$213	$298	$470	$640	$810	$981	$1,033	$1,023	$1,323	$1,663	$2,005	$1,033
	2	$154	$256	$359	$564	$768	$972	$1,178	$1,197	$1,231	$1,588	$1,997	$2,406	$1,197
	3	$177	$295	$413	$665	$887	$1,123	$1,360	$1,444	$1,412	$1,833	$2,306	$2,780	$1,525
	4	$194	$326	$458	$809	$986	$1,250	$1,514	$1,589	$1,553	$1,637	$2,570	$3,098	$1,818
	5	$213	$359	$505	$969	$1,088	$1,378	$1,670	$1,733	$1,693	$2,252	$2,836	$3,419	$2,093

CITY OF CHICAGO
MAXIMUM AFFORDABLE MONTHLY RENTS 2020

Maximum rents when tenants pay for electric heat, cooking gas, and other electric:

	Number of Bedrooms	10% AMI	15% AMI	20% AMI	30% AMI	40% AMI	50% AMI (Low HOME Rent Limit)*	60% AMI	High HOME Rent Limit*	65% AMI	80% AMI	100% AMI	120% AMI	HUD Fair Market Rent*
Single-family	0	$71	$151	$231	$391	$549	$708	$868	$868	$906	$1,187	$1,505	$1,823	$868
	1	$62	$147	$232	$404	$574	$744	$915	$967	$957	$1,257	$1,597	$1,939	$967
	2	$75	$177	$280	$485	$689	$893	$1,099	$1,118	$1,152	$1,509	$1,918	$2,327	$1,118
	3	$86	$204	$322	$574	$796	$1,032	$1,269	$1,353	$1,321	$1,742	$2,215	$2,689	$1,434
	4	$91	$223	$355	$706	$883	$1,147	$1,411	$1,486	$1,450	$1,534	$2,467	$2,995	$1,715
	5	$97	$243	$389	$853	$972	$1,262	$1,554	$1,617	$1,577	$2,136	$2,720	$3,303	$1,977
Low-rise/Duplex/ Row House	0	$88	$168	$248	$408	$566	$725	$885	$885	$923	$1,204	$1,522	$1,840	$885
	1	$79	$164	$249	$421	$591	$761	$932	$984	$974	$1,274	$1,614	$1,956	$984
	2	$94	$196	$299	$504	$708	$912	$1,118	$1,137	$1,171	$1,528	$1,937	$2,346	$1,137
	3	$106	$224	$342	$594	$816	$1,052	$1,289	$1,373	$1,341	$1,762	$2,235	$2,709	$1,454
	4	$112	$244	$376	$727	$904	$1,168	$1,432	$1,507	$1,471	$1,555	$2,488	$3,016	$1,736
	5	$120	$266	$412	$876	$995	$1,285	$1,577	$1,640	$1,600	$2,159	$2,743	$3,326	$2,000
High-rise	0	$104	$184	$264	$424	$582	$741	$901	$901	$939	$1,220	$1,538	$1,856	$901
	1	$101	$186	$271	$443	$613	$783	$954	$1,006	$996	$1,296	$1,636	$1,978	$1,006
	2	$123	$225	$328	$533	$737	$941	$1,147	$1,166	$1,200	$1,557	$1,966	$2,375	$1,166
	3	$141	$259	$377	$629	$851	$1,087	$1,324	$1,408	$1,376	$1,797	$2,270	$2,744	$1,489
	4	$154	$286	$418	$769	$946	$1,210	$1,474	$1,549	$1,513	$1,597	$2,530	$3,058	$1,778
	5	$168	$314	$460	$924	$1,043	$1,333	$1,625	$1,688	$1,648	$2,207	$2,791	$3,374	$2,048

Maximum rents when tenants pay for gas heat, cooking gas, and other electric:

	Number of Bedrooms	10% AMI	15% AMI	20% AMI	30% AMI	40% AMI	50% AMI (Low HOME Rent Limit)*	60% AMI	High HOME Rent Limit*	65% AMI	80% AMI	100% AMI	120% AMI	HUD Fair Market Rent*
Single-family	0	$87	$167	$247	$407	$565	$724	$884	$884	$922	$1,203	$1,521	$1,839	$884
	1	$82	$167	$252	$424	$594	$764	$935	$987	$977	$1,277	$1,617	$1,959	$987
	2	$99	$201	$304	$509	$713	$917	$1,123	$1,142	$1,176	$1,533	$1,942	$2,351	$1,142
	3	$114	$232	$350	$602	$824	$1,060	$1,297	$1,381	$1,349	$1,770	$2,243	$2,717	$1,462
	4	$123	$255	$387	$738	$915	$1,179	$1,443	$1,518	$1,482	$1,566	$2,499	$3,027	$1,747
	5	$133	$279	$425	$889	$1,008	$1,298	$1,590	$1,653	$1,613	$2,172	$2,756	$3,339	$2,013
Low-rise/Duplex/ Row House	0	$103	$183	$263	$423	$581	$740	$900	$900	$938	$1,219	$1,537	$1,855	$900
	1	$97	$182	$267	$439	$609	$779	$950	$1,002	$992	$1,292	$1,632	$1,974	$1,002
	2	$116	$218	$321	$526	$730	$934	$1,140	$1,159	$1,193	$1,550	$1,959	$2,368	$1,159
	3	$131	$249	$367	$619	$841	$1,077	$1,314	$1,398	$1,366	$1,787	$2,260	$2,734	$1,479
	4	$141	$273	$405	$756	$933	$1,197	$1,461	$1,536	$1,500	$1,584	$2,517	$3,045	$1,765
	5	$152	$298	$444	$908	$1,027	$1,317	$1,609	$1,672	$1,632	$2,191	$2,775	$3,358	$2,032
High-rise	0	$112	$192	$272	$432	$590	$749	$909	$909	$947	$1,228	$1,546	$1,864	$909
	1	$112	$197	$282	$454	$624	$794	$965	$1,017	$1,007	$1,307	$1,647	$1,989	$1,017
	2	$135	$237	$340	$545	$749	$953	$1,159	$1,178	$1,212	$1,569	$1,978	$2,387	$1,178
	3	$156	$274	$392	$644	$866	$1,102	$1,339	$1,423	$1,391	$1,812	$2,285	$2,759	$1,504
	4	$170	$302	$434	$785	$962	$1,226	$1,490	$1,565	$1,529	$1,613	$2,546	$3,074	$1,794
	5	$186	$332	$478	$942	$1,061	$1,351	$1,643	$1,706	$1,666	$2,225	$2,809	$3,392	$2,066

CITY OF CHICAGO
MAXIMUM AFFORDABLE MONTHLY RENTS 2020

Maximum rents when tenants pay for electric cooking and other electric (not heat):

	Number of Bedrooms	10% AMI	15% AMI	20% AMI	30% AMI	40% AMI	50% AMI (Low HOME Rent Limit)*	60% AMI	High HOME Rent Limit*	65% AMI	80% AMI	100% AMI	120% AMI	HUD Fair Market Rent*
Single-family	0	$110	$190	$270	$430	$588	$747	$907	$907	$945	$1,226	$1,544	$1,862	$907
	1	$109	$194	$279	$451	$621	$791	$962	$1,014	$1,004	$1,304	$1,644	$1,986	$1,014
	2	$129	$231	$334	$539	$743	$947	$1,153	$1,172	$1,206	$1,563	$1,972	$2,381	$1,172
	3	$148	$266	$384	$636	$858	$1,094	$1,331	$1,415	$1,383	$1,804	$2,277	$2,751	$1,496
	4	$161	$293	$425	$776	$953	$1,217	$1,481	$1,556	$1,520	$1,604	$2,537	$3,065	$1,785
	5	$175	$321	$467	$931	$1,050	$1,340	$1,632	$1,695	$1,655	$2,214	$2,798	$3,381	$2,055
Low-rise/Duplex/ Row House	0	$123	$203	$283	$443	$601	$760	$920	$920	$958	$1,239	$1,557	$1,875	$920
	1	$121	$206	$291	$463	$633	$803	$974	$1,026	$1,016	$1,316	$1,656	$1,998	$1,026
	2	$142	$244	$347	$552	$756	$960	$1,166	$1,185	$1,219	$1,576	$1,985	$2,394	$1,185
	3	$161	$279	$397	$649	$871	$1,107	$1,344	$1,428	$1,396	$1,817	$2,290	$2,764	$1,509
	4	$174	$306	$438	$789	$966	$1,230	$1,494	$1,569	$1,533	$1,617	$2,550	$3,078	$1,798
	5	$189	$335	$481	$945	$1,064	$1,354	$1,646	$1,709	$1,669	$2,228	$2,812	$3,395	$2,069
High-rise	0	$122	$202	$282	$442	$600	$759	$919	$919	$957	$1,238	$1,556	$1,874	$919
	1	$123	$208	$293	$465	$635	$805	$976	$1,028	$1,018	$1,318	$1,658	$2,000	$1,028
	2	$147	$249	$352	$557	$761	$965	$1,171	$1,190	$1,224	$1,581	$1,990	$2,399	$1,190
	3	$169	$287	$405	$657	$879	$1,115	$1,352	$1,436	$1,404	$1,825	$2,298	$2,772	$1,517
	4	$185	$317	$449	$800	$977	$1,241	$1,505	$1,580	$1,544	$1,628	$2,561	$3,089	$1,809
	5	$203	$349	$495	$959	$1,078	$1,368	$1,660	$1,723	$1,683	$2,242	$2,826	$3,409	$2,083

Maximum rents when tenants pay only for other electric:

	Number of Bedrooms	10% AMI	15% AMI	20% AMI	30% AMI	40% AMI	50% AMI (Low HOME Rent Limit)*	60% AMI	High HOME Rent Limit*	65% AMI	80% AMI	100% AMI	120% AMI	HUD Fair Market Rent*
Single-family	0	$116	$196	$276	$436	$594	$753	$913	$913	$951	$1,232	$1,550	$1,868	$913
	1	$117	$202	$287	$459	$629	$799	$970	$1,022	$1,012	$1,312	$1,652	$1,994	$1,022
	2	$139	$241	$344	$549	$753	$957	$1,163	$1,182	$1,216	$1,573	$1,982	$2,391	$1,182
	3	$160	$278	$396	$648	$870	$1,106	$1,343	$1,427	$1,395	$1,816	$2,289	$2,763	$1,508
	4	$175	$307	$439	$790	$967	$1,231	$1,495	$1,570	$1,534	$1,618	$2,551	$3,079	$1,799
	5	$190	$336	$482	$946	$1,065	$1,355	$1,647	$1,710	$1,670	$2,229	$2,813	$3,396	$2,070
Low-rise/Duplex/ Row House	0	$129	$209	$289	$449	$607	$766	$926	$926	$964	$1,245	$1,563	$1,881	$926
	1	$129	$214	$299	$471	$641	$811	$982	$1,034	$1,024	$1,324	$1,664	$2,006	$1,034
	2	$152	$254	$357	$562	$766	$970	$1,176	$1,195	$1,229	$1,586	$1,995	$2,404	$1,195
	3	$173	$291	$409	$661	$883	$1,119	$1,356	$1,440	$1,408	$1,829	$2,302	$2,776	$1,521
	4	$188	$320	$452	$803	$980	$1,244	$1,508	$1,583	$1,547	$1,631	$2,564	$3,092	$1,812
	5	$204	$350	$496	$960	$1,079	$1,369	$1,661	$1,724	$1,684	$2,243	$2,827	$3,410	$2,084
High-rise	0	$128	$208	$288	$448	$606	$765	$925	$925	$963	$1,244	$1,562	$1,880	$925
	1	$131	$216	$301	$473	$643	$813	$984	$1,036	$1,026	$1,326	$1,666	$2,008	$1,036
	2	$157	$259	$362	$567	$771	$975	$1,181	$1,200	$1,234	$1,591	$2,000	$2,409	$1,200
	3	$181	$299	$417	$669	$891	$1,127	$1,364	$1,448	$1,416	$1,837	$2,310	$2,784	$1,529
	4	$199	$331	$463	$814	$991	$1,255	$1,519	$1,594	$1,558	$1,642	$2,575	$3,103	$1,823
	5	$218	$364	$510	$974	$1,093	$1,383	$1,675	$1,738	$1,698	$2,257	$2,841	$3,424	$2,098

CITY OF CHICAGO
MAXIMUM AFFORDABLE MONTHLY RENTS 2020

	Number of Bedrooms	Utility allowances per CHA schedule for: Cooking gas & other electric (not heat)	Electric heat, cooking gas & other electric	Gas heat, cooking gas & other electric	Electric cooking & other electric (not heat)	Other electric only (not cooking or heat)
Single-family	0	$45	$88	$72	$49	$43
	1	$57	$109	$89	$62	$54
	2	$69	$130	$106	$76	$66
	3	$81	$151	$123	$89	$77
	4	$94	$173	$141	$103	$89
	5	$106	$194	$158	$116	$101
Low-rise/Duplex/ Row House	0	$32	$71	$56	$36	$30
	1	$45	$92	$74	$50	$42
	2	$56	$111	$89	$63	$53
	3	$68	$131	$106	$76	$64
	4	$81	$152	$123	$90	$76
	5	$92	$171	$139	$102	$87
High-rise	0	$33	$55	$47	$37	$31
	1	$43	$70	$59	$48	$40
	2	$51	$82	$70	$58	$48
	3	$60	$96	$81	$68	$56
	4	$70	$110	$94	$79	$65
	5	$78	$123	$105	$88	$73

NOTE: Gross rent limits for 50% and 65% AMI, High HOME Rent and Fair Market Rent are as published by HUD. All other rent limits are calculated assuming 1.5 occupants per bedroom and 1 occupant for an apartment with no bedrooms.

* For HOME-funded developments, rents are the lesser of the Fair Market Rent or the High HOME Rent for the unit size. In HOME-funded developments with 5 or more units, 20% of the HOME-assisted units must be occupied by very low income families whose rents do not exceed 30% of the annual income of a family @ 50% of the area median. This is known as the "Low HOME Rent."

DEPARTMENT OF HOUSING
AFFORDABLE UNIT PRICING GUIDE

For more information or an electronic version of this worksheet, contact Brian O'Donnell at (312)744-0141.

Property:		**DOH contact:**	
Address:		**Date price calculated:**	
Developer:			

NOTE: Only enter data in the green shaded cells. The pricing guide will calculate the rest

Line		120% AMI				
1	Resale Restriction or Recapture Mortgage					
2	**Number of Bedroom**	2	3	4	5	6
3	**Developer's Market Price** (enter)		$400,000			
4	Monthly Tax Estimate	$0	$567	$0	$0	$0
5	Monthly Maintenance Costs	$150	$175	$200	$225	$250
6	Monthly Private Mortgage Insurance	$0	$511	$0	$0	$0
7	Monthly Homeowner's Insurance	$0	$250	$0	$0	$0
8	Mortgage Interest Rate	4.56%	4.56%	4.56%	4.56%	4.56%
9	**Estimated Affordable Price** (enter)		$340,000			
10	Mortgage Principal @ 97% Loan-to-Value	$0	$329,800	$0	$0	$0
11	Monthly Principal & Interest Payment	$0	$1,683	$0	$0	$0
12	Plus: Tax, Insurance, Assessment, Fee, PMI	$150	$1,503	$200	$225	$250
13	Total Monthly Payments	$150	$3,186	$200	$225	$250
14	**Required Annual Gross Income**	**$5,455**	**$115,852**	**$7,273**	**$8,182**	**$9,091**
15	**Maximum Allowable Income (120% AMI)**	$98,280	$113,580	$126,720	$139,860	$152,880

HUD Median Income for Unit Type/Family Size
for purposes of calculating max resale price (NOT for determining eligibility to purchase or lease a unit)

Bedrooms	Family Size	80% Median	100% Median	120% Median	140% Median
1	1	$51,000	$63,700	$76,440	$89,180
2	3	$65,550	$81,900	$98,280	$114,660
3	4.5	$75,725	$94,650	$113,580	$132,510
4	6.0	$84,450	$105,600	$126,720	$147,840
5	7.5	$93,200	$116,550	$139,860	$163,170
6	9.0	$101,950	$127,400	$152,880	$178,360

HUD figures as of April 1, 2020

LINE NOTES:

1 Units will be kept affordable by a resale restriction, unless otherwise specified.
2 Use column matching the number of bedrooms in unit.
3 Enter developer's market rate price.
4 Property taxes are estimated at 2% of the estimated **affordable** price. If the project does not go into the Chicago Community Land Trust (CCLT), taxes should be calculated off the market price.
5 The assessment is the higher of the amount indicated by the developer/homeowner - or the average assessments, calculated by the City using MLS data, for units by number of bedrooms. For single family homes, a monthly maintenance cost of $150 should be included in the calucations.
6 PMI is estimated at 186 BPS
7 Property insurance is estimated at 0.25% of the market price - or 0.75% for single family homes and townhomes
8 Interst rate calculation

1 basis point added to the 10-year monthly average of FNMA interest rates, as calculated by DOH, which is currently: **3.56**

9 Use trial-and-error to match the affordable price to the required annual gross income necessary to qualify for this price (Line 15). Does the affordable price include parking? ___ yes ___ no (See Line 3 note).
10 Loan amount at 97% of the affordable price.
11 Monthly payments based on a 30-year loan at the mortgage rate entered on Line 9.
12 The total of Lines 4, 5, 6, 7and 8.
13 The total of Lines 12 and 13.
14 The annual gross income (assuming 1.5 persons per bedroom, and household housing costs that total no more than 33% of their total gross annual income) required to qualify for a loan on the affordable unit at the indicated affordable price (Line 10).

DEPARTMENT OF HOUSING
AFFORDABLE UNIT PRICING GUIDE

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Property:		**DOH contact:**	
Address:		**Date price calculated:**	
Developer:			

NOTE: Only enter data in the green shaded cells. The pricing guide will calculate the rest

Line						
1	Resale Restriction or Recapture Mortgage	**100% AMI**				
2	**Number of Bedroom**	**2**	**3**	**4**	**5**	**6**
3	**Developer's Market Price** (enter)			**$550,000**		
4	Monthly Tax Estimate	$0	$0	$482	$0	$0
5	Monthly Maintenance Costs	$150	$175	$200	$225	$250
6	Monthly Private Mortgage Insurance	$0	$0	$435	$0	$0
7	Monthly Homeowner's Insurance	$0	$0	$344	$0	$0
8	Mortgage Interest Rate	4.56%	4.56%	4.56%	4.56%	4.56%
9	**Estimated Affordable Price** (enter)			**$289,000**		
10	Mortgage Principal @ 97% Loan-to-Value	$0	$0	$280,330	$0	$0
11	Monthly Principal & Interest Payment	$0	$0	$1,431	$0	$0
12	Plus: Tax, Insurance, Assessment, Fee, PMI	$150	$175	$1,460	$225	$250
13	Total Monthly Payments	$150	$175	$2,891	$225	$250
14	**Required Annual Gross Income**	**$5,455**	**$6,364**	**$105,111**	**$8,182**	**$9,091**
15	**Maximum Allowable Income (100% AMI)**	$81,900	$94,650	$105,600	$116,550	$127,400

HUD Median Income for Unit Type/Family Size
for purposes of calculating max resale price (NOT for determining eligibility to purchase or lease a unit)

Bedrooms	Family Size	80% Median	100% Median	120% Median	140% Median
1	1	$51,000	$63,700	$76,440	$89,180
2	3	$65,550	$81,900	$98,280	$114,660
3	4.5	$75,725	$94,650	$113,580	$132,510
4	6.0	$84,450	$105,600	$126,720	$147,840
5	7.5	$93,200	$116,550	$139,860	$163,170
6	9.0	$101,950	$127,400	$152,880	$178,360

HUD figures as of April 1, 2020

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DEPARTMENT OF HOUSING
AFFORDABLE UNIT PRICING GUIDE

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Property:
Address:
Developer:

DOH contact:
Date price calculated:

NOTE: Only enter data in the green shaded cells. The pricing guide will calculate the rest

Line						
1	Resale Restriction or Recapture Mortgage	**140% AMI**				
2	**Number of Bedroom**	**2**	**3**	**4**	**5**	**6**
3	**Developer's Market Price** (enter)			**$550,000**		
4	Monthly Tax Estimate	$0	$0	$0	$0	$0
5	Monthly Maintenance Costs	$150	$175	$200	$225	$250
6	Monthly Private Mortgage Insurance	$0	$0	$0	$0	$0
7	Monthly Homeowner's Insurance	$0	$0	$344	$0	$0
8	Mortgage Interest Rate	4.56%	4.56%	4.56%	4.56%	4.56%
9	**Estimated Affordable Price** (enter)					
10	Mortgage Principal @ 97% Loan-to-Value	$0	$0	$0	$0	$0
11	Monthly Principal & Interest Payment	$0	$0	$0	$0	$0
12	Plus: Tax, Insurance, Assessment, Fee, PMI	$150	$175	$544	$225	$250
13	Total Monthly Payments	$150	$175	$544	$225	$250
14	**Required Annual Gross Income**	**$5,455**	**$6,364**	**$19,773**	**$8,182**	**$9,091**
15	**Maximum Allowable Income (140% AMI)**	$114,660	$132,510	$147,840	$163,170	$178,360

HUD Median Income for Unit Type/Family Size
for purposes of calculating max resale price (NOT for determining eligibility to purchase or lease a unit)

Bedrooms	Family Size	80% Median	100% Median	120% Median	140% Median
1	1	$51,000	$63,700	$76,440	$89,180
2	3	$65,550	$81,900	$98,280	$114,660
3	4.5	$75,725	$94,650	$113,580	$132,510
4	6.0	$84,450	$105,600	$126,720	$147,840
5	7.5	$93,200	$116,550	$139,860	$163,170
6	9.0	$101,950	$127,400	$152,880	$178,360

HUD figures as of April 1, 2020

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Line				80% AMI		
1	Resale Restriction or Recapture Mortgage					
2	**Number of Bedroom**	2	3	4	5	6
3	**Developer's Market Price** (enter)			**$550,000**		
4	Monthly Tax Estimate	$0	$0	$358	$0	$0
5	Monthly Maintenance Costs	$150	$175	$200	$225	$250
6	Monthly Private Mortgage Insurance	$0	$0	$323	$0	$0
7	Monthly Homeowner's Insurance	$0	$0	$344	$0	$0
8	Mortgage Interest Rate	4.56%	4.56%	4.56%	4.56%	4.56%
9	**Estimated Affordable Price** (enter)			**$215,000**		
10	Mortgage Principal @ 97% Loan-to-Value	$0	$0	$208,550	$0	$0
11	Monthly Principal & Interest Payment	$0	$0	$1,064	$0	$0
12	Plus: Tax, Insurance, Assessment, Fee, PMI	$150	$175	$1,225	$225	$250
13	Total Monthly Payments	$150	$175	$2,290	$225	$250
14	**Required Annual Gross Income**	**$5,455**	**$6,364**	**$83,259**	**$8,182**	**$9,091**
15	**Maximum Allowable Income (80% AMI)**	$65,550	$75,725	$84,450	$93,200	$101,950

HUD Median Income for Unit Type/Family Size
for purposes of calculating max resale price (NOT for determining eligibility to purchase or lease a unit)

Bedrooms	Family Size	80% Median	100% Median	120% Median	140% Median
1	1	$51,000	$63,700	$76,440	$89,180
2	3	$65,550	$81,900	$98,280	$114,660
3	4.5	$75,725	$94,650	$113,580	$132,510
4	6.0	$84,450	$105,600	$126,720	$147,840
5	7.5	$93,200	$116,550	$139,860	$163,170
6	9.0	$101,950	$127,400	$152,880	$178,360

HUD figures as of April 1, 2020

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12 The total of Lines 4, 5, 6, 7and 8.
13 The total of Lines 12 and 13.
14 The annual gross income (assuming 1.5 persons per bedroom, and household housing costs that total no more than 33% of their total gross annual income) required to qualify for a loan on the affordable unit at the indicated affordable price (Line 10).

property taxes	2% of the affordable price. If the property doesn't go into the CCLT, the taxes should be calculated off the market price				
condo assessment	The assessment is the higher of the amount indicated by the developer/homeowner - or the average assessments, calculated by the City using MLS data, for units by number of bedrooms. For single family homes, a monthly maintenance cost of $150 should be included in the calculations.				
Private Mortgage Insurance	PMI is estimated at 186 BPS				
Property Insurance	Property insurance is estimated at 0.75% of the market value for single family homes and townhomes				
Interest Rate	The interest rate one (1) basis point added to the 10 year average (first business day of month) of FNMA required net yield for 30-year Actual/Actual Remittances fixed-rate mortgages covered by the 60-day mandatory delivery whole loan commitments				

The annual gross income (assuming 1.5 persons per bedroom, and household housing costs that total no more than 33% of their total gross annual income) required to qualify for a loan on the affordable unit at the indicated affordable price (Line 10).

CHICAGO COMMUNITY LAND TRUST
OVERVIEW

The Chicago Community Land Trust (CCLT) is a private not-for-profit corporation (IRS 501(c)3 designation) established by City of Chicago Ordinance in 2006 to provide and sustain quality, affordable homeownership opportunities and a community of support for working families and individuals in Chicago, and to preserve these opportunities for future generations. CCLT is governed by a Board of Directors appointed by the Mayor and comprised of representatives from financial institutions, community development organizations, non-profit organizations, governmental agencies and municipal departments.

CCLT accomplishes its mission by managing and adding to a portfolio of owner-occupied homes (condominiums, townhomes, and SF-detached homes) that are priced affordably and sold to low-to-moderate income owner-occupants – households at or below the Area Median Income. Currently (August 2020) CCLT manages a portfolio of 105 homes in 15 different Community Areas in Chicago. CCLT homeowners have an average household income of 78% of the Area Median Income at time of purchase.

Homes currently in the CCLT portfolio are subject to a 30-year Affordable Housing Agreement and Restrictive Covenant (Covenant) which has several requirements:

- purchasers of a CCLT home must be income-eligible;
- CCLT owners must occupy the home as principal residence for as long as they own the home;
- future sales of a CCLT home must be to other income-eligible owner-occupants; and
- the maximum resale price of a CCLT home is determined by formulas in the Covenant.

Many homes in the CCLT portfolio have been added as a result of the City of Chicago's Affordable Requirements Ordinance (ARO) – and the home prices for these ARO units are established in the developer's agreement with the City. CCLT certifies that potential buyers are income-eligible and are pre-approved for financing before a Purchase Contract for the home is executed.

Existing homeowners can choose to Opt-In to the CCLT portfolio as well by executing the 30-year Covenant. CCLT also has the ability to acquire, rehab and sell homes at affordable prices to income-eligible home buyers. According to the terms of the Covenant and in exchange for an affordable purchase price and reduced property taxes (based on a working agreement between CCLT and the Cook County Assessor) owners agree to resell at an affordable price to an income-eligible home buyer. Owners earn a share of market value appreciation, but the CCLT calculation of maximum resale price ensures that equity will remain in the home to maintain affordability.

CCLT adds value not only by preserving affordability but, as in traditional homeownership, CCLT homes promote neighborhood stability by allowing families to put down roots in their communities. CCLT ensures that buyers are educated about the obligations and responsibilities of homeownership in addition to the requirements of the CCLT itself. CCLT works with a group of lenders who are familiar with the CCLT requirements and offer products that are affordable and competitively-priced for CCLT buyers.

CHICAGO COMMUNITY LAND TRUST
OVERVIEW

The Chicago Community Land Trust currently engages in four primary program activities:

*1) **Outreach & Marketing***

CCLT markets its homeownership opportunities through non-profit partner agencies, lenders, the City of Chicago website, and direct marketing to over 1700 subscribers to CCLT's monthly newsletter and E-blasts. CCLT also provides developers of CCLT homes with marketing and resource materials for distribution. CCLT does regular E-blasts marketing CCLT homes (both new construction and resales) for sale.

CCLT educates developers, aldermen, community organizations and the public at large about its work. As a national model, CCLT provides technical assistance to other governmental and non-governmental agencies interested in the CCLT model and its Opt-In feature for existing homeowners.

*2) **Homebuyer Education & Resources***

CCLT offers twice-monthly Orientation workshops on the process of purchasing a home through CCLT, along with information about City programs for homebuyers. CCLT collaborates with HUD-certified non-profit housing counseling agencies that provide 8-hour Home Buyer Education classes. CCLT recruits and provides technical assistance to lenders, attorneys and other professionals that CCLT buyers need to purchase a home, and provides lists of these resources to CCLT buyers. CCLT staff coordinates closings on all CCLT homes with sellers, lenders, real estate professionals, and attorneys to ensure a smooth closing process.

3) Affordable Housing Creation

Under a Pilot Program established in 2020 (Affordable Homeownership & Housing Program – AHHP), CCLT acquires homes (SF-detached, townhomes, condos, 2-units) in six Target Community Areas for rehabilitation and resale at affordable prices to income-eligible buyers. CCLT works collaboratively with other community-based land trusts in this endeavor and provides the capital for the acquisition of homes.

*4) **Stewardship***

CCLT has a long-term partnership through the 30-year Covenant with CCLT homeowners and an on-going stewardship function. CCLT's stewardship activities include workshops on home ownership skills, issues and programs; default/foreclosure prevention counseling services through referrals and CCLT's partners; working with CCLT condo owners to troubleshoot development issues both directly and through referrals; refinancing and resale oversight and assistance; and property tax appeal filing and monitoring to ensure homeowners secure CCLT tax benefits. CCLT also monitors its homes to confirm owner occupancy, payment of property taxes, and that homes are free of unauthorized liens.

ILLINOIS GREEN
A USGBC COMMUNITY

Resources for Energy Efficiency Project Information and Financing

Organizations with Information and Support for Sustainable Design and Facilities Operations

- **Illinois Green Alliance**
- **Illinois EPA**
- **Smart Energy Design Assistance Center** (SEDAC) – information about energy efficiency programs, certifications, and training
- **ENERGY STAR** information (from the EPA)
  - ENERGY STAR information for new construction
  - EPA WaterSense information
- **Elevate Energy** – information about energy efficiency

Utility Assessments and Incentives

- **ComEd**
  - Energy Efficiency Information for Commercial Buildings (electricity)
  - Commercial Property Energy Efficiency Incentive Information
- **Peoples Gas**
  - Energy Efficiency Information for Commercial Buildings (natural gas)
  - Information about Natural Gas Incentives

Other Financing Information and Opportunities

- **Database of State Incentives for Renewables & Efficiency** (DSIRE) – collection of policies and financing opportunities by state
- **Chicago PACE** – financing opportunities for eligible energy projects for existing and new construction for commercial, industrial, and multifamily properties.
- **Illinois Solar for All** – solar development opportunities for low-income and environmental justice communities.
- **Nonprofit Green Lending Program** from Faith In Place – financing opportunities for energy efficiency projects at nonprofits and houses of worship.
- **Community Investment Corporation Energy Savers** (CIC) – financing opportunities for energy efficiency projects at multi-family rehabs
- **Illinois Clean Energy Community Foundation** – grants and financing opportunities for renewable energy projects and natural area conservation.
- **Illinois EPA** – grant and loan information for land, water, and air projects in Illinois
- **SEDAC** – information about incentive programs in Illinois

C. Submission Forms and Affidavits

To be submitted with proposal

C1. Proposal Summary Form

C2. Sources and uses of funds statement

C3. Construction budget

C4. Revenue projections

C5. Offer to Purchase

C6. Confidentiality Agreement

Editable forms / spreadsheets available on RFP download website

Request For Proposals
Proposal Summary Form

Applicants: Complete this form and place in the first section of the response, immediately following the cover letter.

Project Address:	*As identified on the RFP.*
Applicant:	*Name of applicant entity.*
Principals:	*Names of principal owners of applicant entity.*
Development Team:	*Identify architect, attorney, GC if known, and consultants.*
Purchase Price:	*Your bid price.*
Purchase Parcels:	*For multi-parcel RFPs only: if allowed under the RFP, identify which of the RFP parcels are proposed for purchase.*
City Assistance Requested:	*Include TIF request or other requests for City financial assistance. Identify the type and amount of each type of assistance.*
Total Project Cost:	*Total development cost.*
Estimated Completion Date:	*Include date.*
Proposed Use:	*Identify proposed use of the property.*
Zoning:	*Indicate if a zoning change or planned development classification is required for the project.*
Proposed Project:	*Briefly describe the project including number and type of units, exterior building materials, number of stories, floor area, amenities, number and type of parking spaces, etc.*
Public Benefits:	*Identify public benefits of the project such as affordable housing, senior housing, 'green' elements, new retail services, fiscal benefits, public open space, etc.*

SOURCES AND USES OF FUNDS

Project Name: ______________________
Developer: ______________________
Date: ______________________

Notes: Enter data only in Columns C and H. Column C figures will total automatically. The totals of sources of funds and uses of funds must match exactly.

SOURCES	Amount	% of Total Sources	
Equity			
Cash Equity	$ -	#DIV/0!	
Real Estate	$ -	#DIV/0!	*Source:*
Other Equity	$ -	#DIV/0!	*Source:*
Total Equity	**$ -**	**#DIV/0!**	
Loans			
Bank Loan	$ -	#DIV/0!	*Terms:*
Mezzanine Loan	$ -	#DIV/0!	*Terms:*
Other Financing	$ -	#DIV/0!	*Terms:*
Total Loans	**$0**	**#DIV/0!**	
Sales Revenue	**$ -**	**#DIV/0!**	*Source:*
Government Assistance			
Land Write-Down	$ -	#DIV/0!	
TIF	$ -	#DIV/0!	
Tax Credits	$ -	#DIV/0!	*Source:*
Grants	$ -	#DIV/0!	*Source:*
Other	$ -	#DIV/0!	*Source:*
Total Assistance	**$ -**	**#DIV/0!**	
Total Sources	**$ -**	**#DIV/0!**	

USES	Amount	$ per SFof Building Area*
Land Acquisition	$ -	#DIV/0!
Demolition	$ -	#DIV/0!
Site Preparation	$ -	#DIV/0!
Landscaping & Paving	$ -	#DIV/0!
Hard Costs	$ -	#DIV/0!
Equipment	$ -	#DIV/0!
Furniture and Fixtures	$ -	#DIV/0!
Soft Costs	$ -	#DIV/0!
Total Uses	**$0**	**#DIV/0!**

** Building area = 0 square feet*

Attachment A

DETAILED CONSTRUCTION BUDGET

Project Name: ______________________________
Developer: ______________________________
Date: ______________________________

Note: Enter data only in Column C. Totals will be calculated automatically.

	Amount	$ per SFof Building Area*	% of Total Project Costs	Comment:
Land Acquisition				
City Land	$ -	#DIV/0!	#DIV/0!	
Other Property	$ -	#DIV/0!	#DIV/0!	
Total Land Acquisition	**$0**	**#DIV/0!**	**#DIV/0!**	
Demolition	$ -	#DIV/0!	#DIV/0!	
Site Preparation				
Utilities	$ -	#DIV/0!	#DIV/0!	
Environmental	$ -	#DIV/0!	#DIV/0!	
Foundation Removal	$ -	#DIV/0!	#DIV/0!	
Grading	$ -	#DIV/0!	#DIV/0!	
Other	$ -	#DIV/0!	#DIV/0!	
Total Site Preparation	**$0**	**#DIV/0!**	**#DIV/0!**	
Landscaping & Paving	**$ -**	**#DIV/0!**	**#DIV/0!**	
Hard Costs				
Construction	$ -	#DIV/0!	#DIV/0!	
General Contractor Fee	$ -	#DIV/0!	#DIV/0!	
General Conditions	$ -	#DIV/0!	#DIV/0!	
Hard Cost Contingency	$ -	#DIV/0!	#DIV/0!	
Total Hard Costs	**$0**	**#DIV/0!**	**#DIV/0!**	
Equipment	**$ -**	**#DIV/0!**	**#DIV/0!**	
Furniture and Fixtures	**$ -**	**#DIV/0!**	**#DIV/0!**	
Soft Costs				
Architect Fee	$ -	#DIV/0!	#DIV/0!	
Project Management	$ -	#DIV/0!	#DIV/0!	
Developer Fee	$ -	#DIV/0!	#DIV/0!	
Legal/Accounting	$ -	#DIV/0!	#DIV/0!	
Leasing Commissions	$ -	#DIV/0!	#DIV/0!	
Market Studies	$ -	#DIV/0!	#DIV/0!	
Financing Fees	$ -	#DIV/0!	#DIV/0!	
Financing Interest	$ -	#DIV/0!	#DIV/0!	
Real Estate Taxes	$ -	#DIV/0!	#DIV/0!	
Insurance	$ -	#DIV/0!	#DIV/0!	
Appraisal	$ -	#DIV/0!	#DIV/0!	
Testing	$ -	#DIV/0!	#DIV/0!	
Permits	$ -	#DIV/0!	#DIV/0!	
Other Soft Costs	$ -	#DIV/0!	#DIV/0!	
Soft Cost Contingency	$ -	#DIV/0!	#DIV/0!	
Total Soft Costs	**$0**	**#DIV/0!**	**#DIV/0!**	
Total Project Costs	**$ -**	**#DIV/0!**	**#DIV/0!**	

** Building area = 0 square feet*

Attachment A

REVENUE PROJECTIONS - FOR SALE PROJECT

Project Name: ______________________
Developer: ______________________
Date: ______________________

Note: Enter data only in shaded cells.

GROSS SALES REVENUE

Housing Units:

	Unit Type	Number	Unit Price	Total
A		0	$ -	$ -
B		0	$ -	$ -
C		0	$ -	$ -
D		0	$ -	$ -
E		0	$ -	$ -
F		0	$ -	$ -
G		0	$ -	$ -
Total Housing Unit Sales		0	#DIV/0!	$0
Housing Unit Upgrades				$ -

Parking Spaces:

	Type	Number	Price	Total
A		0	$ -	$0
B		0	$ -	$0
Total Parking Sales		0	#DIV/0!	$0

	Size-sf	Price/sf	Value
Commercial Space Value	-	$0	$ -

TOTAL GROSS SALES REVENUE		$ -
COST OF SALES		
Commissions	0.0%	$ -
Closing Costs	0.0%	$ -
Other Costs	0.0%	$ -
TOTAL COST OF SALES	0.0%	$ -
NET SALES REVENUE		$ -
Less Total Project Costs		$ -
NET PROFIT		$ -

INDICATORS:

Profit as % of Gross Sales:	#DIV/0!
Profit as % of Total Project Costs:	#DIV/0!

Attachment A

REVENUE PROJECTIONS - RENTAL PROJECT

(Sample Cash Flow Projection)

Project Name: ______________________
Developer: ______________________
Date: ______________

Note: Enter data only in shaded cells.

Vacancy Rates				
Years	1	2	3	4+
Commercial	0%	0%	0%	0%
Residential	0%	0%	0%	0%

Growth Rates				
Years	1	2	3	4+
Commercial Rent	0%	0%	0%	0%
Residential Rent	0%	0%	0%	0%
Parking/Other Revenue	0%	0%	0%	0%
Operating Expense	0%	0%	0%	0%
Real Estate Tax	0%	0%	0%	0%
Capital Reserves	0%	0%	0%	0%

Mortgage	
Principal	$ -
Term (years)	-
Interest Rate	0.0%

Equity / Total Project Costs	
Total Equity	$ -
Total Project Costs	$ -

	SF	Rent/sf		YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	YEAR 11
INCOME														
Commercial Rent	-	$0.00	/yr.	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Commercial Expense Recoveries	-	$0.00	/yr.	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Residential Rent- Market Rate	-	$0.00	/mo.	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Residential Rent- Affordable	-	$0.00	/mo.	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Parking Revenue per space	-	$0.00	/mo.	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Other Revenue	-	$0.00	/yr.	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
GROSS POTENTIAL INCOME				**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Commercial Vacancy				$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Residential Vacancy				$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
EFFECTIVE GROSS INCOME (EGI)				**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
EXPENSES	**SF**	**Cost/sf**												
Maintenance, Repairs, Utilities	-	$0.00		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Real Estate Taxes	-	$0.00		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Insurance	-	$0.00		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Management Fee	EGI	0%		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Professional Fees	-	$0.00		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Other Expenses	-	$0.00		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
TOTAL EXPENSES				**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
NET OPERATING INCOME (NOI)				**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
	SF	**Cost/sf**												
Reserves	-	$0.00		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	---
Other Capital Costs (insert for each year)				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	---
Debt Service				#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	---
NET CASH FLOW before depreciation				**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**---**

Calculation of the Reversion	
Year 11 NOI	$0
Cap Rate (enter rate)	0.0%
Gross Reversion	#DIV/0!
Less Cost of Sale (enter rate)	2.0%
Net Reversion before Debt	#DIV/0!
Less Loan Balance	#NUM!
Net Reversion	**#DIV/0!**

Internal Rates of Return	
Overall IRR	#VALUE!
Equity IRR	#VALUE!

City of Chicago Dept. of Community Development 6/09

DATE: ___________________

OFFER
TO PURCHASE LAND FOR DEVELOPMENT
FROM
THE CITY OF CHICAGO
DEPARTMENT OF PLANNING AND DEVELOPMENT
ROOM 1000 CITY HALL
121 NORTH LASALLE STREET
CHICAGO, ILLINOIS 60602

1. ACKNOWLEDGMENT OF RECEIPT OF CONDITIONS

The Undersigned, as the "Offeror", has been furnished by the City of Chicago through its Department of Planning and Development ("City"), a copy of the form of agreement for the Sale and Redevelopment of Land ("Agreement") setting forth the terms and conditions under which property will be sold by the City. The Offeror has also been provided with a copy, or the opportunity to review a copy, of the pertinent Redevelopment Plan ("Plan") affecting the subject property.

2. PURCHASE PRICE

The Offeror offers and agrees to purchase from the City the parcel(s) of land ("Property") legally described in Exhibit A attached hereto, at the price(s) stated below:

Address or Street Location	Disposition Number or P.I.N.	Size in sq. ft.	Price per sq. ft.	Price
Total:				

In making this offer, the Offeror has given consideration to the terms and conditions of the Agreement and the restrictions of the Plan. In addition, the Offeror understands that the City is offering to sell the property "as is" and shall therefore make no representations concerning the soil and environmental condition of the property, and the City shall have no responsibility to clear the property of any improvements.

3. TERM OF OFFER:

It is agreed that this offer shall remain open for a period of ninety (90) days commencing with the final date for delivery of offers as specified in the advertisement for the Property, and shall remain in force thereafter until withdrawn by the Offeror in writing. It is expressly understood by the Offeror that the City at any time may reject any and all offers received by the City as result of the advertisement to sell the property and waive any information therein.

4. GOOD FAITH DEPOSIT:

The Offeror transmits to the City with this Offer a cashier's or certified check or irrevocable letter of credit in the amount of $______________ payable to the City of Chicago, said sum representing a good faith deposit equal to ___ percent (__%) of the Purchase Price of the Property. The City shall be under no obligation to deposit or invest the good faith deposit or pay interest thereon. If, during the time period commencing with the receipt of this Offer by the City until the expiration of the ninety (90) day period described in Paragraph 3 above, the Offeror rescinds this offer by written notice to the City, the City shall have the right to retain the good faith deposit as liquidated damages and shall be under no further obligation or duty to the Offeror. If this Offer is rejected by the City, the good faith deposit shall be returned by the City to the Offeror. In the event this Offer is accepted by the City, $_____________ of the good faith deposit will be credited to the purchase of the Property at closing, and $____________ will be retained by the City until the construction of the improvements is completed to the satisfaction of the City in accordance with the terms and conditions of the Agreement to be executed by the City and the Offeror.

5. EXECUTION OF AGREEMENTS:

The Offeror acknowledges and understands that acceptance of this Offer by the City will be effective upon passage of an ordinance by the City Council approving the sale and the execution of the Agreement by the City. Failure of the Offeror to execute the Agreement within 30 days of its being tendered by the City to the Offeror shall constitute a default under the terms of this Offer, and the City may terminate all rights of the Offeror and retain the good faith deposit as the City's property. If the Offeror fails to complete the purchase of the property within the time frame provided for in the Agreement, through no fault of the City, the City shall have the right to declare a default under the terms of the Agreement. The City may consent to the extension of the closing date upon payment of a nonrefundable extension fee.

6. COVENANT AGAINST CONTINGENT FEES:

The Offeror warrants that no person or agency has been employed or retained to solicit or secure the acceptance of this Offer upon agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial agencies maintained by the Offeror for the purpose of securing business. For any breach violation of this warranty, the City shall have the right to annul its acceptance of this offer, or if executed by the parties, the agreement, without liability to the Offeror. In the alternative, the City may choose to require the Offeror to pay, in addition to the purchase price, the full amount of such commission, percentage, brokerage, or contingent fee. Bona fide established commercial agencies may include real estate brokers, investment brokers and others engaged in furnishing bona fide investment or brokerage services.

7. PROHIBITION AGAINST TRANSFER OF INTEREST

Prior to completion of the project, the Offeror may not agree to sell the property or any interest in it, or agree to assign the redevelopment project or any interest in it, without the prior written consent of the City.

8. WITHDRAWAL IN CASE OF INABILITY TO DELIVER POSSESSION:

The City reserves the right to refund the Good Faith Deposit to the Offeror and to rescind the sale of the Property at any time prior to conveyance of title in the event that the City is unable to deliver title and possession of the Property for any reason whatsoever.

Firm or Individual: ________________________________

By: ________________________________

Print Name: ________________________________

Title: ________________________________

Attest: ________________________________

Print Name: ________________________________

Business Address: ________________________________

____

____

Telephone: ________________________________

Attachments: Legal Description of Property

REQUEST FOR PROPOSALS
RESPONDENT CONFIDENTIALITY AGREEMENT

The undersigned hereby acknowledges the submission of a proposal to the Department of Planning and Development of the City of Chicago in response to the Request for Proposals for the purchase and development of (enter address).

I understand and agree that I will keep confidential the proposal and all other material, information or discussions related to the RFP. I will not share any material, information or discussions with any individual that has not signed a confidentiality agreement for the RFP.

Date: ______________________________

Proposal Name: ______________________________

Responding Entity: ______________________________

Name: ______________________________

Signature: ______________________________

NOTE: Each principal, project manager and key team member identified in the proposal must sign and submit a confidentiality agreement.

D. Environmental Reports

April 27, 2017

Illinois Environmental Protection Agency
Bureau of Land
Remedial Project Management Section
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276

Attn: Mr. Jim Baldwin

Re: **ROR/RAP Addendum**
Chicago/4300 W. Roosevelt Road
4300 W. Roosevelt Road
LPC# 0316255161 – Cook County
Terracon Project No. A2147008 Task 3b
2FM TOR No.:14-2FMEHS-0009

Dear Mr. Baldwin:

Terracon Consultants, Inc. (Terracon) is pleased to submit this Remediation Objectives Report / Remedial Action Plan (ROR/RAP) Addendum letter for the above referenced site. This letter includes additional information related to a potential underground storage tank(s) (USTs), additional soil and soil gas site investigation results conducted at the request of the proposed site developer, Clarius Partners. We are also presenting new Tier 2 calculations to evaluate the inhalation exposure pathways. This ROR/RAP Addendum also includes an updated development plan for the site showing locations of proposed engineered barriers. This work was conducted on behalf of the current site owner and Remediation Applicant (RA), the City of Chicago Department of Fleet and Facility Management (2FM), as a follow up to the IEPA-approved Comprehensive Site Investigation Report, Remediation Objectives Report, and Remedial Action Plan (CSIR/ROR/RAP) dated March 30, 2015.

1.0 PROJECT INFORMATION

The site was formerly occupied by a rubber factory on the eastern portion of the site, a die cast factory on the southern portion of the site, and residential properties on the western portion, and has had various environmental site investigations conducted since 1992. The site was an illegal construction fill site in the late 1990s and was the subject of a United States Environmental Protection Agency (USEPA) removal action combined with the north adjacent property. Terracon submitted a CSIR/ROR/RAP to the IEPA, which was conditionally approved in a correspondence dated May 5, 2015.

This RAP Addendum letter presents information on the following:

- In the RAP, additional investigation was planned to investigate the potential for USTs at the site. The potential for orphaned USTs on the northeastern portion of the site was identified with discovery of City of Chicago installation permits for USTs at 1014 South Kildare Avenue, the address associated with the former on-site Dryden Rubber Company. No records for tank removal were found. In the east-central portion of the site, two metal plates were identified during the Phase I ESA site reconnaissance. The nature of these plates was not known with certainty, and the potential that they may be “hatches” related to USTs resulted in a recommendation for further investigation. To evaluate the areas associated with the UST permit address and the two metal plates, Terracon conducted a geophysical survey in June and August of 2016.
- An updated site development map is provided in Attachment 1, and the presentation of a proposed alternative for one of the engineered barriers described in the RAP relative to the development plan.
- Results of the additional soil and soil gas investigation that has been conducted at the site.
- Tier 2 evaluation of the inhalation exposure pathways.

2.0 UST EVALUATION

During the 2014 Phase I ESA, a history of on-site USTs was noted in the City of Chicago installation permit records for a UST at 1014 South Kildare Avenue, associated with an area located in the northeastern portion of the site. No records for tank removal were identified. Additionally, during the 2014 Phase I ESA site visit, two suspect square “hatches” were noted on the east-central portion of the site. The location of these suspect “hatches” is depicted on Exhibit 1 of Attachment 1. The RA elected to conduct further UST investigations prior to redevelopment. This included conducting a geophysical survey and further evaluation of the suspect hatches.

On June 9, 2016, further evaluation was conducted by Terracon staff in the area of the two metal plates. The two metals plates were observed to be set in concrete. The square-shaped plates measured approximately 8 inches on each side and did not include lift rings or other features that would suggest they would open. The plates produced a solid sound when struck with a hammer (i.e., not a reverberating or hollow sound). The available information suggests these metal plates may be related to former above-grade equipment, rather than being access hatches for a below grade feature. Photographs of the suspect hatches are included in Attachment 2.

On August 10, 2016, personnel from GPRS, Inc. mobilized to the site with environmental oversight to conduct a geophysical survey in the suspected UST area associated with the UST permit at 1014 South Kildare Avenue near the access road and boiler room of the former rubber manufacturing building, as depicted on historical Sanborn maps provided in the Phase I ESA. Some portions of the planned search area were inaccessible due to vegetation growth. The remaining area was scanned using a GSSI SIR – 4000 ground penetrating radar unit with 400-megahertz (MHz) antenna and surveyed using an electromagnetic induction (EMI) instrument. A copy of the GPRS report, dated August 14, 2016, is provided in Attachment 3. The geophysical survey area is shown in Exhibit 1 of Attachment 1.

As outlined in the GPRS report, the results of the survey identified six anomalies, as summarized in Exhibit 1. Based on size, depth and other factors, GPRS determined that one of the six anomalies was likely representative of a UST. Anomaly C was identified as a suspected UST, which was located in the northcentral portion of the scanned area. GPRS noted that based on the data, the anomaly was below 2.5 to 3 feet of fill and approximately 6-foot by 8-foot in size which may be indicative of a UST approximately 1,500 gallons in size.

To investigate the anomalies identified, test pits will be conducted in the anomaly areas during the redevelopment activities. If an UST is identified, it will be communicated with the IEPA Project Manager and removed by a licensed contractor in accordance with Office of the Illinois State Fire Marshal (OSFM) regulations. Samples will be collected per applicable OSFM and IEPA regulations, including Illinois Administration Code Title 35 Part 734. Results will be communicated to the IEPA and reported in the Remedial Action Completion Report (RACR).

3.0 SUBSURFACE INVESTIGATION

3.1 Field and Sampling Scope of Services

At the request of the RA and proposed developer, Terracon conducted additional investigation at the site to further evaluate inhalation impacts identified in the CSI/ROR/RAP and further evaluate the former die casting facility located in the southwestern portion of the site. This investigation included the advancement of five borings in the southwestern portion of the site (former Harvill Midwest Corporation, die casting area) to collect soil samples. In addition, six soil gas probes were installed in the east-central and west-central portions of the site. Boring locations are depicted in Exhibit 2 of Attachment 1.

The field methods utilized were similar to those used during the prior 2014 investigations at the site and as presented in the CSI/ROR/RAP (Sections 3.1.1 and 3.1.3 for soil and soil gas, respectively). Borings B-301 through B-305 were advanced to depths of 15 feet below ground surface (bgs). Borings SG-401 through SG-405 were blind drilled to 4 feet bgs for probe installation. Soil gas probe SG-406 was installed to a depth of 5 feet bgs due to gravel located at 4 feet bgs.

Two soil samples were collected from each soil boring from surface and subsurface intervals and submitted for laboratory analysis from the depths noted on the logs and tables. Soil gas samples were collected from a depth of 4 to 5 feet bgs (at least 3 feet bgs and above the groundwater table, per IEPA guidance).

The samples were submitted to STAT Analysis Corporation (STAT) in Chicago, Illinois for analysis. The following table presents a summary of the sample locations, purpose and analytical testing program implemented.

Table 3-1 Summary of Sampling & Laboratory Analytical Program

Sample Location	Purpose	Analysis	Sample Type
B-301 (1-3)	Further investigation of historical die casting operations	VOCs[1], Total metals [2], PCBs[3], pH[4]	Soil
B-301 (4-6)		PCBs	
B-302 (1-3)		VOCs, Total Metals, PCBs, pH	
B-302 (6-8)		PCBs	
B-303 (1-3)		VOCs, Total Metals, PCBs, pH	
B-303 (6-8)		PCBs	
B-304 (1-3)		PCBs	
B-304 (6-8)		VOCs, Total Metals, PCBs, pH	
B-305 (1-3)		VOCs, Total Metals, SPLP[5] Zinc, PCBs, pH	
B-305 (4-6)		PCBs	
SG-401 through SG-406	Further assessment of indoor inhalation exposure route further evaluate inhalation exposure routes.	TO-15[6]	Soil Gas

[1] *VOCs – Volatile organic compounds by method 5035/8260*
[2] *Total metals – Aluminum, Copper, Lead, Magnesium, Nickel and Zinc by method 6020*
[3] *PCBs – Polychlorinated biphenyls by method 8080, 2 samples per boring*
[4] *pH by method 9045*
[5] *Synthetic Precipitation Leaching Procedure (SPLP) by method 6020*
[6] *TO-15 –Includes analysis of those VOC "volatile chemicals" listed in 35 IAC Part 742 Table J by method TO-15*

3.2 Findings

3.2.1 Geology & Field Screening

Borings B-301 through B-305 indicated one to two feet of surficial fill materials overlying native soils. The fill materials consisted primarily of mixed sand and gravel. Slag pieces were noted in the fill at B-301. The underlying soils consisted primarily of gray silty clay. A thin layer of poorly graded gravel was noted interbedded with the clay at B-303.

The soils recovered from the boring locations generally did not exhibit visual or olfactory indications to suggest impact (e.g., staining, unusual odors) and/or elevated PID readings. An oily streak was noted in the sample collected from the 6-6.5 foot interval in boring B-304. This sample also indicated a PID reading of 2.5 parts per million (ppm). The boring logs in Attachment 5 detail the observed soil stratigraphy.

During soil gas sample collection, a multi-meter was used to collect lower explosive limit (LEL) readings. No LEL readings were observed during soil sample collection.

3.2.2 Analytical Results

The analytical results from the soil samples were compared to the IEPA's Tiered Approach to Corrective Action Objectives (TACO) Tier 1 Soil Remediation Objectives (SROs) for industrial/commercial properties. The analytical results from the soil gas samples were compared to the TACO Tier 1 Soil Gas Remediation Objectives (SGROs) for industrial/commercial properties. This includes SGROs for the indoor and outdoor inhalation exposure pathways.

Comparisons of the analytical results to TACO Tier 1 ROs are shown in the Tables 1 through 6 provided as Attachment 6. Values exceeding one or more of the applicable established ROs are shaded on the tables. Laboratory analytical reports and chain-of-custody records are provided in Attachment 7.

3.2.2.1 Soil Sample Results

The soil analytical results obtained during this investigation are summarized as follows:

- VOCs – The soil samples analyzed did not identify VOCs above the laboratory detection limits, except for acetone detected in sample B301 (1-3), which was less than the most stringent SRO.
- PCBs – PCBs were not reported above the laboratory detection limits in the soil samples analyzed.

- Metals – No exceedances of the Tier 1 SROs were identified for metals in the samples analyzed.

  Several samples indicated concentrations of metals above the Chicago regional background concentrations, but were below the Tier 1 SROs. A Tier I SRO has not been established for magnesium, which was reported above background in several soil samples. Magnesium is considered a nutrient in soil, and given the site setting, generally does not require further consideration.

  Some metals were reported at concentrations in this updated data that were above background but out of the Tier 1 pH-specific range for the soil component pathway. No new concentrations were identified higher than previously identified, with the exception of zinc identified in B-305 (1-3). This sample was submitted for Synthetic Precipitation Leaching Procedure (SPLP) analysis and the result was below the Tier 1 GRO for zinc. The pH range of the new samples was within the previously observed pH range.

  Samples displaying the highest concentrations for specific chemicals at the site above regional background concentrations and outside of the pH-specific Tier 1 RO range were evaluated with the SPLP data, presented in the March 2015 CSIR/ROR/RAP. The SPLP data for these metals identified in previous data with higher concentrations did not exceed site-specific ROs.

  Therefore, no further evaluation for zinc or the other metals identified over background is required.

3.2.2.2 Soil Gas Sample Results

The soil gas samples (SG-401 through SG-406) indicated the presence of various volatile chemical concentrations. The concentrations detected in these samples did not exceed the Tier 1 SGROs.

4.0 INHALATION EXPOSURE ROUTE TIER 2 EVALUATION

In the March 2015 CSI/ROR/RAP, exceedances of the industrial/commercial outdoor inhalation exposure route were identified in three soil samples – benzene in sample SB20 (3'), tetrachloroethene (PCE) in sample B-203 (14-16') and trichloroethene (TCE) B-203 (14-16'). Exceedances of the indoor inhalation exposure route for PCE and vinyl chloride were identified in three soil gas samples, with extent depicted in Exhibits 7 and 8 of that report. The previous and updated soil gas sampling data is provided in Table 6 of Attachment 6. As provided in Section 3.2.2. above, the horizontal extent of the soil gas exceedances identified in the 2015 CSI/ROR/RAP were further delineated with soil gas samples collected in 2016. A Tier 2 evaluation is presented below for the outdoor and indoor inhalation exposure pathways in accordance with 35 IAC 742.715 and 35 IAC 742.717, respectively.

4.1.1.1 Outdoor Inhalation

The outdoor inhalation evaluation was performed utilizing the Risk Based Corrective Action (RBCA) equations and parameters provided in section 742.Appendix C: Tables C and D, respectively. This evaluation was performed for benzene, PCE, and TCE, which are listed in 35 IAC 742 Appendix E and F as carcinogens and noncarcinogins.

Equation R7 was used to calculate outdoor inhalation Tier 2 RO for each carcinogenic contaminants from subsurface soils. Equation R8 was used to evaluate the Tier 2 RO for nonconcinogenic effects.

$$RO_{\text{outdoor inhalation}} = \frac{RBSL_{air} \cdot 10^{-3}}{VF_{samb}}$$

where R7/R8:

$RBSL_{air}$ = risk-based screening level for air (ug/m^3). Separate equations are required for carcinogenic and noncarcinogenic effects.
VF_{samb} = volatilization factor for soils below one meter to ambient air (mg/m^3)/(mg/kg$_{soil}$)

The following equation R9, was initially used to calculate the carcinogenic risk-based screening level for air.

$$RBSL_{air} = \frac{TR \cdot BW \cdot AT_c \cdot 365 \frac{d}{yr} \cdot 10^3 \frac{ug}{mg}}{SF_i \cdot IR_{air} \cdot EF \cdot ED}$$

where R9 =

TR = Target Risk (Industrial) – 1x10^{-6}

BW = Adult Body Weight – 70 kg
ATc = Averaging Time for Carcinogens – 70 years
SF = Oral Slope Factor – Chemical Specific $(ug/m^3)^{-1}$
IR_{air} = Daily Outdoor Inhalation Rate - 20 (m^3/day)
ED = Exposure Duration (Industrial/Commercial) – 25 years
EF = Exposure Frequency (Industrial/Commercial) – 250 days/years

Table 4-1 Equation R9 Results: Risk Based Screening Level for Air Results - Carcinogens

Chemical	$RBSL_{air}$ $(ug/m^{3)}$
Benzene	0.53
Tetrachloroethene	15.7
Trichloroethene	1.02

The following equation R10, was initially used to calculate the noncarcinogenic risk-based screening level for air.

$$RBSL_{air} = \frac{THQ \cdot RfD_i \cdot BW \cdot AT_n \cdot 365\frac{d}{yr} \cdot 10^3 \frac{ug}{mg}}{IR_{air} \cdot EF \cdot ED}$$

where R10 =

THQ = Target Hazard Quotient (Industrial) – 1.0
BW = Adult Body Weight – 70 kg
ATn = Averaging Time for Noncarcinogens – 25 years
RfD_i = Inhalation Reference Dose (RfD_i) - Chemical-specific [7]
IR_{air} = Daily Outdoor Inhalation Rate - 20 (m^3/day)
ED = Exposure Duration (Industrial/Commercial) – 25 years
EF = Exposure Frequency (Industrial/Commercial) – 250 days/years

Table 4-2 Equation R10 Results: Risk Based Screening Level for Air Results – Noncarcinogens

Chemical	$RBSL_{air}$ $(ug/m^{3)}$
Benzene	43.8
Tetrachloroethene	58.4
Trichloroethene	2.92

[7] *Chemical-specific RfDi values found in http://www.epa.state.il.us/land/taco/toxicity-values.xls updated June 2015, Values provided in Attachment 8.*

Equation R11 was then used to calculate the volatilization factor for the soils.

$$VF_{samb} = \frac{H' \rho_s \cdot 10^3 \frac{cm^3 \cdot kg}{m^3 \cdot g}}{\left[\theta_{ws} + \left(k_s \cdot \rho_s\right) + \left(H' \theta_{as}\right)\right] \cdot \left[1 + \frac{\left(U_{air} \cdot \delta_{air} \cdot L_s\right)}{\left(D_s^{eff} \cdot W\right)}\right]}$$

The input parameters for the volatilization factor were derived from applicable equations R6 and R20. Table 4-3 summarizes the inputs for the volatilization factor and details of the RBCA equations and results are provided in Attachment 8.

Table 4-3 RBCA Inputs Parameter and Values

Parameter	Value
D_s^{eff} = Effective Diffusion Coefficient in Soil Based on Vapor-Phase Concentration – R6	Benzene – 6.86x10^{-3} cm^2/s Tetrachloroethene – 4.37x10^{-4} cm^2/s Trichloroethene – 4.81x10^{-4} cm^2/s
D_{air} = Diffusion Coefficient in Air - Chemical-Specific	Benzene – 8.80x10^{-2} cm^2/s Tetrachloroethene – 7.20x10^{-2} cm^2/s Trichloroethene – 7.90x10^{-2} cm^2/s
D_{water} = Diffusion Coefficient in Water - Chemical-Specific	Benzene – 1.02x10^{-5} cm^2/s Tetrachloroethene – 8.20x10^{-6} cm^2/s Trichloroethene – 9.10x10^{-6} cm^2/s
f_{oc} = Organic Carbon Content of Soil – B201 (6-8')	0.0145 g/g
H' = Dimensionless Henry's Law Constant - Chemical-Specific	35 IAC Section 742, Appendix C, Table E
K_{oc} = Organic Carbon Partition Coefficient - Chemical-Specific	Benzene – 5.00x10^{1} cm^3/g Tetrachloroethene – 6.31x10^{2} cm^3/g Trichloroethene – 1.00x10^{2} cm^3/g
k_s = Soil Water Sorption Coefficient – R20	Benzene – 0.73 cm^3_{water}/g_{soil} Tetrachloroethene – 9.15 cm^3_{water}/g_{soil} Trichloroethene – 1.45 cm^3_{water}/g_{soil}
L_S = Depth to Subsurface Soil Sources – TACO Default	100 cm
U_{air} = Average Wind Speed Above Ground Surface in Ambient Mixing Zone - TACO Default	225 cm/s
d_{air} = Ambient Air Mixing Zone Height - TACO Default	200 cm
W = Width of Source Area Parallel to Direction to Wind or Groundwater Movement	Benzene – 3840 cm Tetrachloroethene – 9144 cm Trichloroethene – 3840 cm
θ_{as} = Volumetric Air Content in Vadose Zone Soils – TACO Default	Surface (Benzene) – 0.28 cm^3_{air}/cm^3_{soil} Subsurface (PCE & TCE) - 0.13 cm^3_{air}/cm^3_{soil}

Parameter	Value
θ_{ws} = Volumetric Water Content in Vadose Zone Soils – TACO Default	Surface (Benzene) – 0.15 cm^3_{air}/cm^3_{soil} Subsurface (PCE and TCE) - 0.30 cm^3_{air}/cm^3_{soil}
θ_T = Total Porosity – TACO Default	0.43 cm^3_{air}/cm^3_{soil}
ρ_s = Soil Particle Density - Site-Specific Harza site-specific samples	2.79 g/cm^3

In Table 4-3, the site-specific f_{oc} value was provided in Terracon's 2015 IEPA-approved CSI/ROR/RAP. The plumes for the W values were identified in Exhibit 7 of that document. The site-specific soil particle density value, ρ_s, of 2.79 g/cm3 was originally provided to IEPA in Harza's Remedial Objectives Report dated January 9, 1998. Eight samples were collected from the site and calculated for ρ_s using ASTM Method D854. The average value of 2.79 g/cm^3 was derived by Harza from the average of the samples collected from the remediation site. The Harza ROR was provided to IEPA as Attachment 7 of Consoer Townsend Envirodyne Engineer's Inc. Remedial Action Completion Report, dated January 1999. Key excerpts regarding the ρ_s value are included in Attachment 8 of this report.

Table 4-4 summarizes the outdoor inhalation Tier 2 RO results for each chemical and the calculations are provided in Attachment 8.

Table 4-4 Equation R11 - Volatilization Factor Surface Soil to Ambient Air (VF_{samb}) Results

Chemical	VF_{samb} $((mg/m^3)/(mg/kg_{soil})$
Benzene	1.33×10^{-3}
Trichloroethene	8.47×10^{-5}
Tetrachloroethene	7.06×10^{-5}

In accordance with 742.720, an evaluation was performed to determine if there is a presence of possible cumulative noncarcinogenic effects concerning the chemicals of concern. Tetrachloroethene and trichloroethene were listed in Appendix A, Table E as chemicals that affect the nervous system. Therefore, the outdoor inhalation Tier 2 ROs were not corrected for cumulative effects.

The Tier 2 SRO summary for the outdoor inhalation exposure pathway were are presented in Table 4-5 below.

Table 4-5 Outdoor Inhalation Tier 2 RO Evaluation

Soil Sample Location	Chemical	Maximum Site Concentration (mg/kg)	Tier 2 SRO – Carcinogenic effects, R7) (mg/kg)	Tier 2 SRO – Noncarcinogenic effects, R8) (mg/kg)
SB20 (3')	Benzene	1.8	**0.4**	32.8
B-203 (14-16')	Tetrachloroethene	22	222.4	827.2
SB12 (4-6')	Trichloroethene	10.6	12.0	34.5

As identified in Table 4-5, the Tier 2 ROs calculated for PCE and TCE exceeded the highest concentrations identified on site. Engineered barriers are no longer required to exclude the industrial/commercial outdoor inhalation exposure route for these contaminants.

The Tier 2 SRO developed for benzene for carcinogenic effects did not exceed the maximum impact identified on site. Therefore, an engineered barrier is required in the area impacted with benzene to address the outdoor inhalation exposure pathway for this site. As identified on Exhibit 3, the area impacted with benzene will be covered with a concrete building slab engineered barrier during the proposed redevelopment, which will exclude the outdoor inhalation exposure route.

4.1.1.2 Indoor Inhalation

The indoor inhalation evaluation was performed utilizing the Johnson and Ettinger (JE) equations and parameters provided in section 742.Appendix C: Tables L and M, respectively. This evaluation was performed for tetrachloroethene and vinyl chloride impacts in soil gas samples presented in the 2015 CSI/ROR/RAP. The two COCs are considered carcinogenic and noncarcinogenic effects.

Equation JE1, for carcinogens, was used to calculate Tier 2 ROs ($RO_{indoor\ air}$) for both tetrachloroethene and vinyl chloride.

$$RO_{indoor\ air} = \frac{TR \times AT_c \times 365\,\frac{days}{yr}}{ED \times EF \times URF \times 1000\,\frac{\mu g}{mg}}$$

Where JE1:

TR = Target Risk (Industrial) – $1\text{x}10^{-6}$
AT_c = Averaging Time for Carcinogens – 70 years
ED = Exposure Duration (Industrial/Commercial) – 25 years
EF = Exposure Frequency (Industrial/Commercial) – 250 days/years
URF = Unit Risk Factor – Chemical Specific $(ug/m^3)^{-1}$ from
IEPA Provided Toxicity-Values [8] updated January 2017

Table 4-6 Equation JE1: Indoor Air Objective Results – Carcinogenics

Chemical	URF $(ug/m^3)^{-1}$	$RO_{indoor\ air}$ (mg/m^3)
Tetrachloroethene	2.6×10^{-7}	0.016
Vinyl Chloride	4.4×10^{-6}	0.00093

[8] *IEPA January 2017 Toxicity Values:*
http://www.epa.illinois.gov/Assets/iepa/cleanup-programs/toxicity-values-for-tier2-and-tier3-calculations.xlsx

Equation JE2, for noncarcinogins, was used to calculate Tier 2 ROs ($RO_{indoor\ air}$) for tetrachloroethene and vinyl chloride.

$$RO_{indoor\ air} = \frac{THQ \times AT_{nc} \times 365\frac{days}{yr} \times RfC}{ED \times EF}$$

Where JE2:

THQ = Target Hazard Quotient (Industrial) – 1.0
AT_{nc} = Averaging Time for Noncarcinogens – 25 years
ED = Exposure Duration (Industrial/Commercial) – 25 years
EF = Exposure Frequency (Industrial/Commercial) – 250 days/years
RfC = Reference Concentration – Chemical Specific (mg/m^3) from
IEPA Toxicity Values updated January 2017

Table 4-7 Equation JE2: Indoor Air Objective Results – Noncarcinogenics

Chemical	**RfC (mg/m^3)**	**$RO_{indoor\ air}$ (mg/m$^{3)}$**
Tetrachloroethene	0.04	0.06
Vinyl Chloride	0.1	0.1

Tier 2 ROs were developed for carcinogenic and noncarcinogenic effects with following equation JE4 for each chemical:

$$RO_{soil\ gas} = \frac{RO_{indoor\ air}}{\alpha}$$

Where JE4:

$RO_{soil\ gas}$ = Soil gas remediation objective (mg/m^3)
$RO_{indoor\ air}$ = Indoor air remediation objective calculated from equations JE1/JE2 (mg/m^3)
α = attenuation factor calculated from equation JE7 (unitless)

The following equation JE7 was used to account for the modes of contaminant transport of both diffusion and advection:

$$a = \frac{\left[\left(\frac{D_T^{eff} \times A_B}{Q_{bldg} \times L_T}\right) \times \exp\left(\frac{Q_{soil} \times L_{crack}}{D_{crack}^{eff} \times A_{crack}}\right)\right]}{\left[\exp\left(\frac{Q_{soil} \times L_{crack}}{D_{crack}^{eff} \times A_{crack}}\right) + \left(\frac{D_T^{eff} \times A_B}{Q_{bldg} \times L_T}\right) + \left(\frac{D_T^{eff} \times A_B}{Q_{soil} \times L_T}\right)\left[\exp\left(\frac{Q_{soil} \times L_{crack}}{D_{crack}^{eff} \times A_{crack}}\right) - 1\right]\right]}$$

The input parameters for the attenuation factor were derived from applicable equations JE9a through JE 18, assuming that any future buildings would be constructed on grade with a full concrete slab. It was also assumed that there was 1 soil layer (n=1, i-1). Table 4-8 summarizes the inputs for the attenuation factor and details of the JE equations and results are provided in Attachment 8.

Table 4-8 JE Input Parameters and Values

Parameter	Value
A_B = Surface area of enclosed space at or below grade - TACO Default	Industrial/Commercial = $4x10^6 cm^2$
A_{crack} = Area of total cracks – JE14	800 cm^2
$D_{crack}{}^{eff}$ = Effective diffusion coefficient through the cracks- JE15	Tetrachloroethene – $5.61x10^{-3}$ cm^2/s Vinyl Chloride - $8.23x10^{-3}$ cm^2/s
D_i = Diffusivity in air – Chemical Chemical-Specific	35 IAC Section 742, Appendix C, Table E in cm^2/s
$D_i{}^{eff}$ = Effective diffusion coefficient through each soil layer- JE11	Tetrachloroethene – $2.39x10^{-5}$ cm^2/s Vinyl Chloride -$2.96x10^{-5}$ cm^2/s
D_{source} = Distance from ground surface to top of contamination- TACO Default	152.4 cm
$D_T{}^{eff}$ = Total overall effective diffusion coefficient – JE9a	Tetrachloroethene – $2.40x10^{-5}$ cm^2/s Vinyl Chloride - $2.96x10^{-5}$ $x10^{-1}$ cm^2/s
Dw = Diffusivity in water - Chemical Chemical-Specific	35 IAC Section 742, Appendix C, Table E in cm^2/s
H'_{TS} Dimensionless Henry's Law Constant - Chemical-Specific	35 IAC Section 742, Appendix C, Table E
L_B = Length of building - TACO Default	Industrial/Commercial = 2000 cm
L_F = Distance from ground surface to bottom of slab – JE10	10 cm (slab on grade)
L_i = Thickness of soil layer – JE9b	142.4 cm
L_T = Distance from bottom of slab to top of contamination – JE10	142.4 cm
n = Total number of layers of different types of soil vapors - Site-specific	1
Q_{bldg} = Building ventilation rate - TACO Default	Industrial/Commercial (slab on grade) – $3.15x10^5$ cm^3/s
Q_{soil} = Volumetric flow rate of soil gas into enclosed space- TACO Default	Industrial/Commercial (slab on grade) – 83.33 cm^3/s
w = Floor-wall seam gap – TACO Default	0.1 cm
W_B = Width of building - TACO Default	Industrial/Commercial = 2000 cm
θ_a = Air-Filled Soil Porosity – JE18	0.05 cm^3_{air}/cm^3_{soil}
$\theta_{a,crack}$ = Air-Filled Porosity for soil in cracks - TACO Default	0.28 cm^3_{air}/cm^3_{soil}
$\theta_{a,i}$ = Air-Filled Porosity of soil layer, i – J18	$0.05cm^3_{air}/cm^3_{soil}$

Parameter	Value
θ_T = Total Porosity – JE16	0.41 cm^3_{air}/cm^3_{soil}
$\theta_{T, crack}$ = Total Porosity for soil in cracks - TACO Default	0.43 cm^3_{air}/cm^3_{soil}
$\theta_{T,i}$ = Total Porosity of soil layer i – JE16	0.41 cm^3_{air}/cm^3_{soil}
θ_w = Water-Filled Soil Porosity – Site-Specific	0.36 cm^3_{air}/cm^3_{soil}
$\theta_{W, crack}$ = Water-Filled Soil Porosity for soil in cracks- TACO Default	0.15 cm^3_{air}/cm^3_{soil}
$\theta_{W,i}$ = Water-Filled Soil Porosity of soil layer i – Site-Specific	0.36 cm^3_{air}/cm^3_{soil}
ρ_{bi} = Dry Soil Bulk Density - Site-Specific	1.64 g/cm^3
ρ_s = Soil Particle Density- Site-Specific	2.79 g/cm^3

Table 4-9 summarizes the Tier 2 soil gas RO results for each chemical. Supporting calculations are provided in Attachment 8.

Table 4-9 Indoor Inhalation Tier 2 Soil Gas RO Results

Chemical	$RO_{indoor\ air}$ (mg/m^3)	Attenuation factor (α)	Tier 2 RO (mg/m^3)
Carcinogenic Effects			
Tetrachloroethene	0.016	2.12×10^{-6}	7,411.2
Vinyl Chloride	0.00093	2.62×10^{-6}	355.2
Noncarcinogenic Effects			
Tetrachloroethene	0.0.06	2.12×10^{-6}	27,527.5
Vinyl Chloride	0.1	2.62×10^{-6}	55,809.9

The Tier 2 RO for each chemical was compared to the soil vapor saturation limit (C_v^{sat}, Equation JE5) in accordance with 742.717 g). The calculated C_v^{sat} values for both chemicals were above the Tier 2 ROs. The results are presented in Attachment 8.

Therefore, the final Tier 2 soil gas ROs for the indoor inhalation exposure pathway are presented in Table 4-10 below.

Table 4-10 Tier 2 Soil Gas RO Evaluation

Soil Gas Sample Location	Chemical	Concentration (mg/m^3)	Carcinogenic Tier 2 RO (mg/m^3)	Noncarcinogenic Tier 2 RO (mg/m^3)
SG-202	Vinyl Chloride	56	355.2	55,809.9
SG-203	Tetrachloroethene	65	7,411.2	27,527.5
SG-205	Vinyl Chloride	5.8	355.2	55,809.9

The soil gas concentrations encountered at SG-202, 203, and 205 are below the soil gas Tier 2 ROs developed for this site. Therefore, building control technology (BCT) to exclude the indoor inhalation exposure route are no longer warranted for this proposed industrial/commercial redevelopment site. Use of the Tier 2 calculations assumed slab-on-grade buildings will be constructed (no basements), and future buildings will require future buildings to have full concrete slabs with no sumps.

4.1.1.3 Cumulative Effects

In accordance with 742.720, an evaluation was performed to determine if there is the presence of possible cumulative noncarcinogenic effects concerning the chemicals of concern for which Tier 2 ROs were developed.

For the indoor inhalation exposure route, toxicity data provided in Appendix A, Table E identified that tetrachloroethene and vinyl chloride are chemicals that affect the same target organ, the liver. Therefore, the noncarcinogenic Tier 2 ROs were evaluated with the following equation to assess whether the Tier 2 ROs need to be corrected for cumulative effects:

$$W_{ave} = \frac{x_1}{CUO_{x_1}} + \frac{x_2}{CUO_{x_2}} + \frac{x_3}{CUO_{x_3}} + K + \frac{x_a}{CUO_{x_a}}$$

where:

W_{ave} = Weighted average
x_1 (Tetrachloroethene maximum site concentration) = 65 mg/m^3
x_2 (Vinyl Chloride maximum site concentration) = 56 mg/m^3
$CUOx_1$ = Tetrachloroethene Tier 2 noncarcinogenic RO = 27,527.5 mg/m^3
$CUOx_2$ = Vinyl chloride Tier 2 noncarcinogenic RO = 55,809.9 mg/m^3

The weighted average was calculated to be 3.4×10^{-3}. Based on 742.720 a), if the value of the weighted average calculated is less than or equal to 1.0, then the remediation objectives are met for those chemicals. This requirement is met.

For the outdoor inhalation exposure route, toxicity data provided in Appendix A, Table E identified that tetrachloroethene and trichloroethene are chemicals that affect the nervous system. Therefore, the noncarcinogenic Tier 2 SROs were evaluated with the following equation to assess whether the Tier 2 SROs need to be corrected for cumulative effects:

$$W_{ave} = \frac{x_1}{CUO_{x_1}} + \frac{x_2}{CUO_{x_2}} + \frac{x_3}{CUO_{x_3}} + \ldots + \frac{x_a}{CUO_{x_a}}$$

where:

W_{ave} = Weighted average
x_1 (Tetrachloroethene) = 22 mg/kg
x_2 (Trichloroethene) = 10.6 mg/kg
$CUOx_1$ = Tetrachloroethene Tier 2 noncarcinogenic SRO = 827.2 mg/kg
$CUOx_2$ = Trichloroethene Tier 2 noncarcinogenic SRO = 34.5 mg/kg

The weighted average was calculated to be 0.33. Based on 742.720 a), if the value of the weighted average calculated is less than or equal to 1.0, then the remediation objectives are met for those chemicals.

Therefore, the Tier 2 ROs developed for the indoor and outdoor inhalation exposure routes for the site satisfy the cumulative effect requirements.

5.0 SITE DEVELOPMENT PLAN

Since the issuance of the approved March 2015 CSI/ROR/RAP, the proposed developer, Clarius Partners, has developed updated preliminary redevelopment plans. The concept for redevelopment of the site with industrial and commercial buildings remains the same. A copy of the updated site development plan is provided as Exhibit 3 of Attachment 1. A survey and legal description is provided in Attachment 9. Clarius plans to develop the site in stages, as depicted in Sub-Areas B and C, provided in Attachment 9. Clarius plans to conduct remediation and redevelop the property in phases, and may submit multiple RACRs to request IEPA closure for Sub-Areas individually.

As noted in the RAP, engineered barriers to exclude the ingestion exposure route are proposed to consist of asphalt pavement, concrete building foundations, or excavation and imported clean soil where landscaping will be placed. The engineered barriers are also shown in Exhibit 3 of Attachment 1.

As an alternative to the 3-foot clean fill engineered barrier in landscaped areas presented in the 2015 RAP to exclude the ingestion exposure route, the developer proposes to provide a barrier of 12 inches of clean soil with a geotextile indicator fabric (TerraTex® N08) placed between existing site soil and imported clean fill as a visual indicator. The specifications of the fabric are provided in Attachment 4. Landscaped areas of the site will surround parking lots and buildings, will be professionally managed, and are anticipated to be infrequently accessed by the industrial/commercial occupants. A fence will restrict access to the site from the adjacent public sidewalks. In areas planned to have trees, a 3-foot engineered barrier will be placed instead of the geotextile fabric liner to prevent restriction of root growth. The 3-foot engineered barrier areas would be placed around each tree and be approximately 6 feet in diameter. The location of the trees is unknown at this time and would be provided in the RACR. The alternative geotextile fabric liner and 12 inches of clean soil covered by grass and other landscaping features will provide an adequate barrier to exclude the industrial/commercial ingestion exposure route, would not adversely impact human health or the environment, and has been approved on other similar sites, including the American President Line commercial site, LPC# 0316286260. Therefore, IEPA acceptance of this 12-inch barrier is sought to help the economic viability of this important redevelopment project.

6.0 CLOSING

We appreciate the opportunity to provide this ROR/RAP Update and Addendum for IEPA approval. If you should have any questions or comments regarding this letter, please contact us at (312) 575-0014.

Sincerely,
Terracon Consultants, Inc.

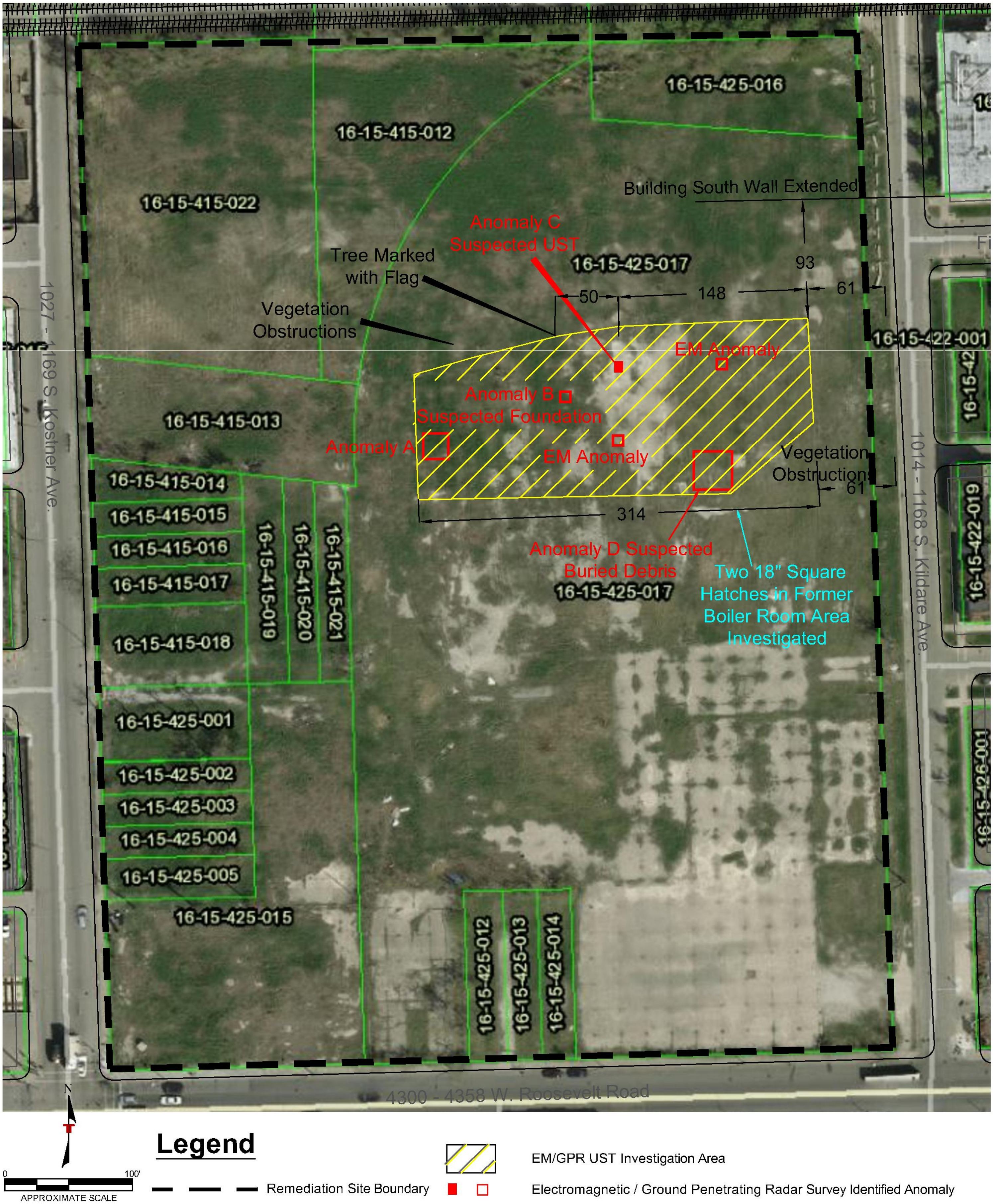
Richard O'Brien, P.E.
Senior Project Engineer

Gwendolyn Williams for
Matt Catlin, P.E.
Senior Principal

Attachments:
- Attachment 1 – Exhibits
- Attachment 2 – Photographs
- Attachment 3 – GPR Report
- Attachment 4 – Proposed Geotextile Fabric
- Attachment 5 – Boring Logs
- Attachment 6 - Tables
- Attachment 7 – Laboratory Analytical Reports
- Attachment 8 – Tier 2 Soil Gas Calculations
- Attachment 9 – Survey and Legal Description

CC: Ms. Sarah Rubin, Chicago 2FM
Mr. Kevin Matzke; Mr. Eric Johnson – Clarius Partners

Attachment 1 - Exhibits



Legend

EM/GPR UST Investigation Area

Remediation Site Boundary

Electromagnetic / Ground Penetrating Radar Survey Identified Anomaly

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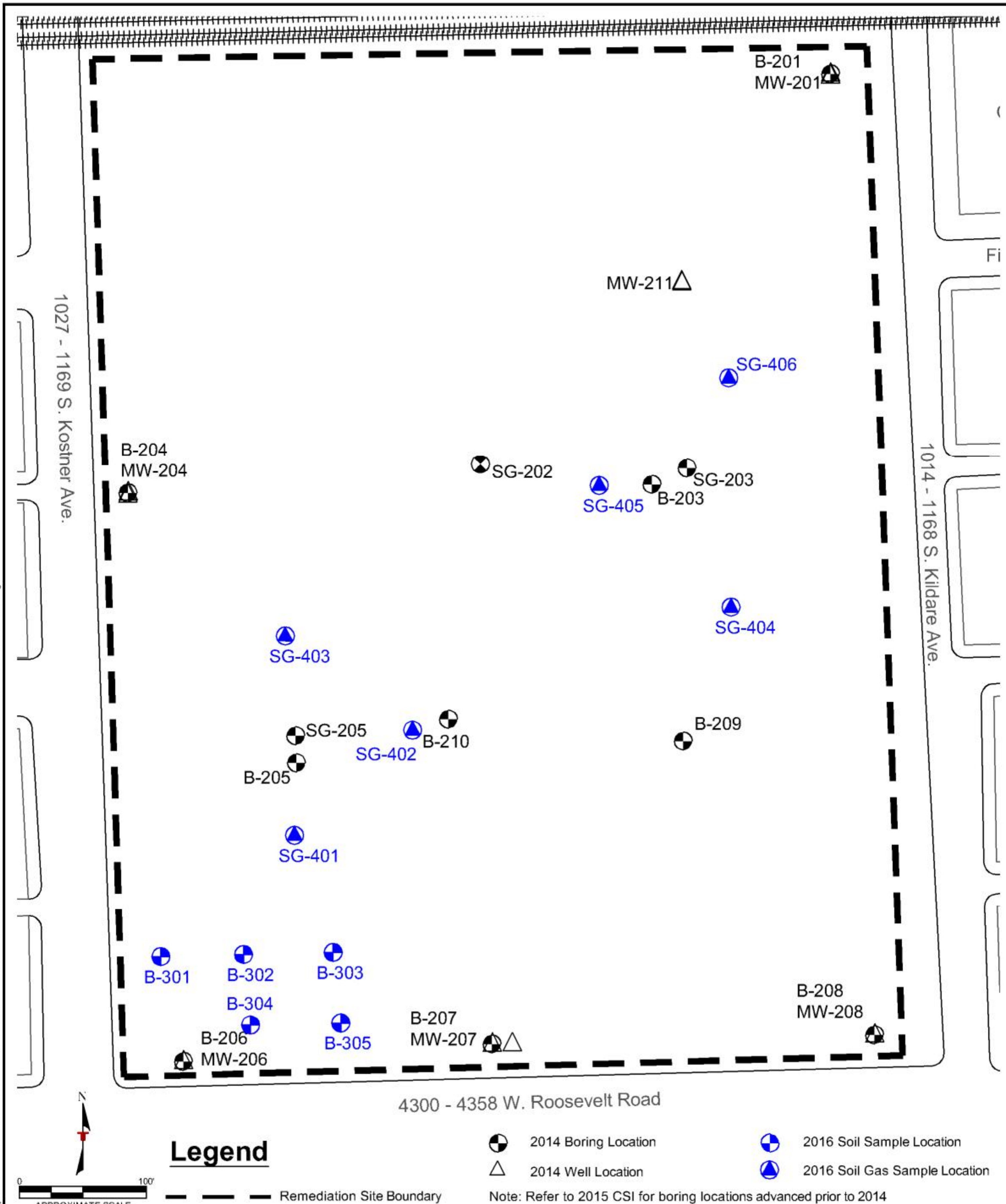
Project Mngr: RO	Project No. A2147008	Terracon Consulting Engineers and Scientists	UST INVESTIGATION AREAS	EXHIBIT
Drawn By: SM	Scale: AS-SHOWN		4300 West Roosevelt Road Chicago, Illinois	1
Checked By: JDM	Revised By: ~	650 W. LAKE ST., SUITE 420 CHICAGO, ILLINOIS 60661		
Approved By: JDM	Date: February 2017	PH. (312) 575-0014 FAX. (312) 575-0111		

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES. 1A



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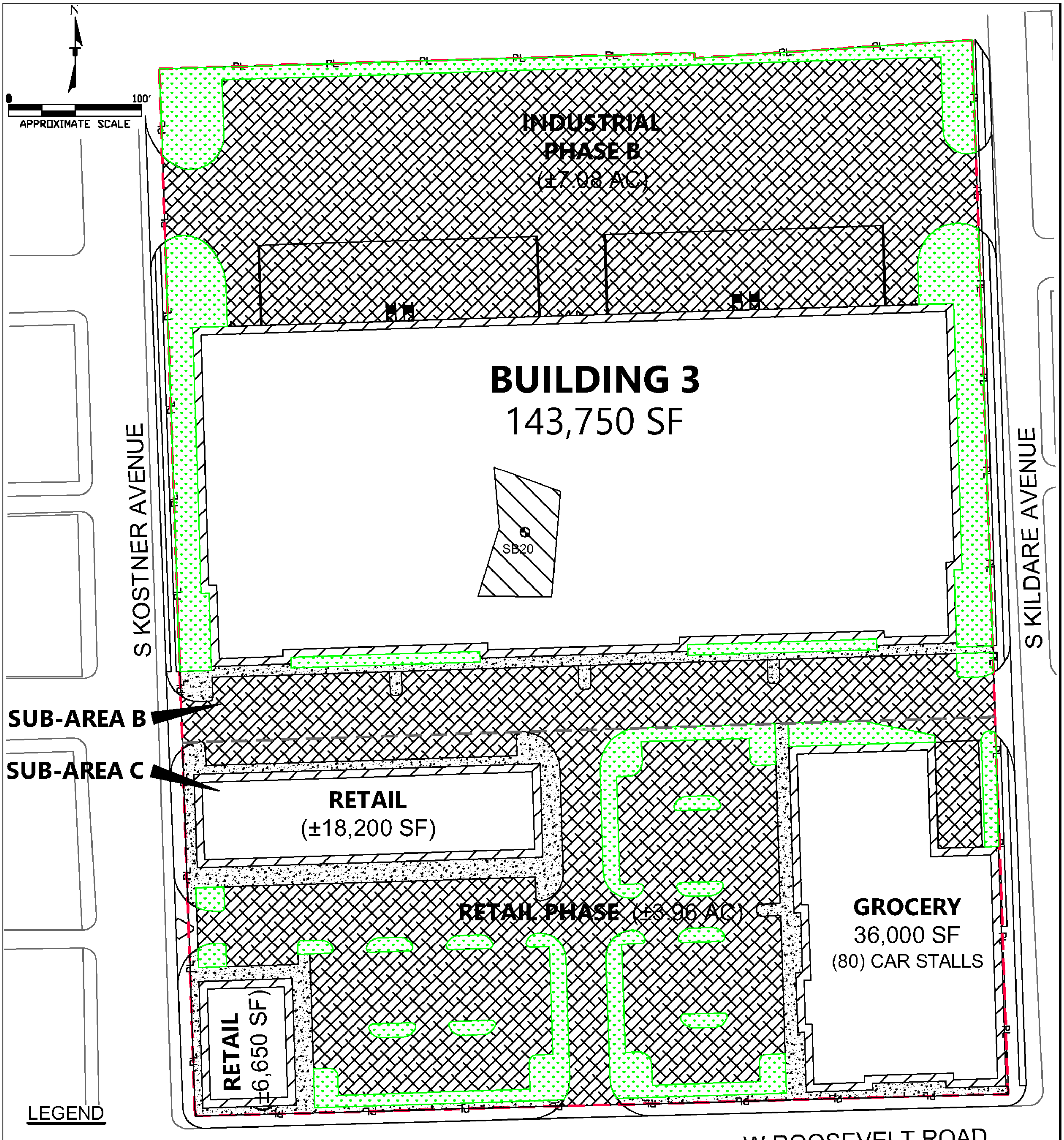
Legend

- 2014 Boring Location
- 2014 Well Location
- 2016 Soil Sample Location
- 2016 Soil Gas Sample Location
- Remediation Site Boundary

Note: Refer to 2015 CSI for boring locations advanced prior to 2014

Project Mngr: RO	Project No. A2147008	Terracon Consulting Engineers and Scientists	SOIL AND SOIL GAS BORING LOCATIONS	EXHIBIT
Drawn By: SM	Scale: AS-SHOWN		4300 West Roosevelt Road Chicago, Illinois	2
Checked By: JDM	Revised By: ~	650 W. LAKE ST., SUITE 420 CHICAGO, ILLINOIS 60661		
Approved By: JDM	Date: February 2017	PH. (312) 575-0014 FAX. (312) 575-0111		

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES. 1A



LEGEND

PL	PROPERTY LINE		PARKING LOT ASPHALT LOT CONCRETE PAVEMENT
	REMEDIATION SITE & SMZ BOUNDARY		CONCRETE WALK
	PROPOSED CONCRETE BUILDING FOOTPRINT		APPROXIMATE EXTENT OF BENZENE EXCEEDING TIER 1 SRO FOR THE OUTDOOR INHALATION EXPOSURE ROUTE EXCLUDED WITH CONCRETE BUILDING SLAB.
	LANDSCAPED AREAS TO BE EXCAVATED TO 12 INCHES BELOW FINAL GRADE AND REPLACED WITH A GEOTEXTILE COVERED BY 12 INCHES OF CLEAN FILL		

Project Mngr: RMO	Project No. A2147008	Terracon Consulting Engineers and Scientists	EXTENT OF REQUIRED ENGINEERED BARRIERS	EXHIBIT
Drawn By: KMK	Scale: AS-SHOWN		4300 W. Roosevelt Road Chicago, Illinois	3
Checked By: MAC	Revised By: ~	650 W. LAKE ST., SUITE 420 CHICAGO, ILLINOIS 60661		
Approved By: MAC	Date: February 2017	PH. (312) 575-0014 FAX. (312) 575-0111		

Attachment 2 - Photographs

Photo 1: View looking North at the metal plate area

Photo 2: View looking east at the metal plate area.

Photo 3: Closer view looking south at the metal plates.
Metal plates were adhered to concrete and could not be preyed up.

Photo 4: Closer view looking south at the metal plates. Plates did not indicate a void space beneath indicative of a UST when hit with hammer.

Photo 5: View looking east at the GPR Area.

Photo 6: View looking west at the GPR Area, a flagged tree in the background.

Photo 7: View of the flagged tree and vegetation obstructions.

Photo 8: View of a 6'X8" anomaly.

Photo 9: Closer view of the 6'X8" anomaly - potential UST.

Photo 10: Close up -view of anomaly B.

Photo 11: View looking northeast at a 30'X30" anomaly.

Photo 12: View looking southeast at the 30'X30" anomaly.

Attachment 3 - GPRS Report

August 14, 2016

Mr. Matt Weiss
Terracon

Subject: Ground Penetrating Radar (GPR) and EMI scanning at 4300 W Roosevelt RD Chicago, IL

Lead Technician: John Lause
Ground Penetrating Radar Systems, Inc.
312-485-7725
John.Lause@gp-radar.com

Table of Contents

1. Overview of GPR

Ground Penetrating Radar (GPR) is a non-destructive testing technology that sends a series of radar pulses into the surface which reflect back off of anomalies below. As the radar pulses pass through the ground, the waves bend slightly when encountering a material with differing physical properties, particularly density and conductivity. Thousands of pulses are sent and received in a small area, and the received signals are combined to form a real-time image of what is in the ground. The various places where the radar waves bend are displayed as anomalies which can be interpreted as steel pipes, PVC conduits, underground storage tanks, voids, foundations, etc. One of the many advantages of the technology is the ability to locate non-metallic objects as well as determining depth to the object. GPR data acquisition is very fast and results are available immediately, allowing any discovered anomalies to be marked directly in the field. Although sometimes confused with X-Ray, GPR uses no radiation emissions and is perfectly safe to work with human presence in close proximity.

2. Equipment and Capabilities

Ground Penetrating Radar (GPR)

- **GSSI SIR – 4000**
  - GPRS uses a Geophysical Survey Systems Inc (GSSI) SIR-4000 Radar unit. This is the most advanced GPR available. It allows for onsite interpretation, as well as stores data for later processing. This equipment is self-calibrating, allowing more precise depth and location measurements.
  - GSSI is the world's leading GPR designer and manufacturer. Information can be found at www.geophysical.com
- **400 MHz GSSI antenna**
  - For this project, we used a 400 MHz antenna with the GPR. This antenna allows data collection to a maximum depth of approximately eight feet, depending on soil conditions. At this site, the GPR was effective to a depth of approximately four feet.
- **GSSI EMI (Profiler)**
  - EMI stands for Electro Magnetic Induction, by which it creates a primary magnetic field and having this current flow in the subsurface, will produce a secondary magnetic field in the sub-surface.
  - EMI – The EMI instrument transmits a primary magnetic field, which induces an electrical current into the earth. The current in the earth produces a secondary magnetic field used to collect data.
  - The EMI can only penetrate to a depth of 3 meters (roughly 10ft).
  - The EMI does not produce an exact picture of the objects below and is typically paired with Ground Penetrating Radar so the extents of the objects can be shown on the surface.

3. Site Description

The site of this scanning was at 4300 West Roosevelt Rd Chicago, IL. A large vacant area was to be scanned. The corners of the area to be scanned were marked with stakes along with paint around the perimeter. The area was a mix of grass, dirt and concrete. An area in the northwest corner could not scanned due to vegetation and overgrowth. The area was approximately 40 feet south and 80 feet east of the northwest corner stake. In this area neither the GPR or EMI could be used effectively. See below pictures for examples

4. Inspection Methods

The primary purpose of this scanning was to locate anomalies. Of particular interest were any anomalies that were consistent with that of an underground storage tank or possible area of removal.

The inspection method for this project consisted of conducting a GPR scan of the designated areas as set in the pre work meeting. Scans were taken in a grid pattern, with adjacent scans no more than three feet apart. Whenever a grid pattern was unable to be completed the most complete scanning was done. The GPR detects differences in physical properties such as conductivity and density; metallic objects are most clearly visible, but it can also detect PVC, concrete (especially reinforced), and often old excavations if the backfill is different from native soil.

As each scan progresses, the GPR presents a sub-surface image in real time, allowing USTs, utilities, foundations, and other significant anomalies to be marked out directly in the field. Whenever an anomaly relevant to this project was detected, its location was marked directly on the surface.

The EMI Profiler was used over the marked area. Large open areas ie the grass lot, free of obstructions will provide the most quality data. In areas where reinforced concrete exists any anomalies that may be present below these areas will not be able to be located.

5. Findings

The area was scanned as best as possible and based upon the data at the site four anomalies were located that based upon the data is consistent with that of a possible structure, excavation, buried debris, change in soil type, unknown anomaly or possible underground tank that will require further investigation to determine what anomaly may be.

It should not be assumed that everything was able to be located in the scan areas. GPRS located what we were able to locate given site conditions/obstructions, scanning constraints and equipment limitations.

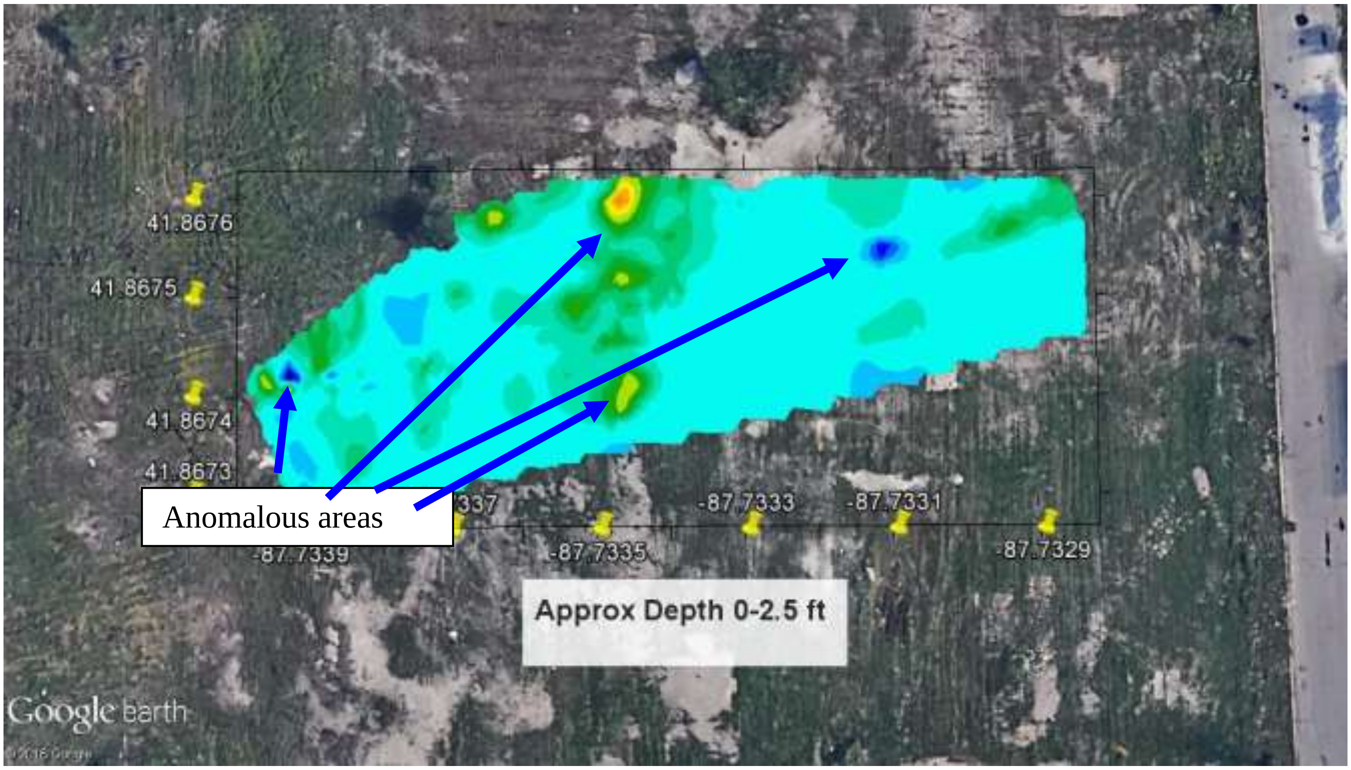
Approx. location of anomalies located with GPR

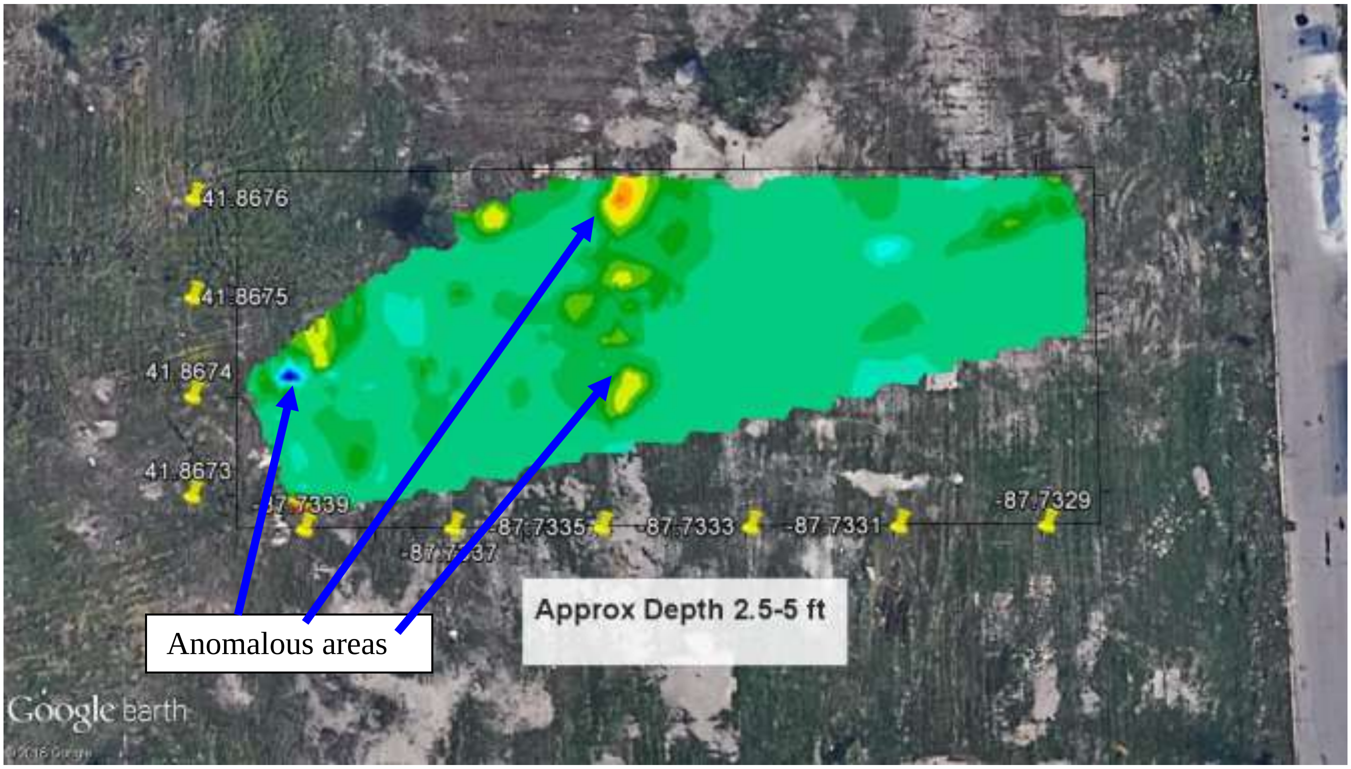
The anomalies located are the red areas. These include possible buried debris, buried foundation, excavation and possible UST. Further investigation will need to be performed to determine exactly what anomalies may be.

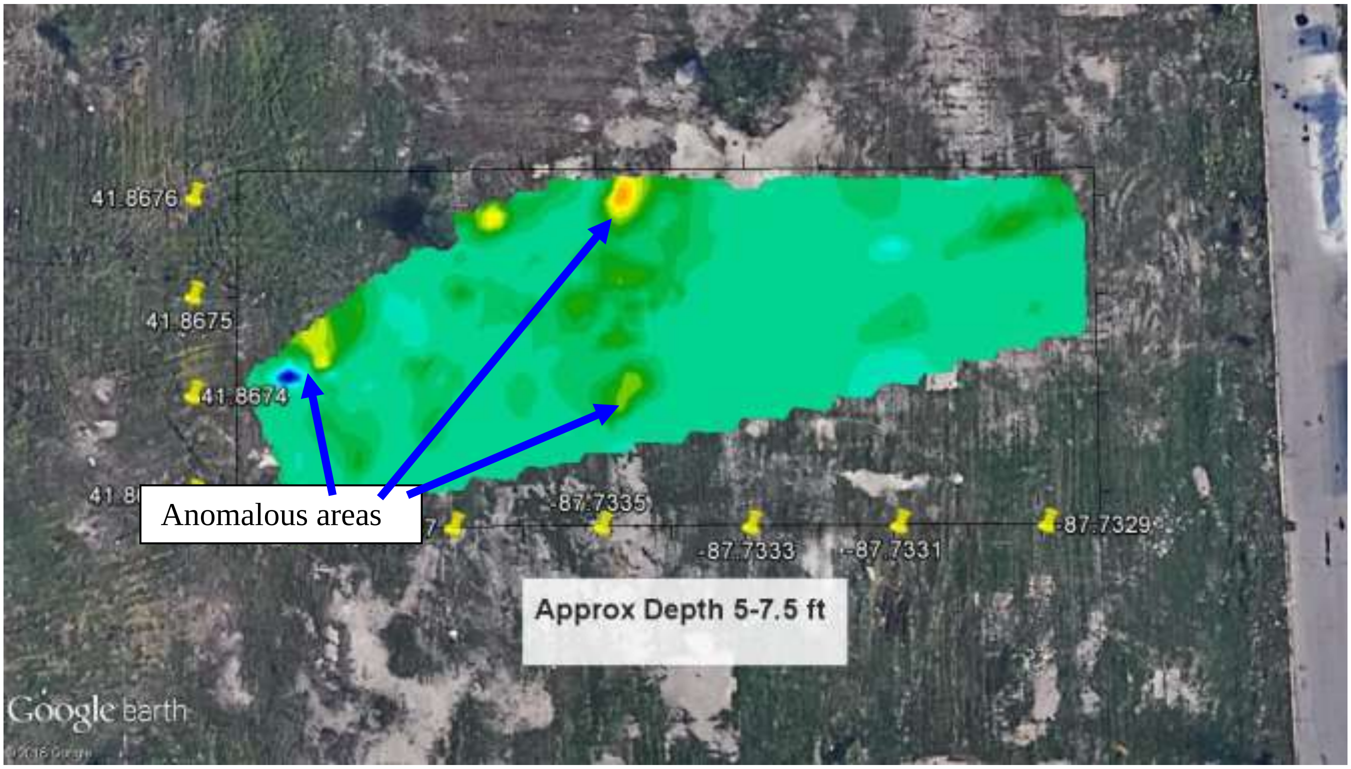
John Lause • Chicago, IL
312-485-7725 • 866-851-8247 fax • John. Lause@gp-radar.com • www.gp-radar.com

Located with the EMI

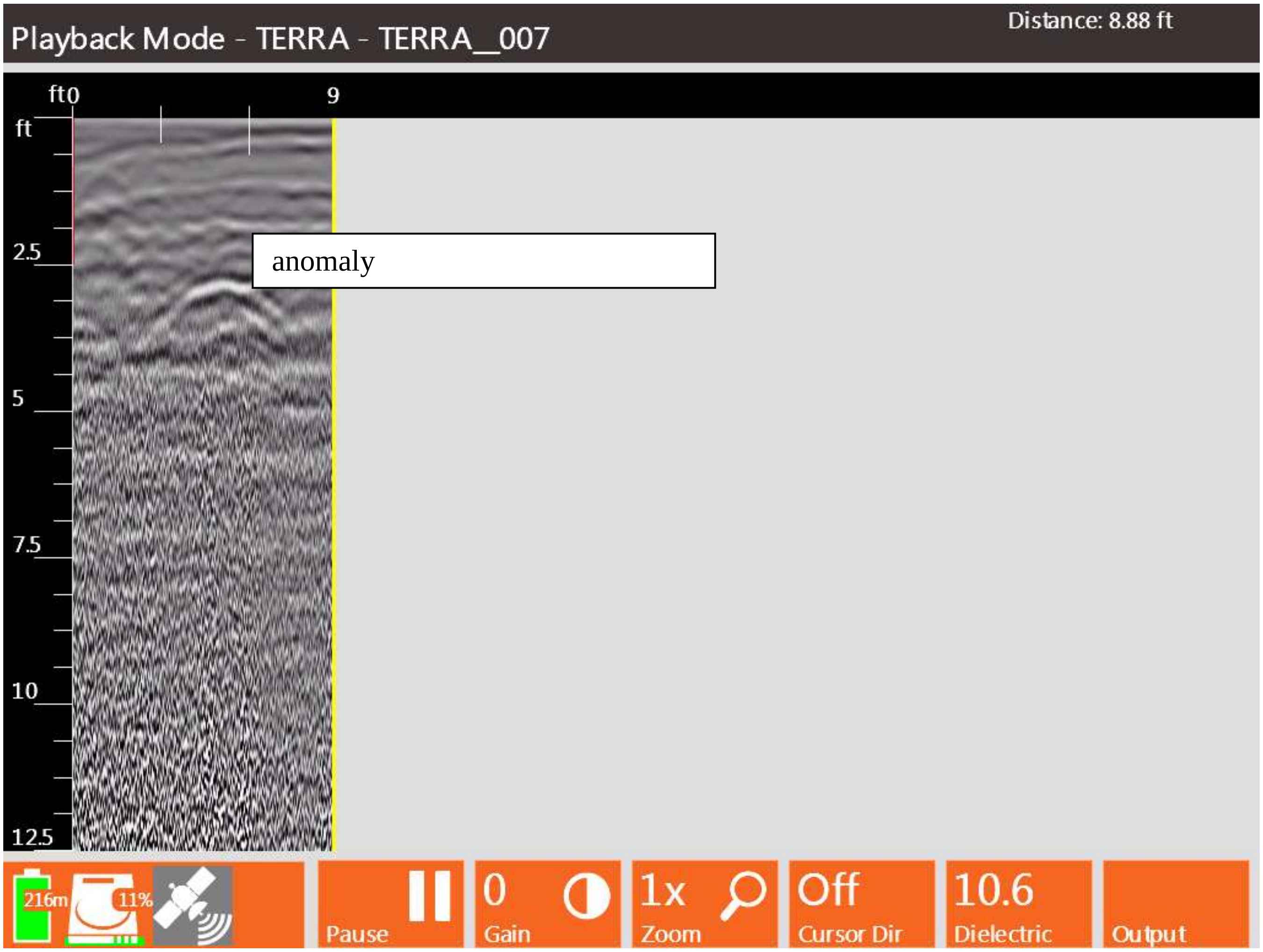
This is the data that was taken with the EMI Profiler. Several anomalous areas can be located in the data that was taken from the EMI. Further investigation will be required to determine what anomalies may be.




41.8676
41.8675
41.8674
41.8673
-87.7339
-87.7337
-87.7335
-87.7333
-87.7331
-87.7329
Approx Depth 2.5-5 ft
Anomalous areas
Google earth


41.8676
41.8675
41.8674
Anomalous areas
-87.7335
-87.7333
-87.7331
-87.7329
Approx Depth 5-7.5 ft
Google earth

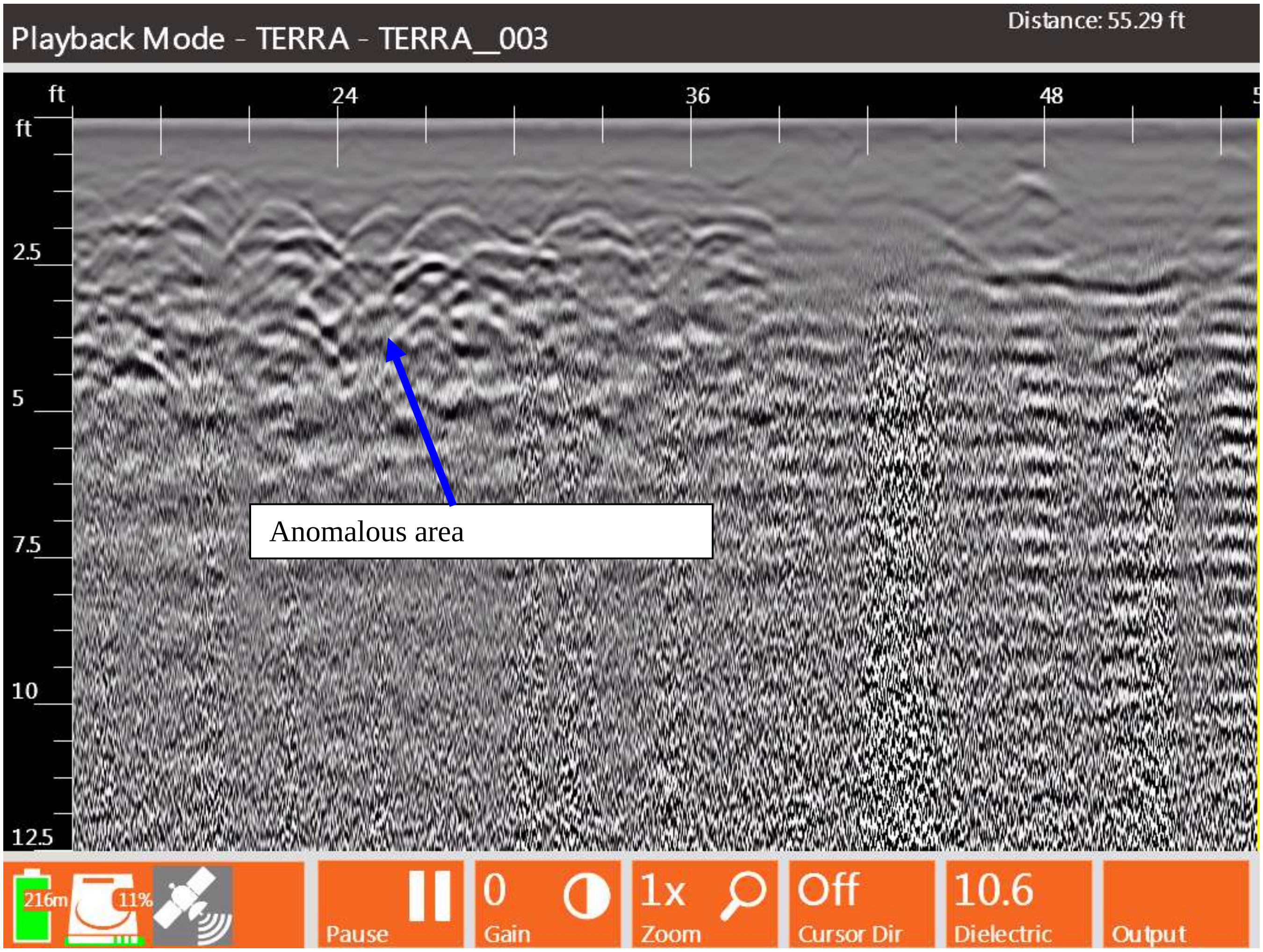
This picture shows the approximate location of one of the anomalies, based on the data the anomaly was 2.5 to 3 feet in depth and 6 x 8 approx. in size. Anomaly maybe possible tank, buried debris or buried structure



This image shows what was located with GPR in the image above. An anomaly can be located at 2.5 to 3 feet in depth.

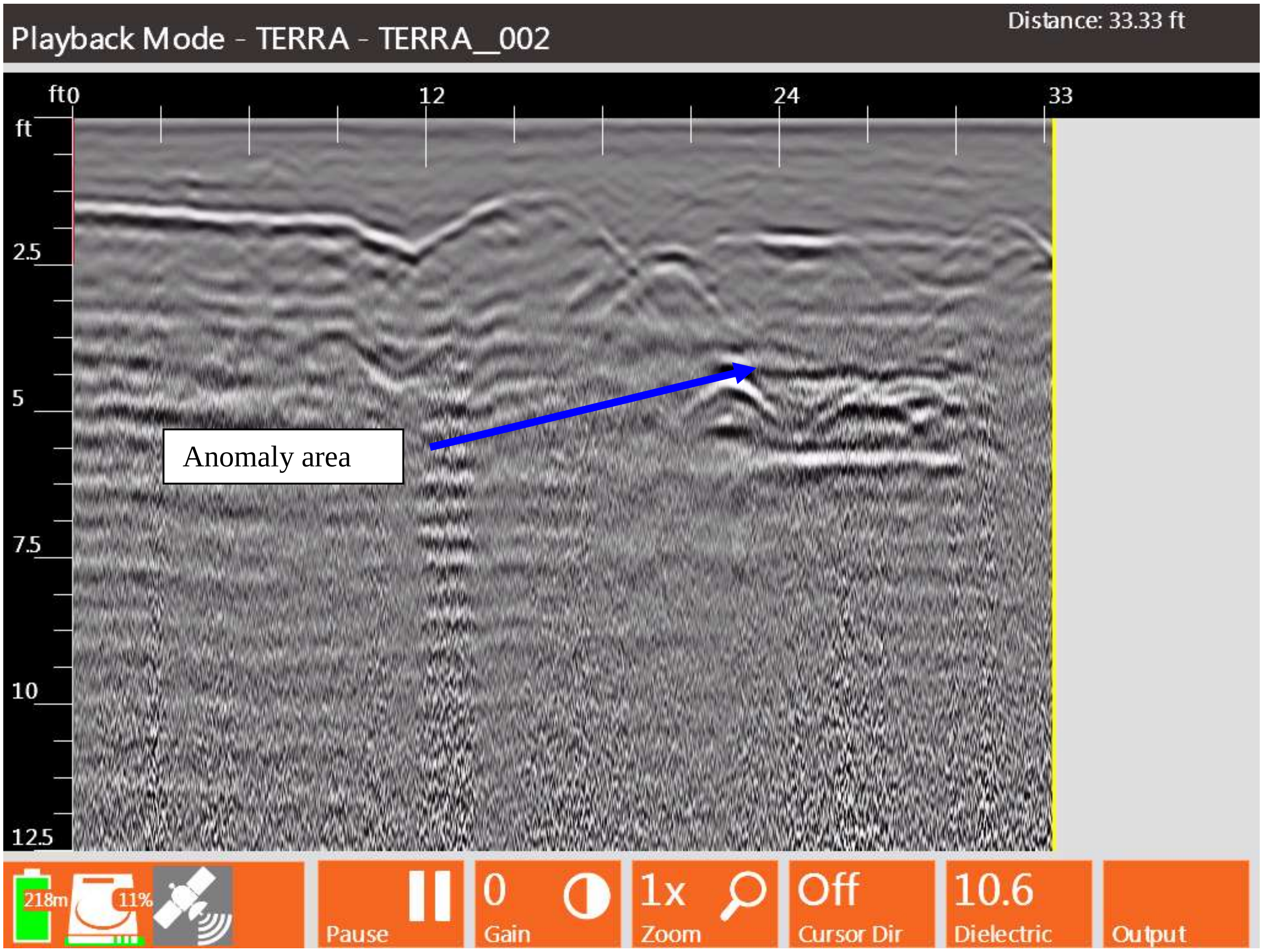
This picture shows another anomaly approx. 30 x 30 feet in size, anomaly may be buried debris or unknowns. Soil was heavily disturbed in this area.

John Lause • Chicago, IL
312-485-7725 • 866-851-8247 fax • John. Lause@gp-radar.com • www.gp-radar.com



This data is from the image above. The ground is heavily disturbed at 2 to 5 feet. Possible buried debris or unknowns.

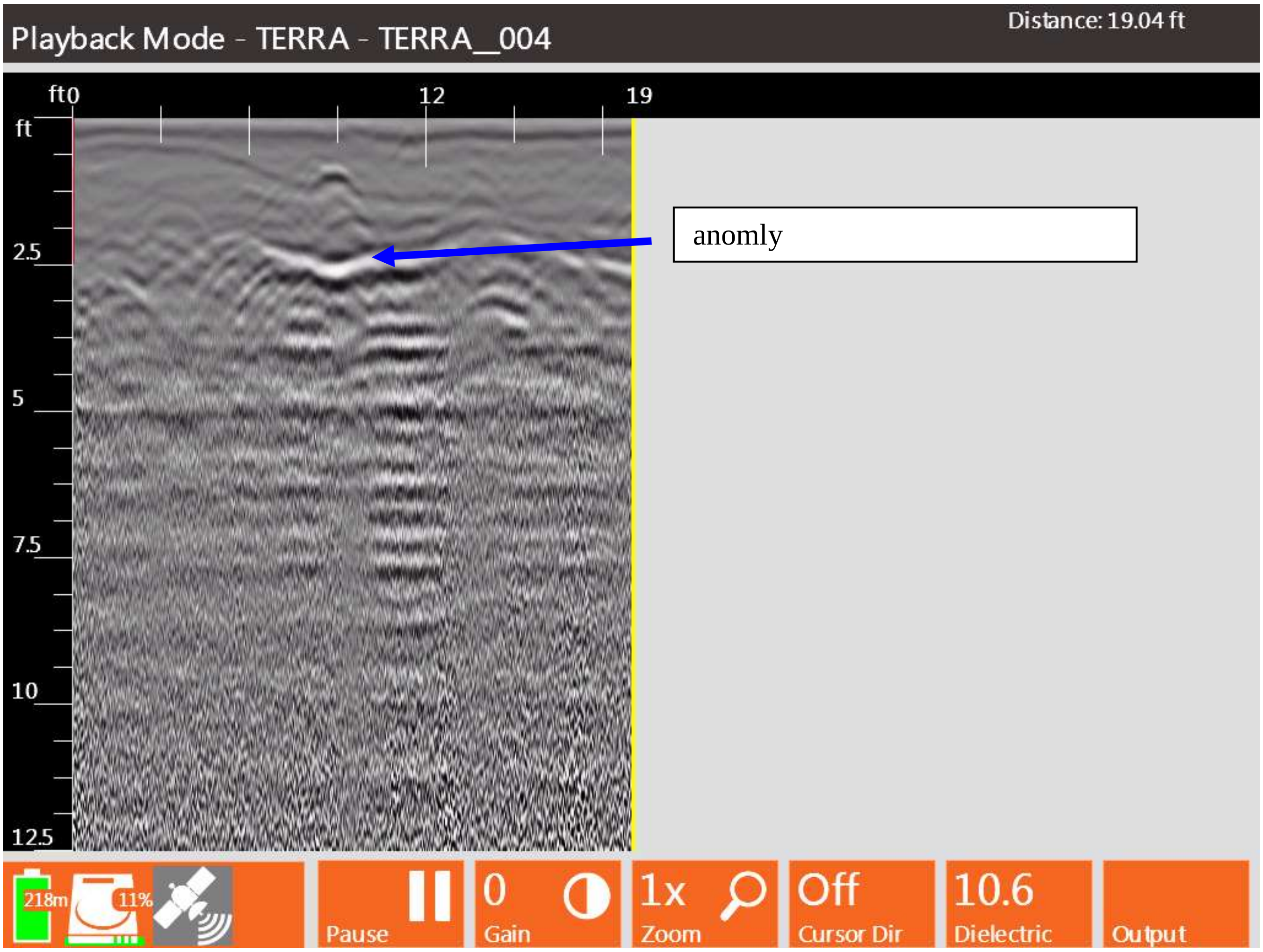

This picture shows a possible excavation or unknown.



This image shows the anomaly from the picture above. Based on the data a possible excavation or change in soil type on the right side of the image.


This location based upon the data may be a possible buried structure or foundation

John Lause • Chicago, IL
312-485-7725 • 866-851-8247 fax • John. Lause@gp-radar.com • www.gp-radar.com



This data shows the anomaly from the picture above, a buried anomaly possible foundation, structure or buried debris.

6. Closing

Thank you for the opportunity to serve you on this project. I hope this report has answered all the questions you had regarding this scanning. However if there is anything you have questions about or feel was omitted, please do not hesitate to call.

Thank you,

John Lause
Ground Penetrating Radar Systems
312-485-7725 Phone
866-851-8247 Fax
John.Lause@gp-radar.com

Attachment 4 - Proposed Geotextile Fabric

HANES® GEO COMPONENTS™
A Leggett & Platt® COMPANY

815 Buxton Street | Winston Salem, NC | 27101
PH: 888.239.4539 | FAX: 336.747.1652
www.HanesGeo.com

TerraTex® N08

TerraTex® N08 is a nonwoven geotextile made up of polypropylene fibers. These fibers are needled to form a stable and durable network such that the fibers retain their relative position. It is non-biodegradable and resistant to most soil chemicals, acids, and alkali with a pH range of 3 to 12. TerraTex® N08 is manufactured to meet or exceed the following minimum average roll values:

Unless noted otherwise, all values are minimum average roll values (MARV).

PROPERTY	TEST METHOD	ENGLISH	METRIC
Weight (Typical) [1]	ASTM D5261	**8.0** oz/yd^2	**271** g/m^2
Grab Tensile	ASTM D4632	**205** lbs	**0.911** kN
Grab Elongation	ASTM D4632	**50** %	**50** %
Trapezoid Tear	ASTM D4533	**85** lbs	**0.378** kN
CBR Puncture	ASTM D6241	**535** lbs	**2.38** kN
Permittivity [1]	ASTM D4491	**1.35** sec^{-1}	**1.35** sec^{-1}
Water Flow Rate [1]	ASTM D4491	**90** gpm/ft^2	**3,657** Lpm/m^2
AOS [1, 2]	ASTM D4751	**80** US Std. Sleve	**0.180** mm
UV Resistance	ASTM D4355	**70** % @ 500 hrs	**70** % @ 500 hrs

1 At the time of manufacturing. Handling, storage, and shipping may change these properties.
2 Value represents maximum average roll value.

KEELEY CONSTRUCTION, INC.

REVIEWED
By mike at 10:31 am, Apr 06, 2016

Attachment 5 – Boring Logs

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING

Auger	**Split Spoon**
Shelby Tube	**Macro Core**
Ring Sampler	**Rock Core**
Grab Sample	**No Recovery**

WATER LEVEL

Water Initially Encountered

Water Level After a Specified Period of Time

Water Level After a Specified Period of Time

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

FIELD TESTS

(HP)	**Hand Penetrometer**
(T)	**Torvane**
(b/f)	**Standard Penetration Test (blows per foot)**
(PID)	**Photo-Ionization Detector**
(OVA)	**Organic Vapor Analyzer**

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance Includes gravels, sands and silts.			**CONSISTENCY OF FINE-GRAINED SOILS** (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance			
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength, Qu, psf**	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**
Very Loose	0 - 3	0 - 6	Very Soft	less than 500	0 - 1	< 3
Loose	4 - 9	7 - 18	Soft	500 to 1,000	2 - 4	3 - 4
Medium Dense	10 - 29	19 - 58	Medium-Stiff	1,000 to 2,000	4 - 8	5 - 9
Dense	30 - 50	59 - 98	Stiff	2,000 to 4,000	8 - 15	10 - 18
Very Dense	> 50	$\geq$ 99	Very Stiff	4,000 to 8,000	15 - 30	19 - 42
			Hard	> 8,000	> 30	> 42

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm
Silt or Clay	Passing #200 sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

Terracon

Exhibit C-1

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]					Soil Classification
				Group Symbol	Group Name[B]
Coarse Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines[C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$[E]	GW	Well-graded gravel[F]
			$Cu < 4$ and/or $1 > Cc > 3$[E]	GP	Poorly graded gravel[F]
		Gravels with Fines More than 12% fines[C]	Fines classify as ML or MH	GM	Silty gravel[F,G, H]
			Fines classify as CL or CH	GC	Clayey gravel[F,G,H]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines[D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$[E]	SW	Well-graded sand[I]
			$Cu < 6$ and/or $1 > Cc > 3$[E]	SP	Poorly graded sand[I]
		Sands with Fines More than 12% fines[D]	Fines classify as ML or MH	SM	Silty sand[G,H,I]
			Fines Classify as CL or CH	SC	Clayey sand[G,H,I]
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid limit less than 50	inorganic	$PI > 7$ and plots on or above "A" line[J]	CL	Lean clay[K,L,M]
			$PI < 4$ or plots below "A" line[J]	ML	Silt[K,L,M]
		organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OL	Organic clay[K,L,M,N]
					Organic silt[K,L,M,O]
	Silts and Clays Liquid limit 50 or more	inorganic	PI plots on or above "A" line	CH	Fat clay[K,L,M]
			PI plots below "A" line	MH	Elastic Silt[K,L,M]
		organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OH	Organic clay[K,L,M,P]
					Organic silt[K,L,M,Q]
Highly organic soils	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-in. (75-mm) sieve

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10} \qquad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains $\geq$ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains $\geq$ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains $\geq$ 30% plus No. 200 predominantly sand, add "sandy" to group name.

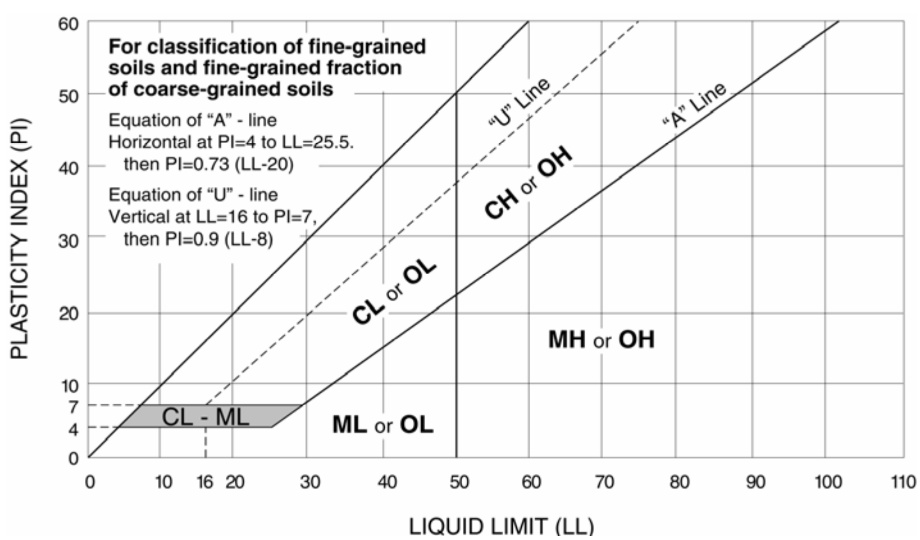
[M] If soil contains $\geq$ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] $PI \geq 4$ and plots on or above "A" line.

[O] $PI < 4$ or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



Terracon

Form 111—6/98

BORING LOG NO. B-301

PROJECT: 4300 Roosevelt & Kostner SRP Services

CLIENT: City of Chicago 2FM Chicago, Illinois

SITE: 4300 West Roosevelt Road Chicago, Illinois

LOCATION See Exhibit 2

GRAPHIC LOG	DEPTH	MATERIAL DESCRIPTION	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	OVA/PID (ppm)	Sample Number	SAMPLE SENT TO LAB (ID NUMBER)
	0.5	**FILL - Crushed Gravel**							
	1.5	**FILL - SAND AND GRAVEL**, with slag pieces, brown/grey							
	15.0	**SILTY CLAY (CL-ML)**, grey, moist to wet				36	*ND *ND	1	B-301 (1-3)
			5	7.0'		60	*ND *ND	2	B-301 (4-6)
			10			60	*ND *ND	3	
		Boring Terminated at 15 Feet	15						

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:
Direct Push

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Appendices for explanation of symbols and abbreviations.

Notes:

Field Geologist: Zack Joiner

* ND indicated a reading of less than the field detection limit (FDL) of one part per million isobutylene equivalents (ppmi).

WATER LEVEL OBSERVATIONS

7.0' while drilling

None, at the completion of the boring

Terracon

Boring Started: 6/10/2016	Boring Completed: 6/10/2016
Drill Rig: 6620DT	Driller: Earth Solutions
Project No.: A2147008	

BORING LOG NO. B-302

PROJECT: 4300 Roosevelt & Kostner SRP Services

CLIENT: City of Chicago 2FM Chicago, Illinois

SITE: 4300 West Roosevelt Road Chicago, Illinois

LOCATION See Exhibit 2

GRAPHIC LOG / DEPTH	MATERIAL DESCRIPTION	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	OVA/PID (ppm)	Sample Number	SAMPLE SENT TO LAB (ID NUMBER)
0.5	**TOPSOIL**							
1.0	**FILL - GRAVEL**							
2.0	**FILL - SILTY CLAYEY SAND WITH GRAVEL**, grey, moist				54	*ND *ND	1	B-302 (1-3)
15.0	**SILTY CLAY (CL-ML)**, grey, moist to wet	5	▽		60	*ND *ND	2	B-302 (6-8)
		10			60	*ND *ND	3	
	Boring Terminated at 15 Feet	15						

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:
Direct Push

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Appendices for explanation of symbols and abbreviations.

Notes:

Field Geologist: Zack Joiner

* ND indicated a reading of less than the field detection limit (FDL) of one part per million isobutylene equivalents (ppmi).

WATER LEVEL OBSERVATIONS

▽ *6.8' while drilling*

None, at the completion of the boring

Terracon

Boring Started: 6/10/2016	Boring Completed: 6/10/2016
Drill Rig: 6620DT	Driller: Earth Solutions
Project No.: A2147008	

BORING LOG NO. B-303

PROJECT: 4300 Roosevelt & Kostner SRP Services

CLIENT: City of Chicago 2FM
Chicago, Illinois

SITE: 4300 West Roosevelt Road
Chicago, Illinois

LOCATION See Exhibit 2

DEPTH	MATERIAL DESCRIPTION	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	OVA/PID (ppm)	Sample Number	SAMPLE SENT TO LAB (ID NUMBER)
0.5	**FILL - Crushed Stone**							
1.0	**FILL - GRAVEL**, with asphalt							
5.0	**SILTY CLAY**, moist				36	*ND *ND	1	B-303 (1-3)
5.5	**POORLY GRADED GRAVEL (GP)**, moist	5						
	SILTY CLAY, moist				54	*ND *ND	2	B-303 (6-8)
		10			60	*ND *ND	3	
15.0		15						

Boring Terminated at 15 Feet

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:
Direct Push

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Appendices for explanation of symbols and abbreviations.

Notes:

Field Geologist: Zack Joiner

* ND indicated a reading of less than the field detection limit (FDL) of one part per million isobutylene equivalents (ppmi).

WATER LEVEL OBSERVATIONS

Terracon

Boring Started: 6/10/2016	Boring Completed: 6/10/2016
Drill Rig: 6620DT	Driller: Earth Solutions
Project No.: A2147008	

BORING LOG NO. B-304

PROJECT: 4300 Roosevelt & Kostner SRP Services

CLIENT: City of Chicago 2FM
Chicago, Illinois

SITE: 4300 West Roosevelt Road
Chicago, Illinois

LOCATION See Exhibit 2

DEPTH	MATERIAL DESCRIPTION	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	OVA/PID (ppm)	Sample Number	SAMPLE SENT TO LAB (ID NUMBER)
0.5	**FILL - Crushed Stone**							
1.0	**FILL - GRAVEL**, with asphalt							
	SILTY CLAY WITH GRAVEL (CL-ML), grey				44	*ND *ND	1	B-304 (1-3)
	@ 6-6.5' - oily streak	5			36	2.5 *ND	2	B-304(6-8)
15.0		10			60	*ND *ND	3	
	Boring Terminated at 15 Feet	15						

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:
Direct Push

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Appendices for explanation of symbols and abbreviations.

Notes:

Field Geologist: Zack Joiner

* ND indicated a reading of less than the field detection limit (FDL) of one part per million isobutylene equivalents (ppmi).

WATER LEVEL OBSERVATIONS

Terracon

Boring Started: 6/10/2016	Boring Completed: 6/10/2016
Drill Rig: 6620DT	Driller: Earth Solutions
Project No.: A2147008	

BORING LOG NO. B-305

PROJECT: 4300 Roosevelt & Kostner SRP Services

CLIENT: City of Chicago 2FM
Chicago, Illinois

SITE: 4300 West Roosevelt Road
Chicago, Illinois

LOCATION See Exhibit 2

GRAPHIC LOG	DEPTH	MATERIAL DESCRIPTION	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	OVA/PID (ppm)	Sample Number	SAMPLE SENT TO LAB (ID NUMBER)
	0.5	**FILL - Crushed Stone**							
	2.0	**FILL - GRAVEL**, with asphalt, moist					*ND		
		SILTY CLAY (CL-ML), grey, moist to wet				36	*ND	1	B-305 (1-3)
			5						B-305(4-6)
						60	*ND *ND	2	
			10						
						60	*ND *ND	3	
				▽					
	15.0		15						
		Boring Terminated at 15 Feet							

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:
Direct Push

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Appendices for explanation of symbols and abbreviations.

Notes:

Field Geologist: Zack Joiner

* ND indicated a reading of less than the field detection limit (FDL) of one part per million isobutylene equivalents (ppmi).

WATER LEVEL OBSERVATIONS

▽ *14.0' while drilling*

None, at the completion of the boring

Terracon

Boring Started: 6/10/2016	Boring Completed: 6/10/2016
Drill Rig: 6620DT	Driller: Earth Solutions
Project No.: A2147008	

WELL LOG NO. SG-401

PROJECT: 4300 Roosevelt & Kostner SRP Services

CLIENT: City of Chicago 2FM Chicago, Illinois

SITE: 4300 West Roosevelt Road Chicago, Illinois

GRAPHIC LOG	LOCATION See Exhibit 2 DEPTH / MATERIAL DESCRIPTION	INSTALLATION DETAILS Well Completion:	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	OVA/PID (ppm)	Sample Number	SAMPLE SENT TO LAB (ID NUMBER)
		Bentonite Sand Filter Pack 6" Probe	4						SG-401

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:
Direct Push

Abandonment Method:
Installed 6" Probe

See Appendices for explanation of symbols and abbreviations.

Notes:

Field Geologist: Zack Joiner
LEL = 0%

WATER LEVEL OBSERVATIONS

Terracon

Well Started: 6/10/2016	Well Completed: 6/10/2016
Drill Rig: 6620DT	Driller: Earth Solutions
Project No.: A2147008	

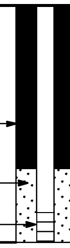
WELL LOG NO. SG-402

PROJECT: 4300 Roosevelt & Kostner SRP Services

CLIENT: City of Chicago 2FM
Chicago, Illinois

SITE: 4300 West Roosevelt Road
Chicago, Illinois

GRAPHIC LOG	LOCATION See Exhibit 2 DEPTH MATERIAL DESCRIPTION	INSTALLATION DETAILS Well Completion:	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	OVA/PID (ppm)	Sample Number	SAMPLE SENT TO LAB (ID NUMBER)
		Bentonite Sand Filter Pack 6" Probe	4						SG-402



The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:
Direct Push

Abandonment Method:
Installed 6" Probe

See Appendices for explanation of symbols and abbreviations.

Notes:

Field Geologist: Zack Joiner
LEL = 0%

WATER LEVEL OBSERVATIONS

Terracon

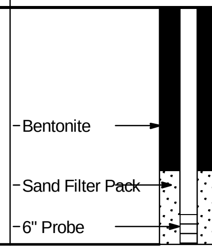
Well Started: 6/10/2016	Well Completed: 6/10/2016
Drill Rig: 6620DT	Driller: Earth Solutions
Project No.: A2147008	

WELL LOG NO. SG-403

PROJECT: 4300 Roosevelt & Kostner SRP Services

CLIENT: City of Chicago 2FM
Chicago, Illinois

SITE: 4300 West Roosevelt Road
Chicago, Illinois

GRAPHIC LOG	LOCATION See Exhibit 2 DEPTH MATERIAL DESCRIPTION	INSTALLATION DETAILS Well Completion:	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	OVA/PID (ppm)	Sample Number	SAMPLE SENT TO LAB (ID NUMBER)
			4						SG-403

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:
Direct Push

Abandonment Method:
Installed 6" Probe

See Appendices for explanation of symbols and abbreviations.

Notes:

Field Geologist: Zack Joiner
LEL = 0%

WATER LEVEL OBSERVATIONS

Terracon

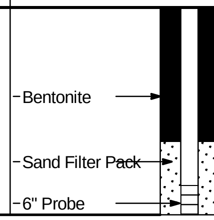
Well Started: 6/10/2016	Well Completed: 6/10/2016
Drill Rig: 6620DT	Driller: Earth Solutions
Project No.: A2147008	

WELL LOG NO. SG-404

PROJECT: 4300 Roosevelt & Kostner SRP Services

CLIENT: City of Chicago 2FM
Chicago, Illinois

SITE: 4300 West Roosevelt Road
Chicago, Illinois

GRAPHIC LOG	LOCATION See Exhibit 2 DEPTH MATERIAL DESCRIPTION	INSTALLATION DETAILS Well Completion:	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	OVA/PID (ppm)	Sample Number	SAMPLE SENT TO LAB (ID NUMBER)
			4						SG-404

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:
Direct Push

Abandonment Method:
Installed 6" Probe

See Appendices for explanation of symbols and abbreviations.

Notes:

Field Geologist: Zack Joiner
LEL = 0%

WATER LEVEL OBSERVATIONS

Terracon

Well Started: 6/10/2016	Well Completed: 6/10/2016
Drill Rig: 6620DT	Driller: Earth Solutions
Project No.: A2147008	

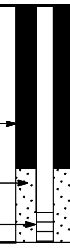
WELL LOG NO. SG-405

PROJECT: 4300 Roosevelt & Kostner SRP Services

CLIENT: City of Chicago 2FM
Chicago, Illinois

SITE: 4300 West Roosevelt Road
Chicago, Illinois

GRAPHIC LOG	LOCATION See Exhibit 2 DEPTH MATERIAL DESCRIPTION	INSTALLATION DETAILS Well Completion:	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	OVA/PID (ppm)	Sample Number	SAMPLE SENT TO LAB (ID NUMBER)
		Bentonite Sand Filter Pack 6" Probe	4						SG-405



The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:
Direct Push

Abandonment Method:
Installed 6" Probe

See Appendices for explanation of symbols and abbreviations.

Notes:

Field Geologist: Zack Joiner
LEL = 0%

WATER LEVEL OBSERVATIONS

Well Started: 6/10/2016	Well Completed: 6/10/2016
Drill Rig: 6620DT	Driller: Earth Solutions
Project No.: A2147008	

WELL LOG NO. SG-406

PROJECT: 4300 Roosevelt & Kostner SRP Services

CLIENT: City of Chicago 2FM
Chicago, Illinois

SITE: 4300 West Roosevelt Road
Chicago, Illinois

GRAPHIC LOG	LOCATION See Exhibit 2 DEPTH / MATERIAL DESCRIPTION	INSTALLATION DETAILS Well Completion:	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	OVA/PID (ppm)	Sample Number	SAMPLE SENT TO LAB (ID NUMBER)
		Bentonite Sand Filter Pack 6" Probe	5						SG-406

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:
Direct Push

Abandonment Method:
Installed 6" Probe

See Appendices for explanation of symbols and abbreviations.

Notes:

Field Geologist: Zack Joiner
LEL = 0%

WATER LEVEL OBSERVATIONS

Terracon

Well Started: 6/10/2016	Well Completed: 6/10/2016
Drill Rig: 6620DT	Driller: Earth Solutions
Project No.: A2147008	

Attachment 6 – Tables

Table 1 - Terracon Soil Analytical Results - VOCs
4300 West Roosevelt Road, Chicago, IL
A2147008

Analyte	Units	IEPA Tier 1 Soil Remediation Objectives					Sample Identification	B-301	B-302	B-303	B-304	B-305
		Industrial/Commercial Properties		Construction Workers		Soil Component of the Groundwater Ingestion Route	Sample Depth (feet)	(1-3)	(1-3)	(1-3)	(6-8)	(1-3)
		Ingestion	Inhalation	Ingestion	Inhalation	Class II	Date Collected	6/10/2016	6/10/2016	6/10/2016	6/10/2016	6/10/2016
Volatile Organic Analytical Parameters												
Benzene	mg/kg	100	1.60	2,300	2.2	0.17		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054
Toluene	mg/kg	410,000	650	410,000	42	29		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054
Ethylbenzene	mg/kg	200,000	400	20,000	58	19		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054
Xylenes (total)	mg/kg	410,000	320	41,000	5.6	150		< 0.014	< 0.017	< 0.019	< 0.013	< 0.016
Methyl Tertiary-Butyl Ether	mg/kg	20,000	8,800	2,000	140	0.32		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054
Acetone	mg/kg	---	100,000	---	100,000	25		< 0.072	0.15	< 0.096	< 0.067	< 0.082
Bromodichloromethane	mg/kg	92	3,000	2,000	3,000	0.6		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054
Bromoform	mg/kg	720	100	16,000	140	0.8		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054
Bromomethane	mg/kg	2,900	15	1,000	3.9	1.2		< 0.0096	< 0.011	< 0.013	< 0.0089	< 0.011
2-Butanone	mg/kg	---	---	---	---	---		< 0.072	< 0.085	< 0.096	< 0.067	< 0.082
Carbon Disulfide	mg/kg	200,000	720	20,000	9.0	160		< 0.048	< 0.056	< 0.064	< 0.045	< 0.054
Carbon Tetrachloride	mg/kg	44	0.64	410	0.9	0.33		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054
Chlorobenzene	mg/kg	41,000	210	4,100	1.3	6.5		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054
Chloroethane	mg/kg	---	---	---	---	---		< 0.0096	< 0.011	< 0.013	< 0.0089	< 0.011
Chloroform	mg/kg	940	0.54	2,000	0.76	2.9		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054
Chloromethane	mg/kg	---	---	---	---	---		< 0.0096	< 0.011	< 0.013	< 0.0089	< 0.011
cis-1,2-Dichloroethene	mg/kg	20,000	1,200	20,000	1,200	1.1		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054
Dibromochloromethane	mg/kg	41,000	1,300	41,000	1,300	0.4		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054
1,1-Dichloroethane	mg/kg	200,000	1,700	200,000	130	110		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054
1,2-Dichloroethane	mg/kg	63	0.7	1,400	0.99	0.1		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054
1,1-Dichloroethene	mg/kg	100,000	470	10,000	3.0	0.3		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054
1,2-Dichloropropane	mg/kg	84	23	1,800	0.5	0.15		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054
1,3-Dichloropropene (cis + trans)	mg/kg	57	2.1	1,200	0.39	0.02		< 0.0019	< 0.0023	< 0.0026	< 0.0018	< 0.0022
2-Hexanone	mg/kg	---	---	---	---	---		< 0.019	< 0.023	< 0.026	< 0.018	< 0.022
4-Methyl-2-pentanone	mg/kg	---	---	---	---	---		< 0.019	< 0.023	< 0.026	< 0.018	< 0.022
Methylene Chloride	mg/kg	760	24	12,000	34	0.2		< 0.0096	< 0.011	< 0.013	< 0.0089	< 0.011
Styrene	mg/kg	410,000	1,500	41,000	430	18		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054
1,1,2,2-Tetrachloroethane	mg/kg	---	---	---	---	---		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054
Tetrachloroethene	mg/kg	110	20	2,400	28	0.3		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054
trans-1,2-Dichloroethene	mg/kg	41,000	3,100	41,000	3,100	3.4		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054
Trichloroethene	mg/kg	520	8.9	1,200	12	0.3		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054
1,1,1-Trichloroethane	mg/kg	---	1,200	---	1,200	9.6		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054
1,1,2-Trichloroethane	mg/kg	8,200	1,800	8,200	1,800	0.3		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054
Vinyl Chloride	mg/kg	7.9	1.1	170	1.1	0.07		< 0.0048	< 0.0056	< 0.0064	< 0.0045	< 0.0054

Table 2 - Terracon Soil Analytical Results - Pesticides and PCBs
4300 West Roosevelt Road, Chicago, IL
A2147008

Analyte	Units	IEPA Tier 1 Soil Remediation Objectives					Sample Identification	B-301	B-301	B-302	B-302	B-303	B-303	B-304
		Industrial/Commercial Properties		Construction Workers		Soil Component of the Groundwater Ingestion Route	Sample Depth (feet)	(1-3)	(4-6)	(1-3)	(6-8)	(1-3)	(6-8)	(1-3)
		Ingestion	Inhalation	Ingestion	Inhalation	Class II	Date Collected	6/10/2016	6/10/2016	6/10/2016	6/10/2016	6/10/2016	6/10/2016	6/10/2016
Pesticide and Aroclors Organic Analytical Parameters														
Aldrin	mg/kg	*0.94*	6.6	6.1	9.3	2.5		--	--	--	--	--	--	--
alpha-BHC	mg/kg	0.9	1.5	20	2.1	*0.0074*		--	--	--	--	--	--	--
alpha-Chlordane	mg/kg	16	140	100	22	48		--	--	--	--	--	--	--
beta-BHC	mg/kg	---	---	---	---	---		--	--	--	--	--	--	--
delta-BHC	mg/kg	---	---	---	---	---		--	--	--	--	--	--	--
Dieldrin	mg/kg	*0.603*	2.2	7.8	3.1	*0.603*		--	--	--	--	--	--	--
4,4'-DDD	mg/kg	24	---	520	---	80		--	--	--	--	--	--	--
4,4'-DDE	mg/kg	17	---	370	---	270		--	--	--	--	--	--	--
4,4'-DDT	mg/kg	17	1,500	100	2,100	160		--	--	--	--	--	--	--
Endosulfan I	mg/kg	12,000	---	1,200	---	90		--	--	--	--	--	--	--
Endosulfan II	mg/kg	12,000	---	1,200	---	90		--	--	--	--	--	--	--
Endosulfan sulfate	mg/kg	12,000	---	1,200	---	90		--	--	--	--	--	--	--
Endrin	mg/kg	610	---	61	---	5.0		--	--	--	--	--	--	--
Endrin aldehyde	mg/kg	610	---	61	---	5.0		--	--	--	--	--	--	--
Endrin ketone	mg/kg	610	---	61	---	5.0		--	--	--	--	--	--	--
gamma-BHC	mg/kg	4.0	---	96	---	0.047		--	--	--	--	--	--	--
gamma-Chlordane	mg/kg	16	140	100	22	48		--	--	--	--	--	--	--
Heptachlor	mg/kg	1.0	11	28	16	110		--	--	--	--	--	--	--
Heptachlor epoxide	mg/kg	1.0	9.2	2.7	13	3.3		--	--	--	--	--	--	--
Methoxychlor	mg/kg	10,000	---	1,000	---	780		--	--	--	--	--	--	--
Toxaphene	mg/kg	5.2	170	110	240	150		--	--	--	--	--	--	--
Aroclor - 1016	mg/kg	---	---	---	---	---		< 0.091	< 0.10	< 0.094	< 0.091	< 0.10	< 0.097	< 0.10
Aroclor - 1221	mg/kg	---	---	---	---	---		< 0.091	< 0.10	< 0.094	< 0.091	< 0.10	< 0.097	< 0.10
Aroclor - 1232	mg/kg	---	---	---	---	---		< 0.091	< 0.10	< 0.094	< 0.091	< 0.10	< 0.097	< 0.10
Aroclor - 1242	mg/kg	---	---	---	---	---		< 0.091	< 0.10	< 0.094	< 0.091	< 0.10	< 0.097	< 0.10
Aroclor - 1248	mg/kg	---	---	---	---	---		< 0.091	< 0.10	< 0.094	< 0.091	< 0.10	< 0.097	< 0.10
Aroclor - 1254	mg/kg	---	---	---	---	---		< 0.091	< 0.10	< 0.094	< 0.091	< 0.10	< 0.097	< 0.10
Aroclor - 1260	mg/kg	---	---	---	---	---		< 0.091	< 0.10	< 0.094	< 0.091	< 0.10	< 0.097	< 0.10
Polychlorinated Biphenyls (PCBs)	mg/kg	1.0	---	1.0	---	---		<0.637	<0.70	<0.658	<0.637	<0.70	<0.679	<0.70

Table 2 - Terracon Soil Analytical Results - Pesticides and PCBs
4300 West Roosevelt Road, Chicago, IL
A2147008

Analyte	Units	IEPA Tier 1 Soil Remediation Objectives					Sample Identification	B-304	B-305	B-305
		Industrial/Commercial Properties		Construction Workers		Soil Component of the Groundwater Ingestion Route	Sample Depth (feet)	(6-8)	(1-3)	(4-6)
		Ingestion	Inhalation	Ingestion	Inhalation	Class II	Date Collected	6/10/2016	6/10/2016	6/10/2016
Pesticide and Aroclors Organic Analytical Parameters										
Aldrin	mg/kg	*0.94*	6.6	6.1	9.3	2.5		--	--	--
alpha-BHC	mg/kg	0.9	1.5	20	2.1	*0.0074*		--	--	--
alpha-Chlordane	mg/kg	16	140	100	22	48		--	--	--
beta-BHC	mg/kg	---	---	---	---	---		--	--	--
delta-BHC	mg/kg	---	---	---	---	---		--	--	--
Dieldrin	mg/kg	*0.603*	2.2	7.8	3.1	*0.603*		--	--	--
4,4'-DDD	mg/kg	24	---	520	---	80		--	--	--
4,4'-DDE	mg/kg	17	---	370	---	270		--	--	--
4,4'-DDT	mg/kg	17	1,500	100	2,100	160		--	--	--
Endosulfan I	mg/kg	12,000	---	1,200	---	90		--	--	--
Endosulfan II	mg/kg	12,000	---	1,200	---	90		--	--	--
Endosulfan sulfate	mg/kg	12,000	---	1,200	---	90		--	--	--
Endrin	mg/kg	610	---	61	---	5.0		--	--	--
Endrin aldehyde	mg/kg	610	---	61	---	5.0		--	--	--
Endrin ketone	mg/kg	610	---	61	---	5.0		--	--	--
gamma-BHC	mg/kg	4.0	---	96	---	0.047		--	--	--
gamma-Chlordane	mg/kg	16	140	100	22	48		--	--	--
Heptachlor	mg/kg	1.0	11	28	16	110		--	--	--
Heptachlor epoxide	mg/kg	1.0	9.2	2.7	13	3.3		--	--	--
Methoxychlor	mg/kg	10,000	---	1,000	---	780		--	--	--
Toxaphene	mg/kg	5.2	170	110	240	150		--	--	--
Aroclor - 1016	mg/kg	---	---	---	---	---		< 0.097	< 0.10	< 0.097
Aroclor - 1221	mg/kg	---	---	---	---	---		< 0.097	< 0.10	< 0.097
Aroclor - 1232	mg/kg	---	---	---	---	---		< 0.097	< 0.10	< 0.097
Aroclor - 1242	mg/kg	---	---	---	---	---		< 0.097	< 0.10	< 0.097
Aroclor - 1248	mg/kg	---	---	---	---	---		< 0.097	< 0.10	< 0.097
Aroclor - 1254	mg/kg	---	---	---	---	---		< 0.097	< 0.10	< 0.097
Aroclor - 1260	mg/kg	---	---	---	---	---		< 0.097	< 0.10	< 0.097
Polychlorinated Biphenyls (PCBs)	mg/kg	1.0	---	1.0	---	---		<0.679	<0.70	<0.679

Table 3 - Terracon Soil Analytical Results - Inorganics
4300 West Roosevelt Road, Chicago, IL
A2147008

Analyte	Units	IEPA Tier 1 Soil Remediation Objectives				Background	Sample Identification	B-301	B-302	B-303	B-304	B-305
		Industrial/Commercial Properties		Construction Workers			Sample Depth (feet)	(1-3)	(1-3)	(1-3)	(6-8)	(1-3)
		Ingestion	Inhalation	Ingestion	Inhalation	Chicago	Date Collected	6/10/2016	6/10/2016	6/10/2016	6/10/2016	6/10/2016
Inorganic Analytical Parameters												
Arsenic	mg/kg	13	1,200	61	25,000	13		--	--	--	--	--
Barium	mg/kg	140,000	910,000	14,000	870,000	110		--	--	--	--	--
Cadmium	mg/kg	2,000	2,800	200	59,000	0.6		--	--	--	--	--
Chromium, total	mg/kg	6,100	420	4,100	690	16.2		--	--	--	--	--
Chromium, ion, hexavalent	mg/kg	6,100	420	4,100	690	---		--	--	--	--	--
Lead	mg/kg	800	---	700	---	36		290	370	340	18	130
Mercury	mg/kg	610	16	61	0.1	0.06		--	--	--	--	--
Selenium	mg/kg	10,000	---	1,000	---	0.48		--	--	--	--	--
Silver	mg/kg	10,000	---	1,000	---	0.55		--	--	--	--	--
Aluminum	mg/kg	1,000,000	1,000,000	410,000	870,000	9,500		4200	9000	12000	12000	12000
Antimony	mg/kg	820	---	82	---	4.0		--	--	--	--	--
Beryllium	mg/kg	4,100	2,100	410	44,000	0.59		--	--	--	--	--
Calcium	mg/kg	---	---	---	---	9,300		--	--	--	--	--
Cobalt	mg/kg	120,000	---	12,000	---	8.9		--	--	--	--	--
Copper	mg/kg	82,000	---	8,200	---	19.6		87	2500	270	30	140
Cyanide	mg/kg	41,000	---	4,100	---	0.51		--	--	--	--	--
Iron	mg/kg	1,000,000	---	---	---	15,900		--	--	--	--	--
Magnesium	mg/kg	---	---	730,000	---	4,820		9300	4100	26000	23000	18000
Manganese	mg/kg	41,000	91,000	4,100	8,700	636		--	--	--	--	--
Nickel	mg/kg	41,000	21,000	4,100	440,000	18		20	200	41	41	37
Potassium	mg/kg	---	---	---	---	1,268		--	--	--	--	--
Sodium	mg/kg	---	---	---	---	130		--	--	--	--	--
Thallium	mg/kg	160	---	160	---	0.32		--	--	--	--	--
Vanadium	mg/kg	14,000	---	1,400	---	25.2		--	--	--	--	--
Zinc	mg/kg	610,000	---	61,000	---	95		500	560	480	59	700

Table 4 - Terracon Soil Analytical Results - pH-Specific Compounds
4300 West Roosevelt Road, Chicago, IL
A2147008

Analyte	Units	Background	pH-Specific Tier 1 SROs				Sample Identification	B-301	B-302	B-303	B-304	B-305
			Class II				Sample Depth (feet)	(1-3)	(1-3)	(1-3)	(6-8)	(1-3)
			6.9	7.25	7.75	8.25	Date Collected	6/10/2016	6/10/2016	6/10/2016	6/10/2016	6/10/2016
		Chicago	7.24	7.74	8.24	8.74						
pH-Specific Compounds							**pH**	7.5	7.1	8.4	7.8	8.4
Arsenic	mg/kg	13	120	120	120	130		--	--	--	--	--
Barium	mg/kg	110	1,700	1,800	2,100	---		--	--	--	--	--
Cadmium	mg/kg	0.6	110	590	4,300	---		--	--	--	--	--
Chromium, total *	mg/kg	16.2	36	32	28	24		--	--	--	--	--
Chromium, ion, hexavalent	mg/kg	---	36	32	28	24		--	--	--	--	--
Lead	mg/kg	36	1,420	1,420	1,420	1,420		**290**	**370**	**340**	18	**130**
Mercury	mg/kg	0.06	16	32	40	---		--	--	--	--	--
Selenium	mg/kg	0.48	4.5	3.3	2.4	1.8		--	--	--	--	--
Silver *	mg/kg	0.55	13	39	110	---		--	--	--	--	--
Aluminum	mg/kg	9,500	---	---	---	---		4200	9000	**12000**	**12000**	**12000**
Antimony	mg/kg	4.0	20	20	20	20		--	--	--	--	--
Beryllium	mg/kg	0.59	17,000	130,000	1,000,000	---		--	--	--	--	--
Calcium	mg/kg	9,300	---	---	---	---		--	--	--	--	--
Cobalt	mg/kg	8.9	---	---	---	---		--	--	--	--	--
Copper	mg/kg	19.6	200,000	330,000	330,000	---		**87**	**2500**	**270**	**30**	**140**
Cyanide	mg/kg	0.51	120	120	120	120		--	--	--	--	--
Iron	mg/kg	15,900	---	---	---	---		--	--	--	--	--
Magnesium	mg/kg	4,820	---	---	---	---		**9300**	4100	**26000**	**23000**	**18000**
Manganese	mg/kg	636	---	---	---	---		--	--	--	--	--
Nickel	mg/kg	18	3,500	14,000	76,000	---		**20**	**200**	**41**	**41**	**37**
Potassium	mg/kg	1,268	---	---	---	---		--	--	--	--	--
Sodium	mg/kg	130	---	---	---	---		--	--	--	--	--
Thallium	mg/kg	0.32	30	34	38	44		--	--	--	--	--
Vanadium *	mg/kg	25.2	980	980	980	980		--	--	--	--	--
Zinc	mg/kg	95	15,000	32,000	110,000	---		**500**	**560**	**480**	59	**700**

Table 5 - Terracon Soil Analytical Results - SPLP
4300 West Roosevelt Road, Chicago, IL
A2147008

Analyte	Units	Tier 1 Groundwater Remediation Objectives	Hazardous Waste	Sample Identification	SB14A *	SP SEC *	B-203 *	B-205 *	B-206 *	B-207 *	B-305
			Toxicity Characteristic (35 IAC 721.124)	Sample Depth (feet)	0-3'	0-3'	(1-3)	(1-3)	(6-8)	(1-3)	(1-3)
		Class II	mg/L	Date Collected	2/1/2003	2/1/2003	11/20/2014	11/20/2014	11/19/2014	11/19/2014	6/10/2016
SPLP Inorganic Analytical Parameters											
Aluminum	mg/L	5.0	---		--	--	0.84	--	--	--	--
Beryllium	mg/L	0.5	---		--	--	< 0.0020	--	--	--	--
Cadmium	mg/L	0.05	---		--	--	--	--	--	< 0.0020	--
Copper	mg/L	0.65	---		--	--	--	< 0.020	--	--	--
Iron	mg/L	5.0	---		--	--	--	--	0.67	--	--
Lead	mg/L	0.10	---		0.022	0.011	--	--	--	< 0.0020	--
Manganese	mg/L	10.0	---		--	--	< 0.0040	--	--	--	--
Mercury	mg/L	0.01	---		--	--	--	--	--	< 0.00025	--
Nickel	mg/L	2.0	---		--	--	--	< 0.0080	--	--	--
Silver	mg/L	0.05	---		--	--	--	--	--	< 0.0040	--
Thallium	mg/L	0.02	---		--	--	< 0.0020	--	--	--	--
Vanadium	mg/L	0.1	---		--	--	--	< 0.0040	--	--	--
Zinc	mg/L	10.0	---		--	--	--	< 0.020	--	--	0.37
Cyanide	mg/L	0.6	---		--	--	--	< 0.0050	--	--	--

* Data Previously Reported in 2015 CSI/ROR/RAP

Table 6 - Terracon Soil Gas Analytical Results
4300 West Roosevelt, Chicago, IL
Project Number: A2147008

Volatile Chemical	Units	Soil Gas Tier 1 Remediation Objectives			Sample Identification	SG-202*	SG-203*	SG-205*
		OUTDOOR Inhalation Exposure Route		INDOOR Inhalation Exposure Route	Sample Depth (feet)	4'	4'	5'
				Diffusion and Advection	Date Collected	11/21/2014	11/21/2014	11/21/2014
		Industrial / Commercial	Construction Workers	Industrial / Commercial				
Volatile Organic Analytical Parameters								
Benzene	mg/m^3	800	1,100	2.8		0.062	< 0.13	0.059
Toluene	mg/m^3	140,000	50,000	40,000		0.032	< 0.18	0.019
Ethylbenzene	mg/m^3	59,000	8,500	9.3		0.0036	< 0.20	0.0055
Xylenes (total)	mg/m^3	49,000	2,900	840		0.0140	< 0.58	0.018
Methyl Tertiary-Butyl Ether	mg/m^3	1,200,000	23,000	24,000		< 0.0012	< 0.16	< 0.0013
Acetone	mg/m^3	750,000	750,000	750,000		< 0.0080	< 1.1	0.0250
Bromodichloromethane	mg/m^3	450,000	450,000	450,000		< 0.0022	< 0.29	< 0.0024
Bromoform	mg/m^3	3,500	4,900	52		< 0.0087	< 1.2	< 0.0094
Bromomethane	mg/m^3	19,000	2,400	42		< 0.0032	< 0.42	< 0.0034
2-Butanone	mg/m^3	380,000	15,000	40,000		0.0034	< 0.34	0.0085
Carbon Disulfide	mg/m^3	1,500,000	48,000	5,300		0.12	< 0.14	0.64
Carbon Tetrachloride	mg/m^3	550	770	1.5		< 0.0022	< 0.29	< 0.0024
Chlorobenzene	mg/m^3	57,000	3,700	420		< 0.0015	< 0.20	< 0.0016
Chloroform	mg/m^3	200	290	0.92		< 0.0017	< 0.22	0.0028
cis-1,2-Dichloroethene	mg/m^3	1,100,000	1,100,000	1,100,000		1.7	2.7	15
Dibromochloromethane	mg/m^3	57,000	150	57,000		< 0.0028	< 0.38	< 0.0031
1,1-Dichloroethane	mg/m^3	1,300,000	90,000	4,200		< 0.0013	< 0.18	< 0.0015
1,2-Dichloroethane	mg/m^3	130	180	0.81		< 0.0013	< 0.18	< 0.0015
1,1-Dichloroethene	mg/m^3	820,000	5,300	1,600		0.037	< 0.18	0.1
1,2-Dichloropropane	mg/m^3	470	110	2.3		< 0.0015	< 0.20	< 0.0016
1,3-Dichloropropene (cis + trans)	mg/m^3	3,700	1,400	6.2		< 0.0015	< 0.20	< 0.0016
Methylene Chloride	mg/m^3	12,000	5,100	45		< 0.012	< 1.5	< 0.013
Styrene	mg/m^3	34,000	16,000	8,500		< 0.0015	< 0.20	< 0.0016
Tetrachloroethene	mg/m^3	690	970	4.0		0.32	65	0.19
trans-1,2-Dichloroethene	mg/m^3	190,000	12,000	510		0.18	< 0.18	2.5
Trichloroethene	mg/m^3	3,300	1,500	12		0.044	2.4	1.8
1,1,1-Trichloroethane	mg/m^3	870,000	89,000	41,000		< 0.0018	< 0.25	< 0.0020
1,1,2-Trichloroethane	mg/m^3	170,000	170,000	170,000		< 0.0018	< 0.25	< 0.0020
Vinyl Chloride	mg/m^3	3,000	3,000	4.8		56	2.9	5.8

* Data Previously Reported in 2015 CSI/ROR/RAP

Table 6 - Terracon Soil Gas Analytical Results
4300 West Roosevelt, Chicago, IL
Project Number: A2147008

Volatile Chemical	Units	Soil Gas Tier 1 Remediation Objectives			Sample Identification	SG-401	SG-402	SG-403
		OUTDOOR Inhalation Exposure Route		INDOOR Inhalation Exposure Route	Sample Depth (feet)	4'	4'	4'
				Diffusion and Advection	Date Collected	6/13/2016	6/13/2016	6/13/2016
		Industrial / Commercial	Construction Workers	Industrial / Commercial				
Volatile Organic Analytical Parameters								
Benzene	mg/m^3	800	1,100	2.8		0.011	0.022	0.0089
Toluene	mg/m^3	140,000	50,000	40,000		0.049	0.6	0.2
Ethylbenzene	mg/m^3	59,000	8,500	9.3		0.0098	0.0590	0.0210
Xylenes (total)	mg/m^3	49,000	2,900	840		0.044	0.28	0.093
Methyl Tertiary-Butyl Ether	mg/m^3	1,200,000	23,000	24,000		< 0.0014	< 0.0013	< 0.0013
Acetone	mg/m^3	750,000	750,000	750,000		1.3	0.0098	0.031
Bromodichloromethane	mg/m^3	450,000	450,000	450,000		< 0.0026	< 0.0024	< 0.0024
Bromoform	mg/m^3	3,500	4,900	52		< 0.010	< 0.0098	< 0.0096
Bromomethane	mg/m^3	19,000	2,400	42		< 0.0037	< 0.0036	< 0.0035
2-Butanone	mg/m^3	380,000	15,000	40,000		0.1500	< 0.0028	< 0.0028
Carbon Disulfide	mg/m^3	1,500,000	48,000	5,300		0.11	0.12	0.0620
Carbon Tetrachloride	mg/m^3	550	770	1.5		< 0.0026	< 0.0024	< 0.0024
Chlorobenzene	mg/m^3	57,000	3,700	420		< 0.0018	< 0.0017	< 0.0017
Chloroform	mg/m^3	200	290	0.92		0.0094	< 0.0019	< 0.0019
cis-1,2-Dichloroethene	mg/m^3	1,100,000	1,100,000	1,100,000		0.11	0.019	< 0.0015
Dibromochloromethane	mg/m^3	57,000	150	57,000		< 0.0033	< 0.0032	< 0.0031
1,1-Dichloroethane	mg/m^3	1,300,000	90,000	4,200		< 0.0016	< 0.0015	< 0.0015
1,2-Dichloroethane	mg/m^3	130	180	0.81		< 0.0016	< 0.0015	< 0.0015
1,1-Dichloroethene	mg/m^3	820,000	5,300	1,600		< 0.0016	< 0.0015	< 0.0015
1,2-Dichloropropane	mg/m^3	470	110	2.3		< 0.0018	< 0.0017	< 0.0017
1,3-Dichloropropene (cis + trans)	mg/m^3	3,700	1,400	6.2		< 0.0018	< 0.0017	< 0.0017
Methylene Chloride	mg/m^3	12,000	5,100	45		< 0.014	< 0.013	< 0.013
Styrene	mg/m^3	34,000	16,000	8,500		< 0.0018	< 0.0017	< 0.0017
Tetrachloroethene	mg/m^3	690	970	4.0		0.015	0.56	0.0064
trans-1,2-Dichloroethene	mg/m^3	190,000	12,000	510		0.017	0.0043	< 0.0015
Trichloroethene	mg/m^3	3,300	1,500	12		3.20	0.1100	< 0.0020
1,1,1-Trichloroethane	mg/m^3	870,000	89,000	41,000		< 0.0022	< 0.0021	< 0.0020
1,1,2-Trichloroethane	mg/m^3	170,000	170,000	170,000		< 0.0022	< 0.0021	< 0.0020
Vinyl Chloride	mg/m^3	3,000	3,000	4.8		< 0.00098	< 0.00094	< 0.00093

Table 6 - Terracon Soil Gas Analytical Results
4300 West Roosevelt, Chicago, IL
Project Number: A2147008

Volatile Chemical	Units	Soil Gas Tier 1 Remediation Objectives			Sample Identification	SG-404	SG-405	SG-406
		OUTDOOR Inhalation Exposure Route		INDOOR Inhalation Exposure Route	Sample Depth (feet)	3.5'	4'	5'
				Diffusion and Advection	Date Collected	6/13/2016	6/13/2016	6/13/2016
		Industrial / Commercial	Construction Workers	Industrial / Commercial				
Volatile Organic Analytical Parameters								
Benzene	mg/m^3	800	1,100	2.8		0.0041	0.18	0.06
Toluene	mg/m^3	140,000	50,000	40,000		0.049	1.5	0.34
Ethylbenzene	mg/m^3	59,000	8,500	9.3		0.0120	0.071	0.038
Xylenes (total)	mg/m^3	49,000	2,900	840		0.056	0.31	0.13
Methyl Tertiary-Butyl Ether	mg/m^3	1,200,000	23,000	24,000		< 0.0013	< 0.018	< 0.0014
Acetone	mg/m^3	750,000	750,000	750,000		0.072	0.97	0.21
Bromodichloromethane	mg/m^3	450,000	450,000	450,000		< 0.0024	< 0.033	< 0.0026
Bromoform	mg/m^3	3,500	4,900	52		< 0.0096	< 0.066	< 0.011
Bromomethane	mg/m^3	19,000	2,400	42		< 0.0035	< 0.048	< 0.0038
2-Butanone	mg/m^3	380,000	15,000	40,000		0.0053	0.1300	0.022
Carbon Disulfide	mg/m^3	1,500,000	48,000	5,300		0.0410	0.5000	0.25
Carbon Tetrachloride	mg/m^3	550	770	1.5		< 0.0024	< 0.033	0.0076
Chlorobenzene	mg/m^3	57,000	3,700	420		< 0.0017	< 0.011	< 0.0018
Chloroform	mg/m^3	200	290	0.92		< 0.0018	< 0.026	0.0083
cis-1,2-Dichloroethene	mg/m^3	1,100,000	1,100,000	1,100,000		0.0021	6	0.015
Dibromochloromethane	mg/m^3	57,000	150	57,000		< 0.0031	< 0.043	< 0.0034
1,1-Dichloroethane	mg/m^3	1,300,000	90,000	4,200		< 0.0015	< 0.020	0.004
1,2-Dichloroethane	mg/m^3	130	180	0.81		< 0.0015	< 0.020	< 0.0016
1,1-Dichloroethene	mg/m^3	820,000	5,300	1,600		< 0.0015	0.0260	< 0.0016
1,2-Dichloropropane	mg/m^3	470	110	2.3		< 0.0017	< 0.023	< 0.0018
1,3-Dichloropropene (cis + trans)	mg/m^3	3,700	1,400	6.2		< 0.0017	< 0.023	< 0.0018
Methylene Chloride	mg/m^3	12,000	5,100	45		< 0.013	< 0.18	< 0.014
Styrene	mg/m^3	34,000	16,000	8,500		0.0017	< 0.011	0.0044
Tetrachloroethene	mg/m^3	690	970	4.0		0.9	1	0.17
trans-1,2-Dichloroethene	mg/m^3	190,000	12,000	510		< 0.0015	0.46	0.0023
Trichloroethene	mg/m^3	3,300	1,500	12		0.0640	0.47	0.0058
1,1,1-Trichloroethane	mg/m^3	870,000	89,000	41,000		< 0.0020	< 0.028	0.013
1,1,2-Trichloroethane	mg/m^3	170,000	170,000	170,000		< 0.0020	< 0.028	< 0.0022
Vinyl Chloride	mg/m^3	3,000	3,000	4.8		< 0.00092	2.9	0.11

Table 6 - Terracon Soil Gas Analytical Results
4300 West Roosevelt, Chicago, IL
Project Number: A2147008

Volatile Chemical	Units	Soil Gas Tier 1 Remediation Objectives			Sample Identification	SG-202	SG-203	SG-205
		OUTDOOR Inhalation Exposure Route		INDOOR Inhalation Exposure Route	Sample Depth (feet)	4'	4'	5'
				Diffusion and Advection	Date Collected	11/21/2014	11/21/2014	11/21/2014
		Industrial / Commercial	Construction Workers	Industrial / Commercial				
Semivolatile Organic Analytical Parameters								
Naphthalene	mg/m^3	620	5.8	0.75		< 0.0017	0.37	< 0.0018
1,2-Dichlorobenzene	mg/m^3	11,000	6,700	1,700		< 0.0020	< 0.27	< 0.0022
1,4-Dichlorobenzene	mg/m^3	8,400	6,400	6,800		< 0.0020	< 0.27	< 0.0022
1,2,4-Trichlorobenzene	mg/m^3	1,600	110	25		< 0.0025	< 0.34	< 0.0027
Other Constituents in TACO								
1,2-Dibromoethane	mg/m^3	5.6	7.9	0.048		< 0.0025	< 0.34	< 0.0027
Dichlorodifluoromethane	mg/m^3	1400000	92000	1700		0.0018	< 0.22	0.0023
p-Dioxane	mg/m^3	30	42	2.3		< 0.0030	< 0.40	< 0.0033
Trichlorofluoromethane	mg/m^3	3400000	220000	5600		< 0.0018	< 0.25	0.071
Vinyl acetate	mg/m^3	250000	1600	1600		< 0.012	< 1.6	0.1
m-Xylene	mg/m^3	52000	3100	850		0.0099	< 0.38	0.012
o-Xylene	mg/m^3	41000	2600	790		0.0037	< 0.20	0.0057

Table 6 - Terracon Soil Gas Analytical Results
4300 West Roosevelt, Chicago, IL
Project Number: A2147008

Volatile Chemical	Units	Soil Gas Tier 1 Remediation Objectives			Sample Identification	SG-401	SG-402	SG-403
		OUTDOOR Inhalation Exposure Route		INDOOR Inhalation Exposure Route	Sample Depth (feet)	4'	4'	4'
				Diffusion and Advection	Date Collected	6/13/2016	6/13/2016	6/13/2016
		Industrial / Commercial	Construction Workers	Industrial / Commercial				
Semivolatile Organic Analytical Parameters								
Naphthalene	mg/m^3	620	5.8	0.75		0.0026	< 0.0019	< 0.0019
1,2-Dichlorobenzene	mg/m^3	11,000	6,700	1,700		< 0.0024	< 0.0023	< 0.0022
1,4-Dichlorobenzene	mg/m^3	8,400	6,400	6,800		< 0.0024	< 0.0023	< 0.0022
1,2,4-Trichlorobenzene	mg/m^3	1,600	110	25		< 0.0029	< 0.0028	< 0.0028
Other Constituents in TACO								
1,2-Dibromoethane	mg/m^3	5.6	7.9	0.048		< 0.0029	< 0.0028	< 0.0028
Dichlorodifluoromethane	mg/m^3	1400000	92000	1700		0.0024	0.002	0.002
p-Dioxane	mg/m^3	30	42	2.3		< 0.0035	< 0.0034	< 0.0033
Trichlorofluoromethane	mg/m^3	3400000	220000	5600		< 0.0022	0.0029	0.0021
Vinyl acetate	mg/m^3	250000	1600	1600		< 0.014	< 0.013	< 0.013
m-Xylene	mg/m^3	52000	3100	850		0.031	0.21	0.07
o-Xylene	mg/m^3	41000	2600	790		0.013	0.067	0.023

Table 6 - Terracon Soil Gas Analytical Results
4300 West Roosevelt, Chicago, IL
Project Number: A2147008

Volatile Chemical	Units	Soil Gas Tier 1 Remediation Objectives			Sample Identification	SG-404	SG-405	SG-406
		OUTDOOR Inhalation Exposure Route		INDOOR Inhalation Exposure Route	Sample Depth (feet)	3.5'	4'	5'
				Diffusion and Advection	Date Collected	6/13/2016	6/13/2016	6/13/2016
		Industrial / Commercial	Construction Workers	Industrial / Commercial				
Semivolatile Organic Analytical Parameters								
Naphthalene	mg/m^3	620	5.8	0.75		< 0.0018	< 0.013	0.14
1,2-Dichlorobenzene	mg/m^3	11,000	6,700	1,700		< 0.0022	< 0.015	< 0.0024
1,4-Dichlorobenzene	mg/m^3	8,400	6,400	6,800		< 0.0022	< 0.015	< 0.0024
1,2,4-Trichlorobenzene	mg/m^3	1,600	110	25		< 0.0028	< 0.019	< 0.0030
Other Constituents in TACO								
1,2-Dibromoethane	mg/m^3	5.6	7.9	0.048		< 0.0028	< 0.038	< 0.0030
Dichlorodifluoromethane	mg/m^3	1400000	92000	1700		0.0021	< 0.026	0.0024
p-Dioxane	mg/m^3	30	42	2.3		< 0.0033	< 0.046	< 0.0036
Trichlorofluoromethane	mg/m^3	3400000	220000	5600		< 0.0020	< 0.028	0.0051
Vinyl acetate	mg/m^3	250000	1600	1600		< 0.013	< 0.18	< 0.014
m-Xylene	mg/m^3	52000	3100	850		0.041	0.230	0.095
o-Xylene	mg/m^3	41000	2600	790		0.015	0.08	0.032

Table Notes

Remediation Objectives from 35 Illinois Administrative Code Chapter 742: *Tiered Approach to Corrective Action Objectives* (TACO).

mg/kg = milligrams per kilogram, generally equivalent to ppm

mg/L = milligrams per liter, generally equivalent to parts per million (ppm)

mg/m3 = milligrams per cubic meter of air

SPLP = Synthetic Precipitation Leaching Procedure

-- = Sample not analyzed for this constituent

--- = No IEPA Remediation Objective for this exposure route.

Bold = Inorganic analyte concentrations above background concentrations.

Italicized Tier 1 ROs were changed to laboratory Accepted Detection Limits (ADL) per 35 IAC 742.510 a) 8.

* In pH-specific table, hexavalent chromium used as RO for total chromium to allow for a conservative comparison.
Since no Class II pH-specific Ros exist for chromium, silver, and vanadium, conservative Class I Ros used for comparison

= Highlighted cell indicates exceedance of Tier 1 Remedial Objective value.
Background considered SRO value for many PNA constituents.

Attachment 7 – Laboratory Analytical Reports

STAT Analysis Corporation
2242 West Harrison St., Suite 200, Chicago, IL 60612-3766
Tel: (312) 733-0551 Fax: (312) 733-2386 STATinfo@STATAnalysis.com
Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

June 28, 2016

Terracon Consultants, Inc.
135 Ambassador Drive
Naperville, IL 60540
Telephone: (630) 717-4263
Fax: (630) 357-9489

Analytical Report for STAT Work Order: 16060406 Revision 1

RE: A2147008, 4300 West Roosevelt Road, Chicago, IL

Dear Richard O'Brien:

STAT Analysis received 10 samples for the referenced project on 6/10/2016 2:25:00 PM. The analytical results are presented in the following report.

This report is revised to reflect additional analysis requested after the last report revision.

All analyses were performed in accordance with the requirements of 35 IAC Part 186 / NELAC standards. Analyses were performed in accordance with methods as referenced on the analytical report. Those analytical results expressed on a dry weight basis are also noted on the analytical report.

All analyses were performed within established holding time criteria, and all Quality Control criteria met EPA or laboratory specifications except when noted in the Case Narrative or Analytical Report. If required, an estimate of uncertainty for the analyses can be provided. A listing of accredited methods/parameters can also be provided.

Thank you for the opportunity to serve you and I look forward to working with you in the future. If you have any questions regarding the enclosed materials, please contact me at (312) 733-0551.

Sincerely,

Justice Kwateng
Project Manager

STAT **Analysis Corporation**

Date: June 28, 2016

Client: Terracon Consultants, Inc.
Project: A2147008, 4300 West Roosevelt Road, Chicago, IL
Work Order: 16060406 Revision 1

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Tag Number	Collection Date	Date Received
16060406-001A	B-303 (1-3)		6/10/2016 8:45:00 AM	6/10/2016
16060406-001B	B-303 (1-3)		6/10/2016 8:45:00 AM	6/10/2016
16060406-002A	B-303 (6-8)		6/10/2016 8:45:00 AM	6/10/2016
16060406-003A	B-302 (1-3)		6/10/2016 9:05:00 AM	6/10/2016
16060406-003B	B-302 (1-3)		6/10/2016 9:05:00 AM	6/10/2016
16060406-004A	B-302 (6-8)		6/10/2016 9:05:00 AM	6/10/2016
16060406-005A	B-301 (1-3)		6/10/2016 9:30:00 AM	6/10/2016
16060406-005B	B-301 (1-3)		6/10/2016 9:30:00 AM	6/10/2016
16060406-006A	B-301 (4-6)		6/10/2016 9:30:00 AM	6/10/2016
16060406-007A	B-304 (1-3)		6/10/2016 10:10:00 AM	6/10/2016
16060406-008A	B-304 (6-8)		6/10/2016 10:10:00 AM	6/10/2016
16060406-008B	B-304 (6-8)		6/10/2016 10:10:00 AM	6/10/2016
16060406-009A	B-305 (1-3)		6/10/2016 10:45:00 AM	6/10/2016
16060406-009B	B-305 (1-3)		6/10/2016 10:45:00 AM	6/10/2016
16060406-010A	B-305 (4-6)		6/10/2016 10:45:00 AM	6/10/2016

CLIENT:	Terracon Consultants, Inc.
Project:	A2147008, 4300 West Roosevelt Road, Chicago, IL
Work Order:	16060406 Revision 1

CASE NARRATIVE

The metals Matrix Spike Duplicate (MSD) prepared from sample B-303 (1-3) (16060406-001) had Copper recovery outside control limits (147% (MSD) recovery, QC limits 75-125%. The MS/MSD had recovery of other analytes outside of control limits, however the analyte concentration in the sample was greater than four times the spiking level for those elements.

STAT **Analysis Corporation**
2242 West Harrison St., Suite 200, Chicago, IL 60612-3766
Tel: (312) 733-0551 Fax: (312) 733-2386 STATinfo@STATAnalysis.com
Accreditations:IEPA ELAP 100445;ORELAP IL300001;AIHA-LAP, LLC 101160;NVLAP LabCode 101202-0

Date Reported: June 28, 2016
Date Printed: June 28, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Work Order: 16060406 Revision 1
Project: A2147008, 4300 West Roosevelt Road, Chicago, I
Lab ID: 16060406-001

Client Sample ID: B-303 (1-3)
Collection Date: 6/10/2016 8:45:00 AM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds by GC/MS	**SW5035/8260B**			Prep Date: **6/13/2016**		Analyst: **ART**
Acetone	ND	0.096		mg/Kg-dry	1	6/14/2016
Benzene	ND	0.0064		mg/Kg-dry	1	6/14/2016
Bromodichloromethane	ND	0.0064		mg/Kg-dry	1	6/14/2016
Bromoform	ND	0.0064		mg/Kg-dry	1	6/14/2016
Bromomethane	ND	0.013		mg/Kg-dry	1	6/14/2016
2-Butanone	ND	0.096		mg/Kg-dry	1	6/14/2016
Carbon disulfide	ND	0.064		mg/Kg-dry	1	6/14/2016
Carbon tetrachloride	ND	0.0064		mg/Kg-dry	1	6/14/2016
Chlorobenzene	ND	0.0064		mg/Kg-dry	1	6/14/2016
Chloroethane	ND	0.013		mg/Kg-dry	1	6/14/2016
Chloroform	ND	0.0064		mg/Kg-dry	1	6/14/2016
Chloromethane	ND	0.013		mg/Kg-dry	1	6/14/2016
Dibromochloromethane	ND	0.0064		mg/Kg-dry	1	6/14/2016
1,1-Dichloroethane	ND	0.0064		mg/Kg-dry	1	6/14/2016
1,2-Dichloroethane	ND	0.0064		mg/Kg-dry	1	6/14/2016
1,1-Dichloroethene	ND	0.0064		mg/Kg-dry	1	6/14/2016
cis-1,2-Dichloroethene	ND	0.0064		mg/Kg-dry	1	6/14/2016
trans-1,2-Dichloroethene	ND	0.0064		mg/Kg-dry	1	6/14/2016
1,2-Dichloropropane	ND	0.0064		mg/Kg-dry	1	6/14/2016
cis-1,3-Dichloropropene	ND	0.0026		mg/Kg-dry	1	6/14/2016
trans-1,3-Dichloropropene	ND	0.0026		mg/Kg-dry	1	6/14/2016
Ethylbenzene	ND	0.0064		mg/Kg-dry	1	6/14/2016
2-Hexanone	ND	0.026		mg/Kg-dry	1	6/14/2016
4-Methyl-2-pentanone	ND	0.026		mg/Kg-dry	1	6/14/2016
Methylene chloride	ND	0.013		mg/Kg-dry	1	6/14/2016
Methyl tert-butyl ether	ND	0.0064		mg/Kg-dry	1	6/14/2016
Styrene	ND	0.0064		mg/Kg-dry	1	6/14/2016
1,1,2,2-Tetrachloroethane	ND	0.0064		mg/Kg-dry	1	6/14/2016
Tetrachloroethene	ND	0.0064		mg/Kg-dry	1	6/14/2016
Toluene	ND	0.0064		mg/Kg-dry	1	6/14/2016
1,1,1-Trichloroethane	ND	0.0064		mg/Kg-dry	1	6/14/2016
1,1,2-Trichloroethane	ND	0.0064		mg/Kg-dry	1	6/14/2016
Trichloroethene	ND	0.0064		mg/Kg-dry	1	6/14/2016
Vinyl chloride	ND	0.0064		mg/Kg-dry	1	6/14/2016
Xylenes, Total	ND	0.019		mg/Kg-dry	1	6/14/2016
PCBs	**SW8082 (SW3550B)**			Prep Date: **6/14/2016**		Analyst: **GVC**
Aroclor 1016	ND	0.10		mg/Kg-dry	1	6/14/2016
Aroclor 1221	ND	0.10		mg/Kg-dry	1	6/14/2016

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter
RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

STAT **Analysis Corporation**
2242 West Harrison St., Suite 200, Chicago, IL 60612-3766
Tel: (312) 733-0551 Fax: (312) 733-2386 STATinfo@STATAnalysis.com
Accreditations:IEPA ELAP 100445;ORELAP IL300001;AIHA-LAP, LLC 101160;NVLAP LabCode 101202-0

Date Reported: June 28, 2016
Date Printed: June 28, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Work Order: 16060406 Revision 1
Project: A2147008, 4300 West Roosevelt Road, Chicago, I
Lab ID: 16060406-001

Client Sample ID: B-303 (1-3)
Collection Date: 6/10/2016 8:45:00 AM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
PCBs	**SW8082 (SW3550B)**			Prep Date: **6/14/2016**		Analyst: **GVC**
Aroclor 1232	ND	0.10		mg/Kg-dry	1	6/14/2016
Aroclor 1242	ND	0.10		mg/Kg-dry	1	6/14/2016
Aroclor 1248	ND	0.10		mg/Kg-dry	1	6/14/2016
Aroclor 1254	ND	0.10		mg/Kg-dry	1	6/14/2016
Aroclor 1260	ND	0.10		mg/Kg-dry	1	6/14/2016
Metals by ICP/MS	**SW6020 (SW3050B)**			Prep Date: **6/17/2016**		Analyst: **JG**
Aluminum	12000	23		mg/Kg-dry	10	6/17/2016
Copper	270	2.9		mg/Kg-dry	10	6/17/2016
Lead	340	0.58		mg/Kg-dry	10	6/17/2016
Magnesium	26000	35		mg/Kg-dry	10	6/17/2016
Nickel	41	1.2		mg/Kg-dry	10	6/17/2016
Zinc	480	5.8		mg/Kg-dry	10	6/17/2016
pH (25 °C)	**SW9045C**			Prep Date: **6/13/2016**		Analyst: **GH**
pH	8.4			pH Units	1	6/13/2016
Percent Moisture	**D2974**			Prep Date: **6/13/2016**		Analyst: **GH**
Percent Moisture	21.5	0.2	*	wt%	1	6/14/2016

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter
RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

Date Reported: June 28, 2016
Date Printed: June 28, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Work Order: 16060406 Revision 1
Project: A2147008, 4300 West Roosevelt Road, Chicago, I
Lab ID: 16060406-002

Client Sample ID: B-303 (6-8)
Collection Date: 6/10/2016 8:45:00 AM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
PCBs	**SW8082 (SW3550B)**			Prep Date: **6/14/2016**		Analyst: **GVC**
Aroclor 1016	ND	0.097		mg/Kg-dry	1	6/14/2016
Aroclor 1221	ND	0.097		mg/Kg-dry	1	6/14/2016
Aroclor 1232	ND	0.097		mg/Kg-dry	1	6/14/2016
Aroclor 1242	ND	0.097		mg/Kg-dry	1	6/14/2016
Aroclor 1248	ND	0.097		mg/Kg-dry	1	6/14/2016
Aroclor 1254	ND	0.097		mg/Kg-dry	1	6/14/2016
Aroclor 1260	ND	0.097		mg/Kg-dry	1	6/14/2016
Percent Moisture	**D2974**			Prep Date: **6/13/2016**		Analyst: **GH**
Percent Moisture	17.6	0.2	*	wt%	1	6/14/2016

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Date Reported: June 28, 2016
Date Printed: June 28, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Work Order: 16060406 Revision 1
Project: A2147008, 4300 West Roosevelt Road, Chicago, I
Lab ID: 16060406-003

Client Sample ID: B-302 (1-3)
Collection Date: 6/10/2016 9:05:00 AM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds by GC/MS	**SW5035/8260B**			Prep Date: **6/13/2016**		Analyst: **ART**
Acetone	0.15	0.085		mg/Kg-dry	1	6/14/2016
Benzene	ND	0.0056		mg/Kg-dry	1	6/14/2016
Bromodichloromethane	ND	0.0056		mg/Kg-dry	1	6/14/2016
Bromoform	ND	0.0056		mg/Kg-dry	1	6/14/2016
Bromomethane	ND	0.011		mg/Kg-dry	1	6/14/2016
2-Butanone	ND	0.085		mg/Kg-dry	1	6/14/2016
Carbon disulfide	ND	0.056		mg/Kg-dry	1	6/14/2016
Carbon tetrachloride	ND	0.0056		mg/Kg-dry	1	6/14/2016
Chlorobenzene	ND	0.0056		mg/Kg-dry	1	6/14/2016
Chloroethane	ND	0.011		mg/Kg-dry	1	6/14/2016
Chloroform	ND	0.0056		mg/Kg-dry	1	6/14/2016
Chloromethane	ND	0.011		mg/Kg-dry	1	6/14/2016
Dibromochloromethane	ND	0.0056		mg/Kg-dry	1	6/14/2016
1,1-Dichloroethane	ND	0.0056		mg/Kg-dry	1	6/14/2016
1,2-Dichloroethane	ND	0.0056		mg/Kg-dry	1	6/14/2016
1,1-Dichloroethene	ND	0.0056		mg/Kg-dry	1	6/14/2016
cis-1,2-Dichloroethene	ND	0.0056		mg/Kg-dry	1	6/14/2016
trans-1,2-Dichloroethene	ND	0.0056		mg/Kg-dry	1	6/14/2016
1,2-Dichloropropane	ND	0.0056		mg/Kg-dry	1	6/14/2016
cis-1,3-Dichloropropene	ND	0.0023		mg/Kg-dry	1	6/14/2016
trans-1,3-Dichloropropene	ND	0.0023		mg/Kg-dry	1	6/14/2016
Ethylbenzene	ND	0.0056		mg/Kg-dry	1	6/14/2016
2-Hexanone	ND	0.023		mg/Kg-dry	1	6/14/2016
4-Methyl-2-pentanone	ND	0.023		mg/Kg-dry	1	6/14/2016
Methylene chloride	ND	0.011		mg/Kg-dry	1	6/14/2016
Methyl tert-butyl ether	ND	0.0056		mg/Kg-dry	1	6/14/2016
Styrene	ND	0.0056		mg/Kg-dry	1	6/14/2016
1,1,2,2-Tetrachloroethane	ND	0.0056		mg/Kg-dry	1	6/14/2016
Tetrachloroethene	ND	0.0056		mg/Kg-dry	1	6/14/2016
Toluene	ND	0.0056		mg/Kg-dry	1	6/14/2016
1,1,1-Trichloroethane	ND	0.0056		mg/Kg-dry	1	6/14/2016
1,1,2-Trichloroethane	ND	0.0056		mg/Kg-dry	1	6/14/2016
Trichloroethene	ND	0.0056		mg/Kg-dry	1	6/14/2016
Vinyl chloride	ND	0.0056		mg/Kg-dry	1	6/14/2016
Xylenes, Total	ND	0.017		mg/Kg-dry	1	6/14/2016
PCBs	**SW8082 (SW3550B)**			Prep Date: **6/14/2016**		Analyst: **GVC**
Aroclor 1016	ND	0.094		mg/Kg-dry	1	6/14/2016
Aroclor 1221	ND	0.094		mg/Kg-dry	1	6/14/2016

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Date Reported: June 28, 2016
Date Printed: June 28, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Work Order: 16060406 Revision 1
Project: A2147008, 4300 West Roosevelt Road, Chicago, I
Lab ID: 16060406-003

Client Sample ID: B-302 (1-3)
Collection Date: 6/10/2016 9:05:00 AM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
PCBs	**SW8082 (SW3550B)**			Prep Date: **6/14/2016**		Analyst: **GVC**
Aroclor 1232	ND	0.094		mg/Kg-dry	1	6/14/2016
Aroclor 1242	ND	0.094		mg/Kg-dry	1	6/14/2016
Aroclor 1248	ND	0.094		mg/Kg-dry	1	6/14/2016
Aroclor 1254	ND	0.094		mg/Kg-dry	1	6/14/2016
Aroclor 1260	ND	0.094		mg/Kg-dry	1	6/14/2016
Metals by ICP/MS	**SW6020 (SW3050B)**			Prep Date: **6/16/2016**		Analyst: **JG**
Aluminum	9000	23		mg/Kg-dry	10	6/16/2016
Copper	2500	2.8		mg/Kg-dry	10	6/16/2016
Lead	370	0.57		mg/Kg-dry	10	6/16/2016
Magnesium	4100	34		mg/Kg-dry	10	6/16/2016
Nickel	200	1.1		mg/Kg-dry	10	6/16/2016
Zinc	560	5.7		mg/Kg-dry	10	6/16/2016
pH (25 °C)	**SW9045C**			Prep Date: **6/13/2016**		Analyst: **GH**
pH	7.1			pH Units	1	6/13/2016
Percent Moisture	**D2974**			Prep Date: **6/13/2016**		Analyst: **GH**
Percent Moisture	15.4	0.2	*	wt%	1	6/14/2016

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter
RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Date Reported: June 28, 2016
Date Printed: June 28, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Work Order: 16060406 Revision 1
Project: A2147008, 4300 West Roosevelt Road, Chicago, I
Lab ID: 16060406-004

Client Sample ID: B-302 (6-8)
Collection Date: 6/10/2016 9:05:00 AM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
PCBs	**SW8082 (SW3550B)**			Prep Date: **6/14/2016**		Analyst: **GVC**
Aroclor 1016	ND	0.091		mg/Kg-dry	1	6/14/2016
Aroclor 1221	ND	0.091		mg/Kg-dry	1	6/14/2016
Aroclor 1232	ND	0.091		mg/Kg-dry	1	6/14/2016
Aroclor 1242	ND	0.091		mg/Kg-dry	1	6/14/2016
Aroclor 1248	ND	0.091		mg/Kg-dry	1	6/14/2016
Aroclor 1254	ND	0.091		mg/Kg-dry	1	6/14/2016
Aroclor 1260	ND	0.091		mg/Kg-dry	1	6/14/2016
Percent Moisture	**D2974**			Prep Date: **6/13/2016**		Analyst: **GH**
Percent Moisture	13.1	0.2	*	wt%	1	6/14/2016

Qualifiers:
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- J - Analyte detected below quanititation limits
- B - Analyte detected in the associated Method Blank
- HT - Sample received past holding time
- * - Non-accredited parameter
- RL - Reporting / Quantitation Limit for the analysis
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range
- H - Holding time exceeded

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Date Reported: June 28, 2016
Date Printed: June 28, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Work Order: 16060406 Revision 1
Project: A2147008, 4300 West Roosevelt Road, Chicago, I
Lab ID: 16060406-005

Client Sample ID: B-301 (1-3)
Collection Date: 6/10/2016 9:30:00 AM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds by GC/MS	**SW5035/8260B**			Prep Date: **6/13/2016**		Analyst: **JNM**
Acetone	ND	0.072		mg/Kg-dry	1	6/13/2016
Benzene	ND	0.0048		mg/Kg-dry	1	6/13/2016
Bromodichloromethane	ND	0.0048		mg/Kg-dry	1	6/13/2016
Bromoform	ND	0.0048		mg/Kg-dry	1	6/13/2016
Bromomethane	ND	0.0096		mg/Kg-dry	1	6/13/2016
2-Butanone	ND	0.072		mg/Kg-dry	1	6/13/2016
Carbon disulfide	ND	0.048		mg/Kg-dry	1	6/13/2016
Carbon tetrachloride	ND	0.0048		mg/Kg-dry	1	6/13/2016
Chlorobenzene	ND	0.0048		mg/Kg-dry	1	6/13/2016
Chloroethane	ND	0.0096		mg/Kg-dry	1	6/13/2016
Chloroform	ND	0.0048		mg/Kg-dry	1	6/13/2016
Chloromethane	ND	0.0096		mg/Kg-dry	1	6/13/2016
Dibromochloromethane	ND	0.0048		mg/Kg-dry	1	6/13/2016
1,1-Dichloroethane	ND	0.0048		mg/Kg-dry	1	6/13/2016
1,2-Dichloroethane	ND	0.0048		mg/Kg-dry	1	6/13/2016
1,1-Dichloroethene	ND	0.0048		mg/Kg-dry	1	6/13/2016
cis-1,2-Dichloroethene	ND	0.0048		mg/Kg-dry	1	6/13/2016
trans-1,2-Dichloroethene	ND	0.0048		mg/Kg-dry	1	6/13/2016
1,2-Dichloropropane	ND	0.0048		mg/Kg-dry	1	6/13/2016
cis-1,3-Dichloropropene	ND	0.0019		mg/Kg-dry	1	6/13/2016
trans-1,3-Dichloropropene	ND	0.0019		mg/Kg-dry	1	6/13/2016
Ethylbenzene	ND	0.0048		mg/Kg-dry	1	6/13/2016
2-Hexanone	ND	0.019		mg/Kg-dry	1	6/13/2016
4-Methyl-2-pentanone	ND	0.019		mg/Kg-dry	1	6/13/2016
Methylene chloride	ND	0.0096		mg/Kg-dry	1	6/13/2016
Methyl tert-butyl ether	ND	0.0048		mg/Kg-dry	1	6/13/2016
Styrene	ND	0.0048		mg/Kg-dry	1	6/13/2016
1,1,2,2-Tetrachloroethane	ND	0.0048		mg/Kg-dry	1	6/13/2016
Tetrachloroethene	ND	0.0048		mg/Kg-dry	1	6/13/2016
Toluene	ND	0.0048		mg/Kg-dry	1	6/13/2016
1,1,1-Trichloroethane	ND	0.0048		mg/Kg-dry	1	6/13/2016
1,1,2-Trichloroethane	ND	0.0048		mg/Kg-dry	1	6/13/2016
Trichloroethene	ND	0.0048		mg/Kg-dry	1	6/13/2016
Vinyl chloride	ND	0.0048		mg/Kg-dry	1	6/13/2016
Xylenes, Total	ND	0.014		mg/Kg-dry	1	6/13/2016
PCBs	**SW8082 (SW3550B)**			Prep Date: **6/14/2016**		Analyst: **GVC**
Aroclor 1016	ND	0.091		mg/Kg-dry	1	6/14/2016
Aroclor 1221	ND	0.091		mg/Kg-dry	1	6/14/2016

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter
RL - Reporting / Quantitation Limit for the analysis
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R - RPD outside accepted recovery limits
E - Value above quantitation range
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Date Reported: June 28, 2016
Date Printed: June 28, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Work Order: 16060406 Revision 1
Project: A2147008, 4300 West Roosevelt Road, Chicago, I
Lab ID: 16060406-005

Client Sample ID: B-301 (1-3)
Collection Date: 6/10/2016 9:30:00 AM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
PCBs	**SW8082 (SW3550B)**			Prep Date: **6/14/2016**		Analyst: **GVC**
Aroclor 1232	ND	0.091		mg/Kg-dry	1	6/14/2016
Aroclor 1242	ND	0.091		mg/Kg-dry	1	6/14/2016
Aroclor 1248	ND	0.091		mg/Kg-dry	1	6/14/2016
Aroclor 1254	ND	0.091		mg/Kg-dry	1	6/14/2016
Aroclor 1260	ND	0.091		mg/Kg-dry	1	6/14/2016
Metals by ICP/MS	**SW6020 (SW3050B)**			Prep Date: **6/16/2016**		Analyst: **JG**
Aluminum	4200	22		mg/Kg-dry	10	6/16/2016
Copper	87	2.7		mg/Kg-dry	10	6/16/2016
Lead	290	0.54		mg/Kg-dry	10	6/16/2016
Magnesium	9300	32		mg/Kg-dry	10	6/16/2016
Nickel	20	1.1		mg/Kg-dry	10	6/16/2016
Zinc	500	5.4		mg/Kg-dry	10	6/16/2016
pH (25 °C)	**SW9045C**			Prep Date: **6/13/2016**		Analyst: **GH**
pH	7.5			pH Units	1	6/13/2016
Percent Moisture	**D2974**			Prep Date: **6/13/2016**		Analyst: **GH**
Percent Moisture	12.5	0.2	*	wt%	1	6/14/2016

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter
RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Date Reported: June 28, 2016
Date Printed: June 28, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Work Order: 16060406 Revision 1
Project: A2147008, 4300 West Roosevelt Road, Chicago, I
Lab ID: 16060406-006

Client Sample ID: B-301 (4-6)
Collection Date: 6/10/2016 9:30:00 AM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
PCBs	**SW8082 (SW3550B)**			Prep Date: **6/14/2016**		Analyst: **GVC**
Aroclor 1016	ND	0.10		mg/Kg-dry	1	6/14/2016
Aroclor 1221	ND	0.10		mg/Kg-dry	1	6/14/2016
Aroclor 1232	ND	0.10		mg/Kg-dry	1	6/14/2016
Aroclor 1242	ND	0.10		mg/Kg-dry	1	6/14/2016
Aroclor 1248	ND	0.10		mg/Kg-dry	1	6/14/2016
Aroclor 1254	ND	0.10		mg/Kg-dry	1	6/14/2016
Aroclor 1260	ND	0.10		mg/Kg-dry	1	6/14/2016
Percent Moisture	**D2974**			Prep Date: **6/13/2016**		Analyst: **GH**
Percent Moisture	20.0	0.2	*	wt%	1	6/14/2016

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Date Reported: June 28, 2016
Date Printed: June 28, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Work Order: 16060406 Revision 1
Project: A2147008, 4300 West Roosevelt Road, Chicago, I
Lab ID: 16060406-007

Client Sample ID: B-304 (1-3)
Collection Date: 6/10/2016 10:10:00 AM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
PCBs	**SW8082 (SW3550B)**			Prep Date: **6/14/2016**		Analyst: **GVC**
Aroclor 1016	ND	0.10		mg/Kg-dry	1	6/15/2016
Aroclor 1221	ND	0.10		mg/Kg-dry	1	6/15/2016
Aroclor 1232	ND	0.10		mg/Kg-dry	1	6/15/2016
Aroclor 1242	ND	0.10		mg/Kg-dry	1	6/15/2016
Aroclor 1248	ND	0.10		mg/Kg-dry	1	6/15/2016
Aroclor 1254	ND	0.10		mg/Kg-dry	1	6/15/2016
Aroclor 1260	ND	0.10		mg/Kg-dry	1	6/15/2016
Percent Moisture	**D2974**			Prep Date: **6/13/2016**		Analyst: **GH**
Percent Moisture	20.6	0.2	*	wt%	1	6/14/2016

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Date Reported: June 28, 2016
Date Printed: June 28, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Work Order: 16060406 Revision 1
Project: A2147008, 4300 West Roosevelt Road, Chicago, I
Lab ID: 16060406-008

Client Sample ID: B-304 (6-8)
Collection Date: 6/10/2016 10:10:00 AM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds by GC/MS	**SW5035/8260B**			Prep Date: **6/13/2016**		Analyst: **ART**
Acetone	ND	0.067		mg/Kg-dry	1	6/14/2016
Benzene	ND	0.0045		mg/Kg-dry	1	6/14/2016
Bromodichloromethane	ND	0.0045		mg/Kg-dry	1	6/14/2016
Bromoform	ND	0.0045		mg/Kg-dry	1	6/14/2016
Bromomethane	ND	0.0089		mg/Kg-dry	1	6/14/2016
2-Butanone	ND	0.067		mg/Kg-dry	1	6/14/2016
Carbon disulfide	ND	0.045		mg/Kg-dry	1	6/14/2016
Carbon tetrachloride	ND	0.0045		mg/Kg-dry	1	6/14/2016
Chlorobenzene	ND	0.0045		mg/Kg-dry	1	6/14/2016
Chloroethane	ND	0.0089		mg/Kg-dry	1	6/14/2016
Chloroform	ND	0.0045		mg/Kg-dry	1	6/14/2016
Chloromethane	ND	0.0089		mg/Kg-dry	1	6/14/2016
Dibromochloromethane	ND	0.0045		mg/Kg-dry	1	6/14/2016
1,1-Dichloroethane	ND	0.0045		mg/Kg-dry	1	6/14/2016
1,2-Dichloroethane	ND	0.0045		mg/Kg-dry	1	6/14/2016
1,1-Dichloroethene	ND	0.0045		mg/Kg-dry	1	6/14/2016
cis-1,2-Dichloroethene	ND	0.0045		mg/Kg-dry	1	6/14/2016
trans-1,2-Dichloroethene	ND	0.0045		mg/Kg-dry	1	6/14/2016
1,2-Dichloropropane	ND	0.0045		mg/Kg-dry	1	6/14/2016
cis-1,3-Dichloropropene	ND	0.0018		mg/Kg-dry	1	6/14/2016
trans-1,3-Dichloropropene	ND	0.0018		mg/Kg-dry	1	6/14/2016
Ethylbenzene	ND	0.0045		mg/Kg-dry	1	6/14/2016
2-Hexanone	ND	0.018		mg/Kg-dry	1	6/14/2016
4-Methyl-2-pentanone	ND	0.018		mg/Kg-dry	1	6/14/2016
Methylene chloride	ND	0.0089		mg/Kg-dry	1	6/14/2016
Methyl tert-butyl ether	ND	0.0045		mg/Kg-dry	1	6/14/2016
Styrene	ND	0.0045		mg/Kg-dry	1	6/14/2016
1,1,2,2-Tetrachloroethane	ND	0.0045		mg/Kg-dry	1	6/14/2016
Tetrachloroethene	ND	0.0045		mg/Kg-dry	1	6/14/2016
Toluene	ND	0.0045		mg/Kg-dry	1	6/14/2016
1,1,1-Trichloroethane	ND	0.0045		mg/Kg-dry	1	6/14/2016
1,1,2-Trichloroethane	ND	0.0045		mg/Kg-dry	1	6/14/2016
Trichloroethene	ND	0.0045		mg/Kg-dry	1	6/14/2016
Vinyl chloride	ND	0.0045		mg/Kg-dry	1	6/14/2016
Xylenes, Total	ND	0.013		mg/Kg-dry	1	6/14/2016
PCBs	**SW8082 (SW3550B)**			Prep Date: **6/14/2016**		Analyst: **GVC**
Aroclor 1016	ND	0.097		mg/Kg-dry	1	6/15/2016
Aroclor 1221	ND	0.097		mg/Kg-dry	1	6/15/2016

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter
RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Date Reported: June 28, 2016
Date Printed: June 28, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Work Order: 16060406 Revision 1
Project: A2147008, 4300 West Roosevelt Road, Chicago, I
Lab ID: 16060406-008

Client Sample ID: B-304 (6-8)
Collection Date: 6/10/2016 10:10:00 AM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
PCBs	**SW8082 (SW3550B)**			Prep Date: **6/14/2016**		Analyst: **GVC**
Aroclor 1232	ND	0.097		mg/Kg-dry	1	6/15/2016
Aroclor 1242	ND	0.097		mg/Kg-dry	1	6/15/2016
Aroclor 1248	ND	0.097		mg/Kg-dry	1	6/15/2016
Aroclor 1254	ND	0.097		mg/Kg-dry	1	6/15/2016
Aroclor 1260	ND	0.097		mg/Kg-dry	1	6/15/2016
Metals by ICP/MS	**SW6020 (SW3050B)**			Prep Date: **6/16/2016**		Analyst: **JG**
Aluminum	12000	23		mg/Kg-dry	10	6/16/2016
Copper	30	2.9		mg/Kg-dry	10	6/16/2016
Lead	18	0.58		mg/Kg-dry	10	6/16/2016
Magnesium	23000	35		mg/Kg-dry	10	6/16/2016
Nickel	41	1.2		mg/Kg-dry	10	6/16/2016
Zinc	59	5.8		mg/Kg-dry	10	6/16/2016
pH (25 °C)	**SW9045C**			Prep Date: **6/13/2016**		Analyst: **GH**
pH	7.8			pH Units	1	6/13/2016
Percent Moisture	**D2974**			Prep Date: **6/13/2016**		Analyst: **GH**
Percent Moisture	17.7	0.2	*	wt%	1	6/14/2016

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter
RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Date Reported: June 28, 2016
Date Printed: June 28, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Work Order: 16060406 Revision 1
Project: A2147008, 4300 West Roosevelt Road, Chicago, I
Lab ID: 16060406-009

Client Sample ID: B-305 (1-3)
Collection Date: 6/10/2016 10:45:00 AM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds by GC/MS	**SW5035/8260B**			Prep Date: **6/13/2016**		Analyst: **JNM**
Acetone	ND	0.082		mg/Kg-dry	1	6/13/2016
Benzene	ND	0.0054		mg/Kg-dry	1	6/13/2016
Bromodichloromethane	ND	0.0054		mg/Kg-dry	1	6/13/2016
Bromoform	ND	0.0054		mg/Kg-dry	1	6/13/2016
Bromomethane	ND	0.011		mg/Kg-dry	1	6/13/2016
2-Butanone	ND	0.082		mg/Kg-dry	1	6/13/2016
Carbon disulfide	ND	0.054		mg/Kg-dry	1	6/13/2016
Carbon tetrachloride	ND	0.0054		mg/Kg-dry	1	6/13/2016
Chlorobenzene	ND	0.0054		mg/Kg-dry	1	6/13/2016
Chloroethane	ND	0.011		mg/Kg-dry	1	6/13/2016
Chloroform	ND	0.0054		mg/Kg-dry	1	6/13/2016
Chloromethane	ND	0.011		mg/Kg-dry	1	6/13/2016
Dibromochloromethane	ND	0.0054		mg/Kg-dry	1	6/13/2016
1,1-Dichloroethane	ND	0.0054		mg/Kg-dry	1	6/13/2016
1,2-Dichloroethane	ND	0.0054		mg/Kg-dry	1	6/13/2016
1,1-Dichloroethene	ND	0.0054		mg/Kg-dry	1	6/13/2016
cis-1,2-Dichloroethene	ND	0.0054		mg/Kg-dry	1	6/13/2016
trans-1,2-Dichloroethene	ND	0.0054		mg/Kg-dry	1	6/13/2016
1,2-Dichloropropane	ND	0.0054		mg/Kg-dry	1	6/13/2016
cis-1,3-Dichloropropene	ND	0.0022		mg/Kg-dry	1	6/13/2016
trans-1,3-Dichloropropene	ND	0.0022		mg/Kg-dry	1	6/13/2016
Ethylbenzene	ND	0.0054		mg/Kg-dry	1	6/13/2016
2-Hexanone	ND	0.022		mg/Kg-dry	1	6/13/2016
4-Methyl-2-pentanone	ND	0.022		mg/Kg-dry	1	6/13/2016
Methylene chloride	ND	0.011		mg/Kg-dry	1	6/13/2016
Methyl tert-butyl ether	ND	0.0054		mg/Kg-dry	1	6/13/2016
Styrene	ND	0.0054		mg/Kg-dry	1	6/13/2016
1,1,2,2-Tetrachloroethane	ND	0.0054		mg/Kg-dry	1	6/13/2016
Tetrachloroethene	ND	0.0054		mg/Kg-dry	1	6/13/2016
Toluene	ND	0.0054		mg/Kg-dry	1	6/13/2016
1,1,1-Trichloroethane	ND	0.0054		mg/Kg-dry	1	6/13/2016
1,1,2-Trichloroethane	ND	0.0054		mg/Kg-dry	1	6/13/2016
Trichloroethene	ND	0.0054		mg/Kg-dry	1	6/13/2016
Vinyl chloride	ND	0.0054		mg/Kg-dry	1	6/13/2016
Xylenes, Total	ND	0.016		mg/Kg-dry	1	6/13/2016
PCBs	**SW8082 (SW3550B)**			Prep Date: **6/14/2016**		Analyst: **GVC**
Aroclor 1016	ND	0.10		mg/Kg-dry	1	6/15/2016
Aroclor 1221	ND	0.10		mg/Kg-dry	1	6/15/2016

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter
RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

STAT **Analysis Corporation**
2242 West Harrison St., Suite 200, Chicago, IL 60612-3766
Tel: (312) 733-0551 Fax: (312) 733-2386 STATinfo@STATAnalysis.com
Accreditations:IEPA ELAP 100445;ORELAP IL300001;AIHA-LAP, LLC 101160;NVLAP LabCode 101202-0

Date Reported: June 28, 2016
Date Printed: June 28, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Work Order: 16060406 Revision 1
Project: A2147008, 4300 West Roosevelt Road, Chicago, I
Lab ID: 16060406-009

Client Sample ID: B-305 (1-3)
Collection Date: 6/10/2016 10:45:00 AM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
PCBs	**SW8082 (SW3550B)**			Prep Date: **6/14/2016**		Analyst: **GVC**
Aroclor 1232	ND	0.10		mg/Kg-dry	1	6/15/2016
Aroclor 1242	ND	0.10		mg/Kg-dry	1	6/15/2016
Aroclor 1248	ND	0.10		mg/Kg-dry	1	6/15/2016
Aroclor 1254	ND	0.10		mg/Kg-dry	1	6/15/2016
Aroclor 1260	ND	0.10		mg/Kg-dry	1	6/15/2016
Metals by ICP/MS	**SW6020 (SW3050B)**			Prep Date: **6/16/2016**		Analyst: **JG**
Aluminum	12000	24		mg/Kg-dry	10	6/16/2016
Copper	140	3.0		mg/Kg-dry	10	6/16/2016
Lead	130	0.59		mg/Kg-dry	10	6/16/2016
Magnesium	18000	36		mg/Kg-dry	10	6/16/2016
Nickel	37	1.2		mg/Kg-dry	10	6/16/2016
Zinc	700	5.9		mg/Kg-dry	10	6/16/2016
SPLP Metals by ICP/MS	**SW1312/6020 (SW3005A)**			Prep Date: **6/21/2016**		Analyst: **JG**
Zinc	0.37	0.020		mg/L	2	6/22/2016
pH (25 °C)	**SW9045C**			Prep Date: **6/13/2016**		Analyst: **GH**
pH	8.4			pH Units	1	6/13/2016
Percent Moisture	**D2974**			Prep Date: **6/13/2016**		Analyst: **GH**
Percent Moisture	20.4	0.2	*	wt%	1	6/14/2016

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter
RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Date Reported: June 28, 2016
Date Printed: June 28, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Work Order: 16060406 Revision 1
Project: A2147008, 4300 West Roosevelt Road, Chicago, I
Lab ID: 16060406-010

Client Sample ID: B-305 (4-6)
Collection Date: 6/10/2016 10:45:00 AM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
PCBs	**SW8082 (SW3550B)**			Prep Date: **6/14/2016**		Analyst: **GVC**
Aroclor 1016	ND	0.097		mg/Kg-dry	1	6/15/2016
Aroclor 1221	ND	0.097		mg/Kg-dry	1	6/15/2016
Aroclor 1232	ND	0.097		mg/Kg-dry	1	6/15/2016
Aroclor 1242	ND	0.097		mg/Kg-dry	1	6/15/2016
Aroclor 1248	ND	0.097		mg/Kg-dry	1	6/15/2016
Aroclor 1254	ND	0.097		mg/Kg-dry	1	6/15/2016
Aroclor 1260	ND	0.097		mg/Kg-dry	1	6/15/2016
Percent Moisture	**D2974**			Prep Date: **6/13/2016**		Analyst: **GH**
Percent Moisture	17.8	0.2	*	wt%	1	6/14/2016

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

STAT Analysis Corporation

2242 W. Harrison Suite 200, Chicago, Illinois 60612 Phone: (312) 733-0551 Fax: (312) 733-2386
e-mail address: STATinfo@STATAnalysis.com AIHA, NVLAP and NELAP accredited

CHAIN OF CUSTODY RECORD

Nº: 864079 Page: 1 of 1

Company: Terracon Environmental Consultants
Project Number: A2147008 Client Tracking No.:
Project Name: 4300 West Roosevelt Road
Project Location: " " Chicago, IL
Sampler(s): ZFJ
Report To: Rich O'Brien Phone: 312-443-2958
Fax:
QC Level: 1 ___ 2 ___ 3 ___ 4 ___ e-mail: Rich.O'Brien@terracon.com

P.O. No.:
Quote No.:

Turn Around: Standard
Results Needed: / / am/pm

Client Sample Number/Description:	Date Taken	Time Taken	Matrix	Comp.	Grab	Preserv.	No. of Containers	PCBs	VOCs	Total Metals - Al, Cu, Pb, Mg, Ni, Zn only	pH	Remarks	Lab No.:
B-303 (1-3)	6-10-16	8:45	S				4	X	X	X	X		001
B-303 (6-8)	↓	↓	↓				1	X					002
B-302 (1-3)	↓	9:05	↓				4	X	X	X	X		003
B-302 (6-8)	↓	↓	↓				~~4~~ 1	X	~~X~~	~~X~~	~~X~~	1 jar for PCBs 6-8	004
B-301 (1-3)	↓	9:30	↓				4	X	X	X	X		005
B-301 (4-6)	↓	↓	↓				1	X					006
B-304 (1-3)	↓	10:10	↓				1	X					007
B-304 (6-8)	↓	↓	↓				4	X	X	X	X		008
B-305 (1-3)	↓	10:45	↓				4	X	X	X	X		009
B-305 (4-6)	↓	↓	↓				1	X					010

Relinquished by: (Signature) [signature] Date/Time: 6-10-16 14:25
Received by: (Signature) [signature] Date/Time: 6/10/16 14:25
Relinquished by: (Signature) Date/Time:
Received by: (Signature) Date/Time:
Relinquished by: (Signature) Date/Time:
Received by: (Signature) Date/Time:

Comments:

Preservation Code: A = None B = HNO_3 C = NaOH D = H_2SO_4 E = HCl F = 5035/EnCore G = Other

Laboratory Work Order No.: 16060406

Received on Ice: Yes ✓ No

Temperature: On Ice °C

STAT Analysis Corporation

Sample Receipt Checklist

Client Name TERRACON-NAPERVILLE

Date and Time Received: 6/10/2016 2:25:00 PM

Work Order Number 16060406

Received by: JDR

Checklist completed by: Martin Kuan 6/10/16
Signature Date

Reviewed by: [illegible] 6/13/16
Initials Date

Matrix:

Carrier name Client Delivered

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels/containers?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container or Temp Blank temperature in compliance?	Yes ☑	No ☐	Temperature On Ice °C
Water - VOA vials have zero headspace?	No VOA vials submitted ☐	Yes ☐	No ☐
Water - Samples pH checked?	Yes ☐	No ☐	Checked by:
Water - Samples properly preserved?	Yes ☐	No ☐	pH Adjusted?

Any No response must be detailed in the comments section below.

Comments:

Client / Person contacted:

Date contacted:

Contacted by:

Response:

From: O'Brien, Richard M [Rich.O'Brien@terracon.com]
Sent: Tuesday, June 21, 2016 8:51 AM
To: Justice Kwateng
Subject: RE: A2147008, 4300 West Roosevelt Road, Chicago, IL STAT 16060406

Can you please run the following on Standard turnaround:

B-305 (1-3) - SPLP Zinc

Please confirm receipt.

Thanks,

Richard O'Brien, P.E.
Senior Environmental Engineer

Terracon Consultants, Inc.
650 West Lake Street, Suite 420 I Chicago, IL 60661
P (312) 575-0014 I F (312) 575-0111 I C (312) 443-2958
rmobrien@terracon.com I terracon.com

From: Justice Kwateng [mailto:JKwateng@STATAnalysis.com]
Sent: Monday, June 20, 2016 4:27 PM
To: O'Brien, Richard M <Rich.O'Brien@terracon.com>
Subject: A2147008, 4300 West Roosevelt Road, Chicago, IL STAT 16060406

Please find the attached report for your A2147008, 4300 West Roosevelt Road, Chicago, IL project.
STAT 16060406

Thank you for choosing STAT for your testing needs.

In an effort to increase efficiency and conserve resources, STAT Analysis has adopted paperless reporting. The attached pdf files can be printed as the final copy. You will not receive a hardcopy in the mail.

Best Regards,

Justice Kwateng
STAT Analysis Corporation
(312)733-0551

<<16060406(Terracon)Rev0.pdf>> <<16060406(Terracon)Rev0.xls>>

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June 20, 2016

Terracon Consultants, Inc.
135 Ambassador Drive
Naperville, IL 60540
Telephone: (630) 717-4263
Fax: (630) 357-9489

Analytical Report for STAT Work Order: 16060460 Revision 0

RE: A2147008, L1300 Roosevelt Road, Chicago, IL

Dear Richard O'Brien:

STAT Analysis received 6 samples for the referenced project on 6/13/2016 3:40:00 PM. The analytical results are presented in the following report.

All analyses were performed in accordance with the requirements of 35 IAC Part 186 / NELAC standards. Analyses were performed in accordance with methods as referenced on the analytical report. Those analytical results expressed on a dry weight basis are also noted on the analytical report.

All analyses were performed within established holding time criteria, and all Quality Control criteria met EPA or laboratory specifications except when noted in the Case Narrative or Analytical Report. If required, an estimate of uncertainty for the analyses can be provided. A listing of accredited methods/parameters can also be provided.

Thank you for the opportunity to serve you and I look forward to working with you in the future. If you have any questions regarding the enclosed materials, please contact me at (312) 733-0551.

Sincerely,

Frank Capoccia
Project Manager

STAT Analysis Corporation

Date: June 20, 2016

Client: Terracon Consultants, Inc.
Project: A2147008, L1300 Roosevelt Road, Chicago, IL
Work Order: 16060460 Revision 0

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Tag Number	Collection Date	Date Received
16060460-001A	SG-404		6/13/2016 10:30:00 AM	6/13/2016
16060460-002A	SG-405		6/13/2016 11:20:00 AM	6/13/2016
16060460-003A	SG-406		6/13/2016 12:25:00 PM	6/13/2016
16060460-004A	SG-402		6/13/2016 1:45:00 PM	6/13/2016
16060460-005A	SG-401		6/13/2016 2:30:00 PM	6/13/2016
16060460-006A	SG-403		6/13/2016 3:10:00 PM	6/13/2016

STAT Analysis Corporation

Date: *June 20, 2016*

CLIENT: Terracon Consultants, Inc.
Project: A2147008, L1300 Roosevelt Road, Chicago, IL
Work Order: 16060460 Revision 0

CASE NARRATIVE

TO-15 results that are reported in mg/m^3 are calculated based on a temperature of 25°C, atmospheric pressure of 760 mm Hg, and the molecular weight of the analyte.

Due to suspected elevated water vapor in the canister, TO-15 results for sample SG-405 (16060460-002A) are reported from 1:5 and 1:10 dilutions. At lower dilutions internal standards were outside of control limits.

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2242 West Harrison St., Suite 200, Chicago, IL 60612-3766
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Accreditations:IEPA ELAP 100445;ORELAP IL300001;AIHA-LAP, LLC 101160;NVLAP LabCode 101202-0

Report Date: June 20, 2016
Print Date: June 20, 2016

ANALYTICAL RESULTS

Client:	Terracon Consultants, Inc.	**Client Sample ID:**	SG-404
Work Order:	16060460 Revision 0	**Tag Number:**	
Project:	A2147008, L1300 Roosevelt Road, Chicago, IL	**Collection Date:**	6/13/2016 10:30:00 AM
Lab ID:	16060460-001A	**Matrix:**	Air

Volatile Organic Compounds in Air by GC/MS **TO-15** Prep Date: **6/14/2016** Analyst: **VP**

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
1,1,1-Trichloroethane	ND	0.0020		mg/m³	1	6/14/2016
1,1,2-Trichloroethane	ND	0.0020		mg/m³	1	6/14/2016
1,1-Dichloroethane	ND	0.0015		mg/m³	1	6/14/2016
1,1-Dichloroethene	ND	0.0015		mg/m³	1	6/14/2016
1,2,4-Trichlorobenzene	ND	0.0028		mg/m³	1	6/14/2016
1,2-Dibromoethane	ND	0.0028		mg/m³	1	6/14/2016
1,2-Dichlorobenzene	ND	0.0022		mg/m³	1	6/14/2016
1,2-Dichloroethane	ND	0.0015		mg/m³	1	6/14/2016
1,2-Dichloropropane	ND	0.0017		mg/m³	1	6/14/2016
1,4-Dichlorobenzene	ND	0.0022		mg/m³	1	6/14/2016
1,4-Dioxane	ND	0.0033		mg/m³	1	6/14/2016
2-Butanone	0.0053	0.0028		mg/m³	1	6/14/2016
Acetone	0.072	0.0089	*	mg/m³	1	6/14/2016
Benzene	0.0041	0.0011		mg/m³	1	6/14/2016
Bromodichloromethane	ND	0.0024		mg/m³	1	6/14/2016
Bromoform	ND	0.0096		mg/m³	1	6/14/2016
Bromomethane	ND	0.0035		mg/m³	1	6/14/2016
Carbon disulfide	0.041	0.0012		mg/m³	1	6/14/2016
Carbon tetrachloride	ND	0.0024		mg/m³	1	6/14/2016
Chlorobenzene	ND	0.0017		mg/m³	1	6/14/2016
Chloroform	ND	0.0018		mg/m³	1	6/14/2016
cis-1,2-Dichloroethene	0.0021	0.0015		mg/m³	1	6/14/2016
cis-1,3-Dichloropropene	ND	0.0017		mg/m³	1	6/14/2016
Dibromochloromethane	ND	0.0031		mg/m³	1	6/14/2016
Dichlorodifluoromethane	0.0021	0.0018		mg/m³	1	6/14/2016
Ethylbenzene	0.012	0.0017		mg/m³	1	6/14/2016
m,p-Xylene	0.041	0.0031		mg/m³	1	6/14/2016
Methyl tert-butyl ether	ND	0.0013		mg/m³	1	6/14/2016
Methylene chloride	ND	0.013		mg/m³	1	6/14/2016
Naphthalene	ND	0.0018		mg/m³	1	6/14/2016
o-Xylene	0.015	0.0017		mg/m³	1	6/14/2016
Styrene	0.0017	0.0017		mg/m³	1	6/14/2016
Tetrachloroethene	0.90	0.026		mg/m³	10	6/14/2016
Toluene	0.049	0.0015		mg/m³	1	6/14/2016
trans-1,2-Dichloroethene	ND	0.0015		mg/m³	1	6/14/2016
trans-1,3-Dichloropropene	ND	0.0017		mg/m³	1	6/14/2016
Trichloroethene	0.064	0.0020		mg/m³	1	6/14/2016
Trichlorofluoromethane	ND	0.0020		mg/m³	1	6/14/2016

Qualifiers:

ND - Not Detected at the Reporting Limit	RL - Reporting / Quantitation Limit for the analysis
J - Analyte detected below quantitation limits	S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank	R - RPD outside accepted recovery limits
HT - Sample received past holding time	E - Value above quantitation range
* - Non-accredited parameter	H - Holding time exceeded

STAT Analysis Corporation
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Report Date: June 20, 2016
Print Date: June 20, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Client Sample ID: SG-404
Work Order: 16060460 Revision 0
Tag Number:
Project: A2147008, L1300 Roosevelt Road, Chicago, IL
Collection Date: 6/13/2016 10:30:00 AM
Lab ID: 16060460-001A
Matrix: Air

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds in Air by GC/MS	**TO-15**			Prep Date: **6/14/2016**		Analyst: **VP**
Vinyl acetate	ND	0.013		mg/m³	1	6/14/2016
Vinyl chloride	ND	0.00092		mg/m³	1	6/14/2016
Xylenes, Total	0.056	0.0048		mg/m³	1	6/14/2016

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter
RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
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E - Value above quantitation range
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Report Date: June 20, 2016
Print Date: June 20, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Client Sample ID: SG-405
Work Order: 16060460 Revision 0
Tag Number:
Project: A2147008, L1300 Roosevelt Road, Chicago, IL
Collection Date: 6/13/2016 11:20:00 AM
Lab ID: 16060460-002A
Matrix: Air

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds in Air by GC/MS	**TO-15**			Prep Date: **6/14/2016**		Analyst: **VP**
1,1,1-Trichloroethane	ND	0.028		mg/m³	10	6/14/2016
1,1,2-Trichloroethane	ND	0.028		mg/m³	10	6/14/2016
1,1-Dichloroethane	ND	0.020		mg/m³	10	6/14/2016
1,1-Dichloroethene	0.026	0.020		mg/m³	10	6/14/2016
1,2,4-Trichlorobenzene	ND	0.019		mg/m³	5	6/14/2016
1,2-Dibromoethane	ND	0.038		mg/m³	10	6/14/2016
1,2-Dichlorobenzene	ND	0.015		mg/m³	5	6/14/2016
1,2-Dichloroethane	ND	0.020		mg/m³	10	6/14/2016
1,2-Dichloropropane	ND	0.023		mg/m³	10	6/14/2016
1,4-Dichlorobenzene	ND	0.015		mg/m³	5	6/14/2016
1,4-Dioxane	ND	0.046		mg/m³	10	6/14/2016
2-Butanone	0.13	0.038		mg/m³	10	6/14/2016
Acetone	0.97	0.12	*	mg/m³	10	6/14/2016
Benzene	0.18	0.015		mg/m³	10	6/14/2016
Bromodichloromethane	ND	0.033		mg/m³	10	6/14/2016
Bromoform	ND	0.066		mg/m³	5	6/14/2016
Bromomethane	ND	0.048		mg/m³	10	6/14/2016
Carbon disulfide	0.50	0.016		mg/m³	10	6/14/2016
Carbon tetrachloride	ND	0.033		mg/m³	10	6/14/2016
Chlorobenzene	ND	0.011		mg/m³	5	6/14/2016
Chloroform	ND	0.026		mg/m³	10	6/14/2016
cis-1,2-Dichloroethene	6.0	0.051		mg/m³	25	6/14/2016
cis-1,3-Dichloropropene	ND	0.023		mg/m³	10	6/14/2016
Dibromochloromethane	ND	0.043		mg/m³	10	6/14/2016
Dichlorodifluoromethane	ND	0.026		mg/m³	10	6/14/2016
Ethylbenzene	0.071	0.011		mg/m³	5	6/14/2016
m,p-Xylene	0.23	0.022		mg/m³	5	6/14/2016
Methyl tert-butyl ether	ND	0.018		mg/m³	10	6/14/2016
Methylene chloride	ND	0.18		mg/m³	10	6/14/2016
Naphthalene	ND	0.013		mg/m³	5	6/14/2016
o-Xylene	0.080	0.011		mg/m³	5	6/14/2016
Styrene	ND	0.011		mg/m³	5	6/14/2016
Tetrachloroethene	1.0	0.036		mg/m³	10	6/14/2016
Toluene	1.5	0.020		mg/m³	10	6/14/2016
trans-1,2-Dichloroethene	0.46	0.020		mg/m³	10	6/14/2016
trans-1,3-Dichloropropene	ND	0.023		mg/m³	10	6/14/2016
Trichloroethene	0.47	0.028		mg/m³	10	6/14/2016
Trichlorofluoromethane	ND	0.028		mg/m³	10	6/14/2016

Qualifiers:
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J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter
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S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
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Tel: (312) 733-0551 Fax: (312) 733-2386 STATinfo@STATAnalysis.com
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Report Date: June 20, 2016
Print Date: June 20, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Work Order: 16060460 Revision 0
Project: A2147008, L1300 Roosevelt Road, Chicago, IL
Lab ID: 16060460-002A

Client Sample ID: SG-405
Tag Number:
Collection Date: 6/13/2016 11:20:00 AM
Matrix: Air

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds in Air by GC/MS **TO-15**				Prep Date: **6/14/2016**		Analyst: **VP**
Vinyl acetate	ND	0.18		mg/m³	10	6/14/2016
Vinyl chloride	2.9	0.013		mg/m³	10	6/14/2016
Xylenes, Total	0.31	0.033		mg/m³	5	6/14/2016

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Report Date: June 20, 2016
Print Date: June 20, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Client Sample ID: SG-406
Work Order: 16060460 Revision 0
Tag Number:
Project: A2147008, L1300 Roosevelt Road, Chicago, IL
Collection Date: 6/13/2016 12:25:00 PM
Lab ID: 16060460-003A
Matrix: Air

Volatile Organic Compounds in Air by GC/MS TO-15 Prep Date: **6/14/2016** Analyst: **VP**

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
1,1,1-Trichloroethane	0.013	0.0022		mg/m³	1	6/14/2016
1,1,2-Trichloroethane	ND	0.0022		mg/m³	1	6/14/2016
1,1-Dichloroethane	0.0040	0.0016		mg/m³	1	6/14/2016
1,1-Dichloroethene	ND	0.0016		mg/m³	1	6/14/2016
1,2,4-Trichlorobenzene	ND	0.0030		mg/m³	1	6/14/2016
1,2-Dibromoethane	ND	0.0030		mg/m³	1	6/14/2016
1,2-Dichlorobenzene	ND	0.0024		mg/m³	1	6/14/2016
1,2-Dichloroethane	ND	0.0016		mg/m³	1	6/14/2016
1,2-Dichloropropane	ND	0.0018		mg/m³	1	6/14/2016
1,4-Dichlorobenzene	ND	0.0024		mg/m³	1	6/14/2016
1,4-Dioxane	ND	0.0036		mg/m³	1	6/14/2016
2-Butanone	0.022	0.0030		mg/m³	1	6/14/2016
Acetone	0.21	0.097	*	mg/m³	10	6/14/2016
Benzene	0.060	0.0012		mg/m³	1	6/14/2016
Bromodichloromethane	ND	0.0026		mg/m³	1	6/14/2016
Bromoform	ND	0.011		mg/m³	1	6/14/2016
Bromomethane	ND	0.0038		mg/m³	1	6/14/2016
Carbon disulfide	0.25	0.0013		mg/m³	1	6/14/2016
Carbon tetrachloride	0.0076	0.0026		mg/m³	1	6/14/2016
Chlorobenzene	ND	0.0018		mg/m³	1	6/14/2016
Chloroform	0.0083	0.0020		mg/m³	1	6/14/2016
cis-1,2-Dichloroethene	0.015	0.0016		mg/m³	1	6/14/2016
cis-1,3-Dichloropropene	ND	0.0018		mg/m³	1	6/14/2016
Dibromochloromethane	ND	0.0034		mg/m³	1	6/14/2016
Dichlorodifluoromethane	0.0024	0.0020		mg/m³	1	6/14/2016
Ethylbenzene	0.038	0.0018		mg/m³	1	6/14/2016
m,p-Xylene	0.095	0.0034		mg/m³	1	6/14/2016
Methyl tert-butyl ether	ND	0.0014		mg/m³	1	6/14/2016
Methylene chloride	ND	0.014		mg/m³	1	6/14/2016
Naphthalene	0.14	0.0020		mg/m³	1	6/14/2016
o-Xylene	0.032	0.0018		mg/m³	1	6/14/2016
Styrene	0.0044	0.0018		mg/m³	1	6/14/2016
Tetrachloroethene	0.17	0.0028		mg/m³	1	6/14/2016
Toluene	0.34	0.0016		mg/m³	1	6/14/2016
trans-1,2-Dichloroethene	0.0023	0.0016		mg/m³	1	6/14/2016
trans-1,3-Dichloropropene	ND	0.0018		mg/m³	1	6/14/2016
Trichloroethene	0.0058	0.0022		mg/m³	1	6/14/2016
Trichlorofluoromethane	0.0051	0.0022		mg/m³	1	6/14/2016

Qualifiers:

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HT - Sample received past holding time
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R - RPD outside accepted recovery limits
E - Value above quantitation range
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Report Date: June 20, 2016
Print Date: June 20, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Work Order: 16060460 Revision 0
Project: A2147008, L1300 Roosevelt Road, Chicago, IL
Lab ID: 16060460-003A

Client Sample ID: SG-406
Tag Number:
Collection Date: 6/13/2016 12:25:00 PM
Matrix: Air

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds in Air by GC/MS	**TO-15**			Prep Date: **6/14/2016**		Analyst: **VP**
Vinyl acetate	ND	0.014		mg/m³	1	6/14/2016
Vinyl chloride	0.11	0.0010		mg/m³	1	6/14/2016
Xylenes, Total	0.13	0.0053		mg/m³	1	6/14/2016

Qualifiers:

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Report Date: June 20, 2016
Print Date: June 20, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Client Sample ID: SG-402
Work Order: 16060460 Revision 0
Tag Number:
Project: A2147008, L1300 Roosevelt Road, Chicago, IL
Collection Date: 6/13/2016 1:45:00 PM
Lab ID: 16060460-004A
Matrix: Air

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds in Air by GC/MS	**TO-15**			Prep Date: **6/14/2016**		Analyst: **VP**
1,1,1-Trichloroethane	ND	0.0021		mg/m³	1	6/14/2016
1,1,2-Trichloroethane	ND	0.0021		mg/m³	1	6/14/2016
1,1-Dichloroethane	ND	0.0015		mg/m³	1	6/14/2016
1,1-Dichloroethene	ND	0.0015		mg/m³	1	6/14/2016
1,2,4-Trichlorobenzene	ND	0.0028		mg/m³	1	6/14/2016
1,2-Dibromoethane	ND	0.0028		mg/m³	1	6/14/2016
1,2-Dichlorobenzene	ND	0.0023		mg/m³	1	6/14/2016
1,2-Dichloroethane	ND	0.0015		mg/m³	1	6/14/2016
1,2-Dichloropropane	ND	0.0017		mg/m³	1	6/14/2016
1,4-Dichlorobenzene	ND	0.0023		mg/m³	1	6/14/2016
1,4-Dioxane	ND	0.0034		mg/m³	1	6/14/2016
2-Butanone	ND	0.0028		mg/m³	1	6/14/2016
Acetone	0.0098	0.0090	*	mg/m³	1	6/14/2016
Benzene	0.022	0.0011		mg/m³	1	6/14/2016
Bromodichloromethane	ND	0.0024		mg/m³	1	6/14/2016
Bromoform	ND	0.0098		mg/m³	1	6/14/2016
Bromomethane	ND	0.0036		mg/m³	1	6/14/2016
Carbon disulfide	0.12	0.0012		mg/m³	1	6/14/2016
Carbon tetrachloride	ND	0.0024		mg/m³	1	6/14/2016
Chlorobenzene	ND	0.0017		mg/m³	1	6/14/2016
Chloroform	ND	0.0019		mg/m³	1	6/14/2016
cis-1,2-Dichloroethene	0.019	0.0015		mg/m³	1	6/14/2016
cis-1,3-Dichloropropene	ND	0.0017		mg/m³	1	6/14/2016
Dibromochloromethane	ND	0.0032		mg/m³	1	6/14/2016
Dichlorodifluoromethane	0.0020	0.0019		mg/m³	1	6/14/2016
Ethylbenzene	0.059	0.0017		mg/m³	1	6/14/2016
m,p-Xylene	0.21	0.0032		mg/m³	1	6/14/2016
Methyl tert-butyl ether	ND	0.0013		mg/m³	1	6/14/2016
Methylene chloride	ND	0.013		mg/m³	1	6/14/2016
Naphthalene	ND	0.0019		mg/m³	1	6/14/2016
o-Xylene	0.067	0.0017		mg/m³	1	6/14/2016
Styrene	ND	0.0017		mg/m³	1	6/14/2016
Tetrachloroethene	0.56	0.0026		mg/m³	1	6/14/2016
Toluene	0.60	0.030		mg/m³	20	6/14/2016
trans-1,2-Dichloroethene	0.0043	0.0015		mg/m³	1	6/14/2016
trans-1,3-Dichloropropene	ND	0.0017		mg/m³	1	6/14/2016
Trichloroethene	0.11	0.0021		mg/m³	1	6/14/2016
Trichlorofluoromethane	0.0029	0.0021		mg/m³	1	6/14/2016

Qualifiers:
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Report Date: June 20, 2016
Print Date: June 20, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Client Sample ID: SG-402
Work Order: 16060460 Revision 0
Tag Number:
Project: A2147008, L1300 Roosevelt Road, Chicago, IL
Collection Date: 6/13/2016 1:45:00 PM
Lab ID: 16060460-004A
Matrix: Air

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds in Air by GC/MS **TO-15**				Prep Date: **6/14/2016**		Analyst: **VP**
Vinyl acetate	ND	0.013		mg/m³	1	6/14/2016
Vinyl chloride	ND	0.00094		mg/m³	1	6/14/2016
Xylenes, Total	0.28	0.0049		mg/m³	1	6/14/2016

Qualifiers:
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Report Date: June 20, 2016
Print Date: June 20, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc.
Client Sample ID: SG-401
Work Order: 16060460 Revision 0
Tag Number:
Project: A2147008, L1300 Roosevelt Road, Chicago, IL
Collection Date: 6/13/2016 2:30:00 PM
Lab ID: 16060460-005A
Matrix: Air

Volatile Organic Compounds in Air by GC/MS **TO-15** Prep Date: **6/14/2016** Analyst: **VP**

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
1,1,1-Trichloroethane	ND	0.0022		mg/m³	1	6/14/2016
1,1,2-Trichloroethane	ND	0.0022		mg/m³	1	6/14/2016
1,1-Dichloroethane	ND	0.0016		mg/m³	1	6/14/2016
1,1-Dichloroethene	ND	0.0016		mg/m³	1	6/14/2016
1,2,4-Trichlorobenzene	ND	0.0029		mg/m³	1	6/14/2016
1,2-Dibromoethane	ND	0.0029		mg/m³	1	6/14/2016
1,2-Dichlorobenzene	ND	0.0024		mg/m³	1	6/14/2016
1,2-Dichloroethane	ND	0.0016		mg/m³	1	6/14/2016
1,2-Dichloropropane	ND	0.0018		mg/m³	1	6/14/2016
1,4-Dichlorobenzene	ND	0.0024		mg/m³	1	6/14/2016
1,4-Dioxane	ND	0.0035		mg/m³	1	6/14/2016
2-Butanone	0.15	0.0029		mg/m³	1	6/14/2016
Acetone	1.3	0.19	*	mg/m³	20	6/14/2016
Benzene	0.011	0.0012		mg/m³	1	6/14/2016
Bromodichloromethane	ND	0.0026		mg/m³	1	6/14/2016
Bromoform	ND	0.010		mg/m³	1	6/14/2016
Bromomethane	ND	0.0037		mg/m³	1	6/14/2016
Carbon disulfide	0.11	0.0012		mg/m³	1	6/14/2016
Carbon tetrachloride	ND	0.0026		mg/m³	1	6/14/2016
Chlorobenzene	ND	0.0018		mg/m³	1	6/14/2016
Chloroform	0.0094	0.0020		mg/m³	1	6/14/2016
cis-1,2-Dichloroethene	0.11	0.0016		mg/m³	1	6/14/2016
cis-1,3-Dichloropropene	ND	0.0018		mg/m³	1	6/14/2016
Dibromochloromethane	ND	0.0033		mg/m³	1	6/14/2016
Dichlorodifluoromethane	0.0024	0.0020		mg/m³	1	6/14/2016
Ethylbenzene	0.0098	0.0018		mg/m³	1	6/14/2016
m,p-Xylene	0.031	0.0033		mg/m³	1	6/14/2016
Methyl tert-butyl ether	ND	0.0014		mg/m³	1	6/14/2016
Methylene chloride	ND	0.014		mg/m³	1	6/14/2016
Naphthalene	0.0026	0.0020		mg/m³	1	6/14/2016
o-Xylene	0.013	0.0018		mg/m³	1	6/14/2016
Styrene	ND	0.0018		mg/m³	1	6/14/2016
Tetrachloroethene	0.015	0.0027		mg/m³	1	6/14/2016
Toluene	0.049	0.0016		mg/m³	1	6/14/2016
trans-1,2-Dichloroethene	0.017	0.0016		mg/m³	1	6/14/2016
trans-1,3-Dichloropropene	ND	0.0018		mg/m³	1	6/14/2016
Trichloroethene	3.2	0.043		mg/m³	20	6/14/2016
Trichlorofluoromethane	ND	0.0022		mg/m³	1	6/14/2016

Qualifiers:

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- B - Analyte detected in the associated Method Blank
- HT - Sample received past holding time
- * - Non-accredited parameter
- RL - Reporting / Quantitation Limit for the analysis
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- R - RPD outside accepted recovery limits
- E - Value above quantitation range
- H - Holding time exceeded

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Report Date: June 20, 2016
Print Date: June 20, 2016

ANALYTICAL RESULTS

Client:	Terracon Consultants, Inc.	**Client Sample ID:**	SG-401
Work Order:	16060460 Revision 0	**Tag Number:**	
Project:	A2147008, L1300 Roosevelt Road, Chicago, IL	**Collection Date:**	6/13/2016 2:30:00 PM
Lab ID:	16060460-005A	**Matrix:**	Air

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds in Air by GC/MS **TO-15**				Prep Date: **6/14/2016**		Analyst: **VP**
Vinyl acetate	ND	0.014		mg/m³	1	6/14/2016
Vinyl chloride	ND	0.00098		mg/m³	1	6/14/2016
Xylenes, Total	0.044	0.0051		mg/m³	1	6/14/2016

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- HT - Sample received past holding time
- * - Non-accredited parameter
- RL - Reporting / Quantitation Limit for the analysis
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range
- H - Holding time exceeded

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Report Date: June 20, 2016
Print Date: June 20, 2016

ANALYTICAL RESULTS

Client: Terracon Consultants, Inc. **Client Sample ID:** SG-403
Work Order: 16060460 Revision 0 **Tag Number:**
Project: A2147008, L1300 Roosevelt Road, Chicago, IL **Collection Date:** 6/13/2016 3:10:00 PM
Lab ID: 16060460-006A **Matrix:** Air

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds in Air by GC/MS	**TO-15**			Prep Date: **6/14/2016**		Analyst: **VP**
1,1,1-Trichloroethane	ND	0.0020		mg/m³	1	6/14/2016
1,1,2-Trichloroethane	ND	0.0020		mg/m³	1	6/14/2016
1,1-Dichloroethane	ND	0.0015		mg/m³	1	6/14/2016
1,1-Dichloroethene	ND	0.0015		mg/m³	1	6/14/2016
1,2,4-Trichlorobenzene	ND	0.0028		mg/m³	1	6/14/2016
1,2-Dibromoethane	ND	0.0028		mg/m³	1	6/14/2016
1,2-Dichlorobenzene	ND	0.0022		mg/m³	1	6/14/2016
1,2-Dichloroethane	ND	0.0015		mg/m³	1	6/14/2016
1,2-Dichloropropane	ND	0.0017		mg/m³	1	6/14/2016
1,4-Dichlorobenzene	ND	0.0022		mg/m³	1	6/14/2016
1,4-Dioxane	ND	0.0033		mg/m³	1	6/14/2016
2-Butanone	ND	0.0028		mg/m³	1	6/14/2016
Acetone	0.031	0.0089	*	mg/m³	1	6/14/2016
Benzene	0.0089	0.0011		mg/m³	1	6/14/2016
Bromodichloromethane	ND	0.0024		mg/m³	1	6/14/2016
Bromoform	ND	0.0096		mg/m³	1	6/14/2016
Bromomethane	ND	0.0035		mg/m³	1	6/14/2016
Carbon disulfide	0.062	0.0012		mg/m³	1	6/14/2016
Carbon tetrachloride	ND	0.0024		mg/m³	1	6/14/2016
Chlorobenzene	ND	0.0017		mg/m³	1	6/14/2016
Chloroform	ND	0.0019		mg/m³	1	6/14/2016
cis-1,2-Dichloroethene	ND	0.0015		mg/m³	1	6/14/2016
cis-1,3-Dichloropropene	ND	0.0017		mg/m³	1	6/14/2016
Dibromochloromethane	ND	0.0031		mg/m³	1	6/14/2016
Dichlorodifluoromethane	0.0020	0.0019		mg/m³	1	6/14/2016
Ethylbenzene	0.021	0.0017		mg/m³	1	6/14/2016
m,p-Xylene	0.070	0.0031		mg/m³	1	6/14/2016
Methyl tert-butyl ether	ND	0.0013		mg/m³	1	6/14/2016
Methylene chloride	ND	0.013		mg/m³	1	6/14/2016
Naphthalene	ND	0.0019		mg/m³	1	6/14/2016
o-Xylene	0.023	0.0017		mg/m³	1	6/14/2016
Styrene	ND	0.0017		mg/m³	1	6/14/2016
Tetrachloroethene	0.0064	0.0026		mg/m³	1	6/14/2016
Toluene	0.20	0.0015		mg/m³	1	6/14/2016
trans-1,2-Dichloroethene	ND	0.0015		mg/m³	1	6/14/2016
trans-1,3-Dichloropropene	ND	0.0017		mg/m³	1	6/14/2016
Trichloroethene	ND	0.0020		mg/m³	1	6/14/2016
Trichlorofluoromethane	0.0021	0.0020		mg/m³	1	6/14/2016

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter
RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

STAT Analysis Corporation

2242 West Harrison St., Suite 200, Chicago, IL 60612-3766
Tel: (312) 733-0551 Fax: (312) 733-2386 STATinfo@STATAnalysis.com
Accreditations:IEPA ELAP 100445;ORELAP IL300001;AIHA-LAP, LLC 101160;NVLAP LabCode 101202-0

Report Date: June 20, 2016
Print Date: June 20, 2016

ANALYTICAL RESULTS

Client:	Terracon Consultants, Inc.	**Client Sample ID:**	SG-403
Work Order:	16060460 Revision 0	**Tag Number:**	
Project:	A2147008, L1300 Roosevelt Road, Chicago, IL	**Collection Date:**	6/13/2016 3:10:00 PM
Lab ID:	16060460-006A	**Matrix:**	Air

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds in Air by GC/MS **TO-15**				Prep Date: **6/14/2016**		Analyst: **VP**
Vinyl acetate	ND	0.013		mg/m³	1	6/14/2016
Vinyl chloride	ND	0.00093		mg/m³	1	6/14/2016
Xylenes, Total	0.093	0.0048		mg/m³	1	6/14/2016

Qualifiers:
- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- HT - Sample received past holding time
- * - Non-accredited parameter
- RL - Reporting / Quantitation Limit for the analysis
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range
- H - Holding time exceeded

STAT Analysis Corporation
2242 W. Harrison Suite 200, Chicago, Illinois 60612 Phone: (312) 733-0551 Fax: (312) 733-2386
e-mail address: STATinfo@STATAnalysis.com AIHA, NVLAP and NELAP accredited

CHAIN OF CUSTODY RECORD

Nº: 864124 Page: 1 of 1

Company: Terracon Consultants
Project Number: A2147008 Client Tracking No.:
Project Name: 4/300 Roosevelt Road
Project Location: " " Chicago, IL
Sampler(s): ZFJ
Report To: Rich O'Brien Phone: 1-312-443-2958
Fax:
e-mail: Rich.O'Brien@terracon.com
QC Level: 1 ___ 2 ___ 3 ___ 4 ___

P.O. No.:
Quote No.:

Turn Around: Standard
Results Needed: / / am/pm

Client Sample Number/Description:	Date Taken	Time Taken	Matrix	Comp.	Grab	Preserv.	No. of Containers	VOCs (TO-15)	Remarks	Lab No.:
SG-404	6-13-16	10:30am	SG				1	X	reg# = C08	001
SG-405	↓	11:20am	↓				1	X	reg# = C05	002
SG-406	↓	12:25pm	↓				1	X	reg# = C03	003
SG-402	↓	1:45pm	↓				1	X	reg# = C04	004
SG-401	↓	2:30pm	↓				1	X	reg# = C02	005
SG-403	↓	3:10pm	↓				1	X	reg# = C07	006

Relinquished by: (Signature) [signature] Date/Time: 6-13-16 / 1540
Received by: (Signature) Martin Kim Date/Time: 6/13/16 15:40
Relinquished by: (Signature) Date/Time:
Received by: (Signature) Date/Time:
Relinquished by: (Signature) Date/Time:
Received by: (Signature) Date/Time:

Comments:

Preservation Code: A = None B = HNO_3 C = NaOH D = H_2SO_4 E = HCl F = 5035/EnCore G = Other

Laboratory Work Order No.: 16060460

Received on Ice: Yes ☐ No ☑

Temperature: Ambient °C

STAT Analysis Corporation

Sample Receipt Checklist

Client Name TERRACON-NAPERVILLE

Date and Time Received: 6/13/2016 3:40:00 PM

Work Order Number 16060460

Received by: MGK

Checklist completed by: Martin Kunan 6/13/16
Signature Date

Reviewed by: [initials] 6/14/16
Initials Date

Matrix:

Carrier name Client Delivered

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels/containers?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container or Temp Blank temperature in compliance?	Yes ☑	No ☐	Temperature Ambient °C
Water - VOA vials have zero headspace?	No VOA vials submitted ☐	Yes ☐	No ☐
Water - Samples pH checked?	Yes ☐	No ☐	Checked by:
Water - Samples properly preserved?	Yes ☐	No ☐	pH Adjusted?

Any No response must be detailed in the comments section below.

Comments:

Client / Person contacted:

Date contacted:

Contacted by:

Response:

Attachment 8 – Tier 2 Soil Gas Calculations

R7 - Remediation Objective for Carcinogenic Contaminants

Benzene SB20 (3')

$$RO_{outdoor\ inhalation} = \frac{RBSL_{air} \cdot 10^{-3}}{VF_{samb}}$$

Parameter	Source	Value	Units
Tier 2 Objective ($RO_{outdoor\ inhalation}$)	R7	**0.4**	**mg/kg**
Risk - Based Screening Level for Air ($RBSL_{air}$)	R9	5.30E-01	ug/m^3
Volatilization Factor - Subsurface Soil to Ambient Air (VF_{samb})	R11	1.33E-03	unitless
Tier 1 Objective - (I/C)	Appendix B, Table B	1.6	mg/kg

R9 - Carcinogenic Contaminants Risk - Based Screening Level for Air $RBSL_{air}$

$$RBSL_{air} = \frac{TR \cdot BW \cdot AT_c \cdot 365 \frac{d}{yr} \cdot 10^3 \frac{ug}{mg}}{SF_i \cdot IR_{air} \cdot EF \cdot ED}$$

Parameter	Source	Value	Units
Target Risk (I/C) (TR)	Appendix C, Table D	1.00E-06	unitless
Adult Body Weight (BW)	Appendix C, Table D	70	kg
Averaging time for Carcinogens (ATc)	Appendix C, Table D	70	years
Daily Outdoor Inhalation Rate (IR_{air})	Appendix C, Table D	20	m^3/day
Exposure Duration (I/C) (ED)	Appendix C, Table D	25	years
Exposure Frequency (I/C) (EF)	Appendix C, Table D	250	days/year

Chemical Specific Parameters	Inhalation Cancer Slope Factor (SF_i)* (mg/kg-d)$^{-1}$	Equation	$RBSL_{air}$ (µg/m^3)
Benzene	2.7E-02	R9	**5.30E-01**

* Values are from http://www.epa.state.il.us/land/taco/toxicity-values.xls

R11- Volatilization Factor - Subsurface Soil to Ambient Air

$$VF_{samb} = \frac{H' \rho_s \cdot 10^3 \frac{cm^3 \times kg}{m^3 \times g}}{\left[\theta_{ws} + \left(k_s \cdot \rho_s\right) + \left(H' \theta_{as}\right)\right] \cdot \left[1 + \frac{\left(U_{air} \cdot \delta_{air} \cdot L_s\right)}{\left(D_s^{eff} \cdot W\right)}\right]}$$

Parameter	Source	Value	Units
Volatilization Factor - Subsurface Soil to Ambient Air (VF_{samb})	R11	**1.33E-03**	$(mg/m^3)/(mg/kg_{soil})$
Henry's Law Constant (H')	App C Table E	2.30E-01	dimensionless
Soil particle density (Specific Gravity), (ρ_s)	Harza 1998 ROR, ASTM Method D854	2.79	g/cm^3
Volumetric Water Content in Vadose Zone Soils (θ_{ws})	App C Table D Surface Default	0.15	cm^3_{water}/cm^3_{soil}
Soil-Water Sorption Coefficient (k_s)	App C Table D - R20	0.73	cm^3_{water}/g_{soil}
Volumetric Air Content in Vadose Zone Soils (θ_{as})	App C Table D Surface Default	0.28	cm^3_{air}/cm^3_{soil}
Average Windspeed Above Ground Surface in Ambient Mixing Zone (U_{air})	App C Table D	225	cm/s
Ambient Air Mixing Zone Height (δ_{air})	App C Table D	200	cm
Depth to Subsurface Soil Sources (L_s)	App C Table D	100	cm
Effective Diffusion Coefficient in Soil Based on Vapor-Phase Concentration (D_s^{eff})	R6	6.86E-03	cm^2/s
Width of Source Area Parallel to Direction of Wind or Groundwater Movement (W)	Site-Specific, See 2015 CSI Exhibit 7	3048	cm

R6 - Effective Diffusion Coefficient in Soil (D_s^{eff})

$$D_s^{eff} = \frac{D^{air} \cdot \theta_{as}^{3.33}}{\theta_T^2} + \frac{D^{water} \cdot \theta_{ws}^{3.33}}{H' \theta_T^2}$$

Parameter	Source	Value	Units
Effective Diffusion Coefficient in Soil (D_s^{eff})	R6	**6.86E-03**	cm^2/s
Diffusion Coefficient in Air (D^{air})	App C Table E	8.80E-02	cm^2/s
Volumetric Air Content in Vadose Zone Soils ($\theta_{as}^{3.33}$)	App C Table D, surface value	0.28	cm^3_{air}/cm^3_{soil}
Diffusion Coefficient in Water (D^{water})	App C Table E	1.02E-05	cm^2/s
Volumetric Water Content in Vadose Zone Soils ($\theta_{ws}^{3.33}$)	App C Table D, surface value	0.15	cm^3_{water}/cm^3_{soil}
Henry's Law Constant (H')	App C Table E	2.30E-01	dimensionless
Total porosity of soil layer (θ_T)	App C Table D	0.43	cm^3_{air}/cm^3_{soil}

R20 - Soil-Water Sorption Coefficient (k_s)

$$k_s = K_{oc} \cdot f_{oc}$$

Parameter	Source	Value	Units
Soil-Water Sorption Coefficient (k_s)	R20	**0.73**	cm^3_{water}/g_{soil}
Organic Carbon Partition Coefficient (K_{oc})	App C Table E	5.00E+01	cm^3/g
Organic Carbon Content of Soil (f_{oc})	Site-specific B-201 (6-8') See Table 3-2 2015 CSI/ROR/RAP	0.0145	g/g

R7 - Remediation Objective for Carcinogenic Contaminants

PCE B-203 (14-16')

$$RO_{\text{outdoor inhalation}} = \frac{RBSL_{air} \cdot 10^{-3}}{VF_{samb}}$$

Parameter	Source	Value	Units
Tier 2 Objective ($RO_{\text{outdoor inhalation}}$)	R7	**222.7**	mg/kg
Risk - Based Screening Level for Air ($RBSL_{air}$)	R9	1.57E+01	ug/m^3
Volatilization Factor - Subsurface Soil to Ambient Air (VF_{samb})	R11	7.06E-05	unitless
Tier 1 Objective - (I/C)	Appendix B, Table B	20	mg/kg

R9 - Carcinogenic Contaminants Risk - Based Screening Level for Air $RBSL_{air}$

$$RBSL_{air} = \frac{TR \cdot BW \cdot AT_c \cdot 365 \frac{d}{yr} \cdot 10^3 \frac{ug}{mg}}{SF_i \cdot IR_{air} \cdot EF \cdot ED}$$

Parameter	Source	Value	Units
Target Risk (I/C) (TR)	Appendix C, Table D	1.00E-06	unitless
Adult Body Weight (BW)	Appendix C, Table D	70	kg
Averaging time for Carcinogens (ATc)	Appendix C, Table D	70	years
Daily Outdoor Inhalation Rate (IR_{air})	Appendix C, Table D	20	m^3/day
Exposure Duration (I/C) (ED)	Appendix C, Table D	25	years
Exposure Frequency (I/C) (EF)	Appendix C, Table D	250	days/year

Chemical Specific Parameters	Inhalation Cancer Slope Factor (SF_i)* (mg/kg-d)$^{-1}$	Equation	$RBSL_{air}$ (µg/m^3)
Tetrachloroethene (PCE)	9.1E-04	R9	**1.57E+01**

* Values are from http://www.epa.state.il.us/land/taco/toxicity-values.xls

R11- Volatilization Factor - Subsurface Soil to Ambient Air

$$VF_{samb} = \frac{H' \rho_s \cdot 10^3 \frac{cm^3 \times kg}{m^3 \times g}}{\left[\theta_{ws} + \left(k_s \cdot \rho_s\right) + \left(H' \theta_{as}\right)\right] \cdot \left[1 + \frac{\left(U_{air} \cdot \delta_{air} \cdot L_s\right)}{\left(D_s^{eff} \cdot W\right)}\right]}$$

Parameter	Source	Value	Units
Volatilization Factor - Subsurface Soil to Ambient Air (VFsamb)	R11	**7.06E-05**	$(mg/m^3)/(mg/kg_{soil})$
Henry's Law Constant (H')	App C Table E	7.38E-01	dimensionless
Soil particle density (ρ_s)	Harza 1998 ROR, ASTM Method D854	2.79	g/cm^3
Volumetric Water Content in Vadose Zone Soils (θ_{ws})	App C Table D Subsurface Default	0.30	cm^3_{water}/cm^3_{soil}
Soil-Water Sorption Coefficient (k_s)	App C Table D - R20	9.15	cm^3_{water}/g_{soil}
Volumetric Air Content in Vadose Zone Soils (θ_{as})	App C Table D Subsurface Default	0.13	cm^3_{air}/cm^3_{soil}
Average Windspeed Above Ground Surface in Ambient Mixing Zone (U_{air})	App C Table D	225	cm/s
Ambient Air Mixing Zone Height (δ_{air})	App C Table D	200	cm
Depth to Subsurface Soil Sources (L_s)	App C Table D	100	cm
Effective Diffusion Coefficient in Soil Based on Vapor-Phase Concentration (D_s^{eff})	R6	4.37E-04	cm^2/s
Width of Source Area Parallel to Direction of Wind or Groundwater Movement (W)	Site-Specific, See 2015 CSI Exhibit 7	9144	cm

R6 - Effective Diffusion Coefficient in Soil (D_s^{eff})

$$D_s^{eff} = \frac{D^{air} \cdot \theta_{as}^{3.33}}{\theta_T^2} + \frac{D^{water} \cdot \theta_{ws}^{3.33}}{H' \theta_T^2}$$

Parameter	Source	Value	Units
Effective Diffusion Coefficient in Soil (D_s^{eff})	R6	**4.37E-04**	cm^2/s
Diffusion Coefficient in Air (D^{air})	App C Table E	7.20E-02	cm^2/s
Volumetric Air Content in Vadose Zone Soils ($\theta_{as}^{3.33}$)	App C Table D, subsurface value	0.13	cm^3_{air}/cm^3_{soil}
Diffusion Coefficient in Water (D^{water})	App C Table E	8.20E-06	cm^2/s
Volumetric Water Content in Vadose Zone Soils ($\theta_{ws}^{3.33}$)	App C Table D, subsurface value	0.30	cm^3_{water}/cm^3_{soil}
Henry's Law Constant (H')	App C Table E	7.38E-01	dimensionless
Total porosity of soil layer (θ_T)	App C Table D	0.43	cm^3_{air}/cm^3_{soil}

R20 - Soil-Water Sorption Coefficient (k_s)

$$k_s = K_{oc} \cdot f_{oc}$$

Parameter	Source	Value	Units
Soil-Water Sorption Coefficient (k_s)	R20	**9.15**	cm^3_{water}/g_{soil}
Organic Carbon Partition Coefficient (K_{oc})	App C Table E	6.31E+02	cm^3/g
Organic Carbon Content of Soil (f_{oc})	Site-specific B-201 (6-8') See Table 3-2 2015 CSI/ROR/RAP	0.0145	g/g

R7 - Remediation Objective for Carcinogenic Contaminants

TCE SB12 (4-6')

$$RO_{\text{outdoor inhalation}} = \frac{RBSL_{air} \cdot 10^{-3}}{VF_{samb}}$$

Parameter	Source	Value	Units
Tier 2 Objective ($RO_{\text{outdoor inhalation}}$)	R7	**12.1**	mg/kg
Risk - Based Screening Level for Air ($RBSL_{air}$)	R9	1.02E+00	ug/m^3
Volatilization Factor - Subsurface Soil to Ambient Air (VF_{samb})	R11	8.47E-05	unitless
Tier 1 Objective - (I/C)	Appendix B, Table B	8.9	mg/kg

R9 - Carcinogenic Contaminants Risk - Based Screening Level for Air $RBSL_{air}$

$$RBSL_{air} = \frac{TR \cdot BW \cdot AT_c \cdot 365 \frac{d}{yr} \cdot 10^3 \frac{ug}{mg}}{SF_i \cdot IR_{air} \cdot EF \cdot ED}$$

Parameter	Source	Value	Units
Target Risk (I/C) (TR)	Appendix C, Table D	1.00E-06	unitless
Adult Body Weight (BW)	Appendix C, Table D	70	kg
Averaging time for Carcinogens (ATc)	Appendix C, Table D	70	years
Daily Outdoor Inhalation Rate (IR_{air})	Appendix C, Table D	20	m^3/day
Exposure Duration (I/C) (ED)	Appendix C, Table D	25	years
Exposure Frequency (I/C) (EF)	Appendix C, Table D	250	days/year

Chemical Specific Parameters	Inhalation Cancer Slope Factor (SF_i)* (mg/kg-d)$^{-1}$	Equation	$RBSL_{air}$ (µg/m^3)
Trichloroethene (TCE)	1.4E-02	R9	**1.02E+00**

* Values are from http://www.epa.state.il.us/land/taco/toxicity-values.xls

R11- Volatilization Factor - Subsurface Soil to Ambient Air

$$VF_{samb} = \frac{H' \cdot \rho_s \cdot 10^3 \frac{cm^3 \times kg}{m^3 \times g}}{\left[\theta_{ws} + \left(k_s \cdot \rho_s\right) + \left(H' \theta_{as}\right)\right] \cdot \left[1 + \frac{\left(U_{air} \cdot \delta_{air} \cdot L_s\right)}{\left(D_s^{eff} \cdot W\right)}\right]}$$

Parameter	Source	Value	Units
Volatilization Factor - Subsurface Soil to Ambient Air (VF_{samb})	R11	**8.47E-05**	$(mg/m^3)/(mg/kg_{soil})$
Henry's Law Constant (H')	App C Table E	4.10E-01	dimensionless
Soil particle density (ρ_s)	Harza 1998 ROR, ASTM Method D854	2.79	g/cm^3
Volumetric Water Content in Vadose Zone Soils (θ_{ws})	App C Table D Subsurface Default	0.30	cm^3_{water}/cm^3_{soil}
Soil-Water Sorption Coefficient (k_s)	App C Table D - R20	1.45	cm^3_{water}/g_{soil}
Volumetric Air Content in Vadose Zone Soils (θ_{as})	App C Table D Subsurface Default	0.13	cm^3_{air}/cm^3_{soil}
Average Windspeed Above Ground Surface in Ambient Mixing Zone (U_{air})	App C Table D	225	cm/s
Ambient Air Mixing Zone Height (δ_{air})	App C Table D	200	cm
Depth to Subsurface Soil Sources (L_s)	App C Table D	100	cm
Effective Diffusion Coefficient in Soil Based on Vapor-Phase Concentration (D_s^{eff})	R6	4.81E-04	cm^2/s
Width of Source Area Parallel to Direction of Wind or Groundwater Movement (W)	Site-Specific, See 2015 CSI Exhibit 7	3048	cm

R6 - Effective Diffusion Coefficient in Soil (D_s^{eff})

$$D_s^{eff} = \frac{D^{air} \cdot \theta_{as}^{3.33}}{\theta_T^2} + \frac{D^{water} \cdot \theta_{ws}^{3.33}}{H' \theta_T^2}$$

Parameter	Source	Value	Units
Effective Diffusion Coefficient in Soil (D_s^{eff})	R6	**4.81E-04**	cm^2/s
Diffusion Coefficient in Air (D^{air})	App C Table E	7.90E-02	cm^2/s
Volumetric Air Content in Vadose Zone Soils ($\theta_{as}^{3.33}$)	App C Table D, subsurface value	0.13	cm^3_{air}/cm^3_{soil}
Diffusion Coefficient in Water (D^{water})	App C Table E	9.10E-06	cm^2/s
Volumetric Water Content in Vadose Zone Soils ($\theta_{ws}^{3.33}$)	App C Table D, subsurface value	0.30	cm^3_{water}/cm^3_{soil}
Henry's Law Constant (H')	App C Table E	4.10E-01	dimensionless
Total porosity of soil layer (θ_T)	App C Table D	0.43	cm^3_{air}/cm^3_{soil}

R20 - Soil-Water Sorption Coefficient (k_s)

$$k_s = K_{oc} \cdot f_{oc}$$

Parameter	Source	Value	Units
Soil-Water Sorption Coefficient (k_s)	R20	**1.45**	cm^3_{water}/g_{soil}
Organic Carbon Partition Coefficient (K_{oc})	App C Table E	1.00E+02	cm^3/g
Organic Carbon Content of Soil (f_{oc})	Site-specific B-201 (6-8') See Table 3-2 2015 CSI/ROR/RAP	0.0145	g/g

R8 - Remediation Objective for Noncarcinogenic Contaminants

PCE B-203 (14-16')

$$RO_{\text{outdoor inhalation}} = \frac{RBSL_{air} \cdot 10^{-3}}{VF_{samb}}$$

Parameter	Source	Value	Units
Tier 2 Objective ($RO_{\text{outdoor inhalation}}$)	R8	**827.2**	mg/kg
Risk - Based Screening Level for Air ($RBSL_{air}$)	R10	5.84E+01	ug/m^3
Volatilization Factor - Subsurface Soil to Ambient Air (VF_{samb})	R11	7.06E-05	unitless
Tier 1 Objective - (I/C)	Appendix B, Table B	20	mg/kg

R10 - Noncarcinogenic Contaminants Risk - Based Screening Level for Air $RBSL_{air}$

$$RBSL_{air} = \frac{THQ \cdot RfD_i \cdot BW \cdot AT_n \cdot 365\frac{d}{yr} \cdot 10^3 \frac{ug}{mg}}{IR_{air} \cdot EF \cdot ED}$$

Parameter	Source	Value	Units
Target Hazard Quotient (I/C) (THQ)	Appendix C, Table D	1.0	unitless
Adult Body Weight (BW)	Appendix C, Table D	70	kg
Averaging time for Noncarcinogenics (I/C) (ATn)	Appendix C, Table D	25	years
Daily Outdoor Inhalation Rate (IR_{air})	Appendix C, Table D	20	m^3/day
Exposure Duration (I/C) (ED)	Appendix C, Table D	25	years
Exposure Frequency (I/C) (EF)	Appendix C, Table D	250	days/year

Chemical Specific Parameters	Inhalation Reference Dose (RfD_i) (mg/kg-d)	Equation	$RBSL_{air}$ (µg/m^3)
Tetrachloroethene (PCE)	1.1E-02	R10	**5.84E+01**

* Values are from http://www.epa.state.il.us/land/taco/toxicity-values.xls updated June 2015

R11- Volatilization Factor - Subsurface Soil to Ambient Air

$$VF_{samb} = \frac{H' \rho_s \cdot 10^3 \, \frac{cm^3 \times kg}{m^3 \times g}}{\left[\theta_{ws} + \left(k_s \cdot \rho_s\right) + \left(H' \theta_{as}\right)\right] \cdot \left[1 + \frac{\left(U_{air} \cdot \delta_{air} \cdot L_s\right)}{\left(D_s^{eff} \cdot W\right)}\right]}$$

Parameter	Source	Value	Units
Volatilization Factor - Subsurface Soil to Ambient Air (VFsamb)	R11	**7.06E-05**	$(mg/m^3)/(mg/kg_{soil})$
Henry's Law Constant (H')	App C Table E	7.38E-01	dimensionless
Soil particle density (ρ_s)	Harza 1998 ROR, ASTM Method D854	2.79	g/cm^3
Volumetric Water Content in Vadose Zone Soils (θ_{ws})	App C Table D Subsurface Default	0.30	cm^3_{water}/cm^3_{soil}
Soil-Water Sorption Coefficient (k_s)	App C Table D - **R20**	9.15	cm^3_{water}/g_{soil}
Volumetric Air Content in Vadose Zone Soils (θ_{as})	App C Table D Subsurface Default	0.13	cm^3_{air}/cm^3_{soil}
Average Windspeed Above Ground Surface in Ambient Mixing Zone (U_{air})	App C Table D	225	cm/s
Ambient Air Mixing Zone Height (δ_{air})	App C Table D	200	cm
Depth to Subsurface Soil Sources (L_s)	App C Table D	100	cm
Effective Diffusion Coefficient in Soil Based on Vapor-Phase Concentration (D_s^{eff})	**R6**	4.37E-04	cm^2/s
Width of Source Area Parallel to Direction of Wind or Groundwater Movement (W)	Site-Specific, See 2015 CSI Exhibit 7	9144	cm

R6 - Effective Diffusion Coefficient in Soil (D_s^{eff})

$$D_s^{eff} = \frac{D^{air} \cdot \theta_{as}^{3.33}}{\theta_T^2} + \frac{D^{water} \cdot \theta_{ws}^{3.33}}{H' \theta_T^2}$$

Parameter	Source	Value	Units
Effective Diffusion Coefficient in Soil (D_s^{eff})	R6	**4.37E-04**	cm^2/s
Diffusion Coefficient in Air (D^{air})	App C Table E	7.20E-02	cm^2/s
Volumetric Air Content in Vadose Zone Soils ($\theta_{as}^{3.33}$)	App C Table D, subsurface value	0.13	cm^3_{air}/cm^3_{soil}
Diffusion Coefficient in Water (D^{water})	App C Table E	8.20E-06	cm^2/s
Volumetric Water Content in Vadose Zone Soils ($\theta_{ws}^{3.33}$)	App C Table D, subsurface value	0.30	cm^3_{water}/cm^3_{soil}
Henry's Law Constant (H')	App C Table E	7.38E-01	dimensionless
Total porosity of soil layer (θ_T)	App C Table D	0.43	cm^3_{air}/cm^3_{soil}

R20 - Soil-Water Sorption Coefficient (k_s)

$$k_s = K_{oc} \cdot f_{oc}$$

Parameter	Source	Value	Units
Soil-Water Sorption Coefficient (k_s)	R20	**9.15**	cm^3_{water}/g_{soil}
Organic Carbon Partition Coefficient (K_{oc})	App C Table E	6.31E+02	cm^3/g
Organic Carbon Content of Soil (f_{oc})	Site-specific B-201 (6-8') See Table 3-2 2015 CSI/ROR/RAP	0.0145	g/g

R8 - Remediation Objective for Noncarcinogenic Contaminants **TCE** SB12 (4-6')

$$RO_{outdoor\ inhalation} = \frac{RBSL_{air} \cdot 10^{-3}}{VF_{samb}}$$

Parameter	Source	Value	Units
Tier 2 Objective ($RO_{outdoor\ inhalation}$)	R8	**34.5**	mg/kg
Risk - Based Screening Level for Air ($RBSL_{air}$)	R10	2.92E+00	ug/m^3
Volatilization Factor - Subsurface Soil to Ambient Air (VF_{samb})	R11	8.47E-05	unitless
Tier 1 Objective - (I/C)	Appendix B, Table B	8.9	mg/kg

R10 - Noncarcinogenic Contaminants Risk - Based Screening Level for Air $RBSL_{air}$

$$RBSL_{air} = \frac{THQ \cdot RfD_i \cdot BW \cdot AT_n \cdot 365\frac{d}{yr} \cdot 10^3\frac{ug}{mg}}{IR_{air} \cdot EF \cdot ED}$$

Parameter	Source	Value	Units
Target Hazard Quotient (I/C) (THQ)	Appendix C, Table D	1.0	unitless
Adult Body Weight (BW)	Appendix C, Table D	70	kg
Averaging time for Noncarcinogenics (I/C) (ATn)	Appendix C, Table D	25	years
Daily Outdoor Inhalation Rate (IR_{air})	Appendix C, Table D	20	m^3/day
Exposure Duration (I/C) (ED)	Appendix C, Table D	25	years
Exposure Frequency (I/C) (EF)	Appendix C, Table D	250	days/year

Chemical Specific Parameters	Inhalation Reference Dose (RfD_i) (mg/kg-d)	Equation	$RBSL_{air}$ (µg/m^3)
Trichloroethene (TCE)	5.7E-04	R10	**2.92E+00**

* Values are from http://www.epa.state.il.us/land/taco/toxicity-values.xls updated June 2015

R11- Volatilization Factor - Subsurface Soil to Ambient Air

$$VF_{samb} = \frac{H' \rho_s \cdot 10^3 \frac{cm^3 \times kg}{m^3 \times g}}{\left[\theta_{ws} + \left(k_s \cdot \rho_s\right) + \left(H' \theta_{as}\right)\right] \cdot \left[1 + \frac{\left(U_{air} \cdot \delta_{air} \cdot L_s\right)}{\left(D_s^{eff} \cdot W\right)}\right]}$$

Parameter	Source	Value	Units
Volatilization Factor - Subsurface Soil to Ambient Air (VF_{samb})	R11	**8.47E-05**	$(mg/m^3)/(mg/kg_{soil})$
Henry's Law Constant (H')	App C Table E	4.10E-01	dimensionless
Soil particle density (ρ_s)	Harza 1998 ROR, ASTM Method D854	2.79	g/cm^3
Volumetric Water Content in Vadose Zone Soils (θ_{ws})	App C Table D Subsurface Default	0.30	cm^3_{water}/cm^3_{soil}
Soil-Water Sorption Coefficient (k_s)	App C Table D - R20	1.45	cm^3_{water}/g_{soil}
Volumetric Air Content in Vadose Zone Soils (θ_{as})	App C Table D Subsurface Default	0.13	cm^3_{air}/cm^3_{soil}
Average Windspeed Above Ground Surface in Ambient Mixing Zone (U_{air})	App C Table D	225	cm/s
Ambient Air Mixing Zone Height (δ_{air})	App C Table D	200	cm
Depth to Subsurface Soil Sources (L_s)	App C Table D	100	cm
Effective Diffusion Coefficient in Soil Based on Vapor-Phase Concentration (D_s^{eff})	R6	4.81E-04	cm^2/s
Width of Source Area Parallel to Direction of Wind or Groundwater Movement (W)	Site-Specific, See 2015 CSI Exhibit 7	3048	cm

R6 - Effective Diffusion Coefficient in Soil (D_s^{eff})

$$D_s^{eff} = \frac{D^{air} \cdot \theta_{as}^{3.33}}{\theta_T^2} + \frac{D^{water} \cdot \theta_{ws}^{3.33}}{H' \theta_T^2}$$

Parameter	Source	Value	Units
Effective Diffusion Coefficient in Soil (D_s^{eff})	R6	**4.81E-04**	cm^2/s
Diffusion Coefficient in Air (D^{air})	App C Table E	7.90E-02	cm^2/s
Volumetric Air Content in Vadose Zone Soils ($\theta_{as}^{3.33}$)	App C Table D, subsurface value	0.13	cm^3_{air}/cm^3_{soil}
Diffusion Coefficient in Water (D^{water})	App C Table E	9.10E-06	cm^2/s
Volumetric Water Content in Vadose Zone Soils ($\theta_{ws}^{3.33}$)	App C Table D, subsurface value	0.30	cm^3_{water}/cm^3_{soil}
Henry's Law Constant (H')	App C Table E	4.10E-01	dimensionless
Total porosity of soil layer (θ_T)	App C Table D	0.43	cm^3_{air}/cm^3_{soil}

R20 - Soil-Water Sorption Coefficient (k_s)

$$k_s = K_{oc} \cdot f_{oc}$$

Parameter	Source	Value	Units
Soil-Water Sorption Coefficient (k_s)	R20	**1.45**	cm^3_{water}/g_{soil}
Organic Carbon Partition Coefficient (K_{oc})	App C Table E	1.00E+02	cm^3/g
Organic Carbon Content of Soil (f_{oc})	Site-specific B-201 (6-8') See Table 3-2 2015 CSI/ROR/RAP	0.0145	g/g

R8 - Remediation Objective for Noncarcinogenic Contaminants

Benzene SB20 (3')

$$RO_{\text{outdoor inhalation}} = \frac{RBSL_{air} \cdot 10^{-3}}{VF_{samb}}$$

Parameter	Source	Value	Units
Tier 2 Objective ($RO_{\text{outdoor inhalation}}$)	R8	**32.8**	mg/kg
Risk - Based Screening Level for Air ($RBSL_{air}$)	R10	4.38E+01	ug/m^3
Volatilization Factor - Subsurface Soil to Ambient Air (VF_{samb})	R11	1.33E-03	unitless
Tier 1 Objective - (I/C)	Appendix B, Table B	1.6	mg/kg

R10 - Noncarcinogenic Contaminants Risk - Based Screening Level for Air $RBSL_{air}$

$$RBSL_{air} = \frac{THQ \cdot RfD_i \cdot BW \cdot AT_n \cdot 365 \frac{d}{yr} \cdot 10^3 \frac{ug}{mg}}{IR_{air} \cdot EF \cdot ED}$$

Parameter	Source	Value	Units
Target Hazard Quotient (I/C) (THQ)	Appendix C, Table D	1.0	unitless
Adult Body Weight (BW)	Appendix C, Table D	70	kg
Averaging time for Noncarcinogens (I/C) (ATn)	Appendix C, Table D	25	years
Daily Outdoor Inhalation Rate (IR_{air})	Appendix C, Table D	20	m^3/day
Exposure Duration (I/C) (ED)	Appendix C, Table D	25	years
Exposure Frequency (I/C) (EF)	Appendix C, Table D	250	days/year

Chemical Specific Parameters	Inhalation Reference Dose (RfD_i) (mg/kg-d)	Equation	$RBSL_{air}$ (µg/m^3)
Benzene	8.6E-03	R10	**4.38E+01**

* Values are from http://www.epa.state.il.us/land/taco/toxicity-values.xls updated June 2015

R11- Volatilization Factor - Subsurface Soil to Ambient Air

$$VF_{samb} = \frac{H' \rho_s \cdot 10^3 \frac{cm^3 \times kg}{m^3 \times g}}{\left[\theta_{ws} + \left(k_s \cdot \rho_s\right) + \left(H' \theta_{as}\right)\right] \cdot \left[1 + \frac{\left(U_{air} \cdot \delta_{air} \cdot L_s\right)}{\left(D_s^{eff} \cdot W\right)}\right]}$$

Parameter	Source	Value	Units
Volatilization Factor - Subsurface Soil to Ambient Air (VF_{samb})	R11	**1.33E-03**	$(mg/m^3)/(mg/kg_{soil})$
Henry's Law Constant (H')	App C Table E	2.30E-01	dimensionless
Soil particle density (Specific Gravity), (ρ_s)	Harza 1998 ROR, ASTM Method D854	2.79	g/cm^3
Volumetric Water Content in Vadose Zone Soils (θ_{ws})	App C Table D Surface Default	0.15	cm^3_{water}/cm^3_{soil}
Soil-Water Sorption Coefficient (k_s)	App C Table D - R20	0.73	cm^3_{water}/g_{soil}
Volumetric Air Content in Vadose Zone Soils (θ_{as})	App C Table D Surface Default	0.28	cm^3_{air}/cm^3_{soil}
Average Windspeed Above Ground Surface in Ambient Mixing Zone (U_{air})	App C Table D	225	cm/s
Ambient Air Mixing Zone Height (δ_{air})	App C Table D	200	cm
Depth to Subsurface Soil Sources (L_s)	App C Table D	100	cm
Effective Diffusion Coefficient in Soil Based on Vapor-Phase Concentration (D_s^{eff})	R6	6.86E-03	cm^2/s
Width of Source Area Parallel to Direction of Wind or Groundwater Movement (W)	Site-Specific, See 2015 CSI Exhibit 7	3048	cm

R6 - Effective Diffusion Coefficient in Soil (D_s^{eff})

$$D_s^{eff} = \frac{D^{air} \cdot \theta_{as}^{3.33}}{\theta_T^2} + \frac{D^{water} \cdot \theta_{ws}^{3.33}}{H' \theta_T^2}$$

Parameter	Source	Value	Units
Effective Diffusion Coefficient in Soil (D_s^{eff})	R6	**6.86E-03**	cm^2/s
Diffusion Coefficient in Air (D^{air})	App C Table E	8.80E-02	cm^2/s
Volumetric Air Content in Vadose Zone Soils ($\theta_{as}^{3.33}$)	App C Table D, surface value	0.28	cm^3_{air}/cm^3_{soil}
Diffusion Coefficient in Water (D^{water})	App C Table E	1.02E-05	cm^2/s
Volumetric Water Content in Vadose Zone Soils ($\theta_{ws}^{3.33}$)	App C Table D, surface value	0.15	cm^3_{water}/cm^3_{soil}
Henry's Law Constant (H')	App C Table E	2.30E-01	dimensionless
Total porosity of soil layer (θ_T)	App C Table D	0.43	cm^3_{air}/cm^3_{soil}

R20 - Soil-Water Sorption Coefficient (k_s)

$$k_s = K_{oc} \cdot f_{oc}$$

Parameter	Source	Value	Units
Soil-Water Sorption Coefficient (k_s)	R20	**0.73**	cm^3_{water}/g_{soil}
Organic Carbon Partition Coefficient (K_{oc})	App C Table E	5.00E+01	cm^3/g
Organic Carbon Content of Soil (f_{oc})	Site-specific B-201 (6-8') See Table 3-2 2015 CSI/ROR/RAP	0.0145	g/g

JE1 - Carcinogenic Contaminants

35 IAC 742 Appendix C, Table L

$$RO_{indoor\ air} = \frac{TR \times AT_c \times 365\frac{days}{yr}}{ED \times EF \times URF \times 1000\frac{\mu g}{mg}}$$

		Value	Units
Target Risk (Industrial)	TR	1.00E-06	unitless
Averaging time for Carcinogens	AT_c	70	years
Exposure Duration (I/C)	ED	25	years
Exposure Frequency (I/C)	EF	250	days/year

Chemical Specific Parameters	Unit Risk Factor* $(\mu g/m^3)^{-1}$	Equation	Indoor Objective (mg/m^3)
Tetrachloroethene (PCE)	2.6E-07	JE1	0.016
Vinyl chloride	4.4E-06	JE1	0.00093

JE2 - Noncarcinogenic Contaminants

$$RO_{indoor\ air} = \frac{THQ \times AT_{nc} \times 365\frac{days}{yr} \times RfC}{ED \times EF}$$

		Value	Units
Target Risk (Industrial)	THQ	1.0	unitless
Averaging time for Noncarcinogens	AT_{nc}	25	years
Exposure Duration (I/C)	ED	25	years
Exposure Frequency (I/C)	EF	250	days/year

Chemical Specific Parameters	Reference Concentration* (mg/m^3)	Equation	Indoor Objective (mg/m^3)
Tetrachloroethene (PCE)	4.0E-02	JE2	0.06
Vinyl chloride	1.0E-01	JE2	0.1

* Values are from http://www.epa.state.il.us/land/taco/toxicity-values.xls updated January 2017

JE4 - Soil Gas Remediation Objective (ROsoilgas)

$$RO_{soil\ gas} = \frac{RO_{indoor\ air}}{\alpha}$$

Parameter	Source	Value	
Carcinogenic Tier 2 Objective ($RO_{soilgas}$)	JE4	**355.2**	mg/m^3
Carcinogenic Indoor Air RO (I/C)	JE1	0.00093	mg/m^3
Noncarcinogenic Tier 2 Objective ($RO_{soilgas}$)	JE4	**55809.9**	mg/m^3
Noncarcinogenic Indoor Air RO (I/C)	JE2	0.15	mg/m^3
Attenuation Factor (α)	JE7	2.62E-06	unitless
Tier 1 Objective - (I/C)	742 Apx. B, Table H	4.8	mg/m^3

JE7 - Attenuation factor for diffusion and advection (α)

$$\alpha = \frac{\left[\left(\frac{D_T^{eff} \times A_B}{Q_{bldg} \times L_T}\right) \times \exp\left(\frac{Q_{soil} \times L_{crack}}{D_{crack}^{eff} \times A_{crack}}\right)\right]}{\left[\exp\left(\frac{Q_{soil} \times L_{crack}}{D_{crack}^{eff} \times A_{crack}}\right) + \left(\frac{D_T^{eff} \times A_B}{Q_{bldg} \times L_T}\right) + \left(\frac{D_T^{eff} \times A_B}{Q_{soil} \times L_T}\right)\left[\exp\left(\frac{Q_{soil} \times L_{crack}}{D_{crack}^{eff} \times A_{crack}}\right) - 1\right]\right]}$$

Parameter	Source	Value	Units
Attenuation factor (α)	JE7	**2.62E-06**	unitless
Area of Building (A_B) (I/C)	JE12a	4.00E+06	cm^2
Building ventilation rate (Q_{bldg})	App C Table M - I/C Slab on Grade	3.15E+05	cm^3/s
Total Effective Diffusion Coefficient (D_T^{eff})	JE9a	2.96291E-05	cm^2/s
Distance from bottom of slab to top of contamination (L_T)	JE10	142.4	cm
Volumetric soil gas flow rate (Q_{soil}) assuming impacts <5'	App C Table M	83.33	cm^3/s
Slab thickness (L_{crack})	App C Table M	10	cm
Effective Diffusion Coefficient of Crack ($D_{effcrack}$)	JE15	0.0082681	cm^2
Area of total cracks (A_{crack})	JE14	800	cm^2

JE9a - Total Effective Diffusion Coefficient (D_T^{eff})

$$D_T^{eff} = \frac{L_T}{\sum_{i=1}^{n} L_i / D_i^{eff}}$$

Parameter	Source	Value	Units
Total Effective Diffusion Coefficient (D_T^{eff})	JE9a	**2.963E-05**	cm^2/s
Distance from bottom of slab to top of contamination (L_T)	JE9b	142.4	cm
		4.672	feet
Thickness of soil layer 1 (L_1)	IEPA Default	142.4	cm
		4.672	feet
Effective diffusion coefficient (D_i^{eff})	JE11	2.963E-05	cm^2/s
Thickness of soil layer 2 (N/A) (L_2)		0	cm
	N/A	0	feet
Effective diffusion coefficient for clay layer (N/A) (D_{2eff})	N/A	0	cm^2/s

JE9b

$$\sum_{i=1}^{n} L_i = L_T$$

Parameter	Source	Value	Units
Thickness of soil layer (L_{i})	Assumed 1 soil layer 742 Apx. C Table M	142.4	cm
Distance from bottom of slab to top of contamination (L_T)	JE10	**142.4**	cm^2

JE10 - Source to building separation (L_T)

$$L_T = D_{source} - L_F$$

Parameter	Source	Value	Units
Distance from bottom of the slab to top of contamination (L_T)	JE10	**142.4**	cm
Distance from ground surface to top of contamination (D_{source})	Default App C Table M	152.4	cm
Distance from ground surface to bottom of slab (L_F)	Default Slab-on-grade App C Table M	10.0	cm

JE11 - Effective diffusion coefficient for each soil layer (Deffi)

$$D_i^{eff} = D_i\left(\frac{\theta_{a,i}^{3.33}}{\theta_{T,i}^2}\right) + \left(\frac{D_w}{H'_{TS}}\right)\left(\frac{\theta_{w,i}^{3.33}}{\theta_{T,i}^2}\right)$$

Parameter	Source	Value	Units
Effective diffusion coefficient (D_i^{eff})	JE11	**2.963E-05**	cm^2/s
Diffusivity in air - Vinylchloride (D_i)	App C Table E	1.06E-01	cm^2/s
Air-filled porosity of soil layer ($\theta_{a,i}$)	JE18	0.05	cm^3/cm^3
Total porosity of soil layer ($\theta_{T,i}$)	JE16	0.41	cm^3/cm^3
Diffusivity in water - Vinylchloride (D_w)	App C Table E	1.23E-06	cm^2/s
Henry's Law Coeff for indoor inhalation - VC (H'_{TS})	App C Table E	8.14E-01	dimensionless
water filled porosity of layer ($\theta_{w,i}$)	Harza 1998 ROR	0.36	cm^3/cm^3

JE12a -Surface area of enclosed space at or below grade (A_B)

$$A_B = (L_B \times W_B)$$

Parameter	Source	Value	Units
Surface area of enclosed space at or below grade	JE12a	**4.00E+06**	cm^2
Length of building (L_B)	App C Table M	2.00E+03	cm
Width of building (W_B)	App C Table M	2.00E+03	cm

JE15 - Effective Diffusion Coefficient of Crack ($D_{effcrack}$)

$$D_{crack}^{eff} = D_i\left(\frac{\theta_{a,crack}^{3.33}}{\theta_{T,crack}^{2}}\right)+\left(\frac{D_w}{H_{TS}^{'}}\right)\left(\frac{\theta_{w,crack}^{3.33}}{\theta_{T,crack}^{2}}\right)$$

Parameter	Source	Value	Units
Effective Diffusion Coefficient of Crack	JE15	**8.268E-03**	cm^2/s
Diffusivity in air - VC (D_i)	App C Table E	1.06E-01	cm^2/s
Diffusivity in water - VC (Dw)	App C Table E	1.23E-06	cm^2/s
Henry's Law Coeff for indoor inhalation - VC (H'_{TS})	App C Table E	8.14E-01	dimensionless
	App C Table M	0.28	cm^3/cm^3
Total porosity of soil layer ($\theta_{T,crack}$)	App C Table M	0.43	cm^3/cm^3
Water filled porosity of layer ($\theta_{w,crack}$)	App C Table M	0.15	cm^3/cm^3

JE14 - Area of total cracks

$$A_{crack} = 2\times\left(L_B + W_B\right)\times w$$

Parameter	Source	Value	Units
Area of total cracks (A_{crack})	JE14	**800**	cm^2
Length of building (L_B)	App C Table M - I/C	2000	cm
Width of building (W_B)	App C Table M - I/C	2000	cm
Floor-wall seam gap (w)	App C Table M	0.1	cm

JE16 - Total Porosity

$$q_{T\,i} = 1 - \frac{r_{bi}}{r_s}$$

Parameter	Source	Value	Units
Total porosity (θ_{Ti})	JE16	**0.41**	cm^3/cm^3
Soil bulk density (ρ_{bi})	Harza 1998 ROR	1.64	g/cm^3
Soil Particle Density (Specific Gravity) (ρ_s)	Site-specific Harza 1998 ROR ASTM Method D854	2.79	g/cm^3

JE18 - Water Filled Porosity

$$q_a = q_T - q_w$$

Parameter	Source	Value	Units
Air-filled porosity (θ_a)	JE18	**0.05**	dimensionless
Total porosity (θ_T)	JE16	0.41	cm^3/cm^3
Water-filled Porosity (θ_w)	Harza 1998 ROR	**0.36**	cm^3/cm^3

JE4 - Soil Gas Remediation Objective (ROsoilgas)

$$RO_{soil\ gas} = \frac{RO_{indoor\ air}}{\alpha}$$

Parameter	Source	Value	
Carcinogenic Tier 2 Objective ($RO_{soilgas}$)	JE4	**7411.2**	mg/m^3
Carcinogenic Indoor Air RO (I/C)	JE1	0.016	mg/m^3
Noncarcinogenic Tier 2 Objective ($RO_{soilgas}$)	JE4	**27527.5**	mg/m^3
Noncarcinogenic Indoor Air RO (I/C)	JE2	0.058	mg/m^3
Attentuation Factor (α)	JE7	2.12E-06	unitless
Tier 1 Objective - (I/C)	742 Apx. B, Table H	4.00	mg/m^3

JE7 - Attenuation factor for diffusion and advection (α)

$$\alpha = \frac{\left[\left(\frac{D_T^{eff} \times A_B}{Q_{bldg} \times L_T}\right) \times \exp\left(\frac{Q_{soil} \times L_{crack}}{D_{crack}^{eff} \times A_{crack}}\right)\right]}{\left[\exp\left(\frac{Q_{soil} \times L_{crack}}{D_{crack}^{eff} \times A_{crack}}\right) + \left(\frac{D_T^{eff} \times A_B}{Q_{bldg} \times L_T}\right) + \left(\frac{D_T^{eff} \times A_B}{Q_{soil} \times L_T}\right)\left[\exp\left(\frac{Q_{soil} \times L_{crack}}{D_{crack}^{eff} \times A_{crack}}\right) - 1\right]\right]}$$

Parameter	Source	Value	Units
Attenuation factor (α)	JE7	**2.12E-06**	unitless
Area of Building (A_B) (I/C)	JE12a	4.00E+06	cm^2
Building ventilation rate (Q_{bldg})	App C Table M - I/C Slab on Grade	3.15E+05	cm^3/s
Total Effective Diffusion Coefficient (D_T^{eff})	JE9a	2.398E-05	cm^2/s
Distance from bottom of slab to top of contamination (L_T)	JE10	142.4	cm
Volumetric soil gas flow rate (Qsoil) assuming impacts <5'	742 Apx. C Table M	83.33	cm^3/s
Slab thickness (L_{crack})	742 Apx. C Table M	10	cm
Effective Diffusion Coefficient of Crack ($D_{effcrack}$)	JE15	5.616E-03	cm^2
Area of total cracks (A_{crack})	JE14	800	cm^2

JE9a - Total Effective Diffusion Coefficient (D_T^{eff})

$$D_T^{eff} = \frac{L_T}{\sum_{i=1}^{n} L_i / D_i^{eff}}$$

Parameter	Source	Value	Units
Total Effective Diffusion Coefficient (D_T^{eff})	JE9a	**2.398E-05**	cm^2/s
Distance from bottom of slab to top of contamination (L_T)	JE9b	142.4	cm
		4.672	feet
Thickness of soil layer 1 (L_1)	IEPA Default	142.4	cm
		4.672	feet
Effective diffusion coefficient (D_i^{eff})	JE11	0.0000240	cm^2/s
Thickness of soil layer 2 (N/A) (L_2)	N/A	0	cm
		0	feet
Effective diffusion coefficient for clay layer (N/A) (D_{2eff})	N/A	0	cm^2/s

JE9b

$$\sum_{i=1}^{n} L_i = L_T$$

Parameter	Source	Value	Units
Thickness of soil layer (L_i)	Assumed 1 soil layer 742 Apx. C Table M	142.4	cm
Distance from bottom of slab to top of contamination (L_T)	JE10	**142.4**	cm^2

JE10 - Source to building separation (L_T)

$$L_T = D_{source} - L_F$$

Parameter	Source	Value	Units
Distance from bottom of the slab to top of contamination (L_T)	JE10	**142.4**	cm
Distance from ground surface to top of contamination (D_{source})	Default App C Table M	152.4	cm
Distance from ground surface to bottom of slab (L_F)	Default Slab-on-grade App C Table M	10.0	cm

JE11 - Effective diffusion coefficient for each soil layer (Deffi)

$$D_i^{eff} = D_i\left(\frac{\theta_{a,i}^{3.33}}{\theta_{T,i}^2}\right) + \left(\frac{D_w}{H'_{TS}}\right)\left(\frac{\theta_{w,i}^{3.33}}{\theta_{T,i}^2}\right)$$

Parameter	Source	Value	Units
Effective diffusion coefficient (D_i^{eff})	JE11	**2.398E-05**	cm^2/s
Diffusivity in air - VC (D_i)	742 Apx. C Table E	7.20E-02	cm^2/s
Air-filled porosity of soil layer ($\theta_{a,i}$)	JE18	0.05	cm^3/cm^3
Total porosity of soil layer ($\theta_{T,i}$)	JE16	0.41	cm^3/cm^3
Diffusivity in water - VC (D_w)	742 Apx. C Table E	8.20E-06	cm^2/s
Henry's Law Coeff - VC (H'_{TS})	742 Apx. C Table E	4.00E-01	dimensionless
water filled porosity of layer ($\theta_{w,i}$)	Harza 1998 ROR	0.36	cm^3/cm^3

JE12a -Surface area of enclosed space at or below grade (A_B)

$$A_B = (L_B \times W_B)$$

Parameter	Source	Value	Units
Surface area of enclosed space at or below grade	JE12a	4.00E+06	cm^2
Length of building (L_B)	742 Apx. C Table M	2.00E+03	cm
Width of building (W_B)	742 Apx. C Table M	2.00E+03	cm

JE15 - Effective Diffusion Coefficient of Crack ($D_{effcrack}$)

$$D_{crack}^{eff} = D_i \left(\frac{\theta_{a,crack}^{3.33}}{\theta_{T,crack}^{2}} \right) + \left(\frac{D_w}{H_{TS}^{'}} \right) \left(\frac{\theta_{w,crack}^{3.33}}{\theta_{T,crack}^{2}} \right)$$

Parameter	Source	Value	Units
Effective Diffusion Coefficient of Crack	JE15	5.616E-03	cm^2/s
Diffusivity in air - PCE (D_i)	742 Apx. C Table E	7.20E-02	cm^2/s
PCE Diffusivity in water (Dw)	742 Apx. C Table E	8.20E-06	cm^2/s
Henry's Law Coeff for indoor inhalation - PCE (H'_{TS})	742 Apx. C Table E	4.00E-01	dimensionless
	741 Apx. C Table M	0.28	cm^3/cm^3
Total porosity of soil layer ($\theta_{T,crack}$)	742 Apx. C Table M	0.43	cm^3/cm^3
Water filled porosity of layer ($\theta_{w,crack}$)	742 Apx. C Table M	0.15	cm^3/cm^3

JE14 - Area of total cracks

$$A_{crack} = 2 \times (L_B + W_B) \times w$$

Parameter	Source	Value	Units
Area of total cracks (A_{crack})	JE14	800	cm^2
Length of building (L_B)	App C Table M - I/C	2000	cm
Width of building (W_B)	App C Table M - I/C	2000	cm
Floor-wall seam gap (w)	App C Table M	0.1	cm

JE16 - Total Porosity

$$q_{T\,i} = 1 - \frac{r_{bi}}{r_s}$$

Parameter	Source	Value	Units
Total porosity (θ_{Ti})	JE16	0.41	cm^3/cm^3
Soil bulk density (ρ_{bi})	Harza 1998 ROR	1.64	g/cm^3
Soil Particle Density (Specific Gravity) (ρ_s)	Site-specific Harza 1998 ROR ASTM Method D854	2.79	g/cm^3

JE18 - Water Filled Porosity

$$q_a = q_T - q_w$$

Parameter	Source	Value	Units
Air-filled porosity (θ_a)	JE18	0.05	cm^3/cm^3
Total porosity (θ_T)	JE16	0.41	cm^3/cm^3
Water-filled Porosity (θ_w)	Harza 1998 ROR	0.36	cm^3/cm^3

JE5 - Soil Vapor Saturation Limit

$$C_v^{sat} = \frac{P \times MW}{R \times T} \times 10^6$$

		Value	Units	Source
Ideal Gas Constant	R	0.08206	atm-L/mol-K	Apx. C Table M
Temperature	T	286	K	Apx. C Table M

Chemical Specific Parameters	Vapor Pressure (P) (mmHg) *	Molecular Weight (MW) (g/mol) *	Equation	Soil Vapor Saturation Limit (mg/m^3-air)	Tier 2 Objective (ROsoilgas) (mg/m^3)
Tetrachloroethene (PCE)	1.9E+01	165.83	JE5	1.77E+05	7411.2
Vinyl chloride	3.0E+03	62.49	JE5	1.05E+07	355.2

* Values are from http://www.epa.state.il.us/land/taco/toxicity-values.xls

DEPARTMENT OF ENVIRONMENT
City of Chicago, Illinois

REMEDIATION OBJECTIVES REPORT

916 South Kildare Avenue
Chicago, Illinois

HARZA Consulting Engineers and Scientists

January 9, 1998

screening.

Tables 2 through 7 summarize the contaminants and exposure pathways that exceed the Tier-1 remediation objectives in each of the soil boring locations.

As indicated, a number of chemicals exceeded their respective Tier-1 remediation objectives for incidental ingestion in the North Parcel (SB01, SB02, and SB06). Most of the chemicals found in the North Parcel have no Tier-1 objectives for inhalation due to lack of toxicity values. Tier-2 remediation objectives were therefore focused on incidental ingestion. However, because no parameters for calculating cleanup objectives for incidental ingestion of soil particles are allowed to change under the TACO, Tier-2 cleanup objectives could not be developed for this pathway. Consequently, Tier-1 remediation objectives for incidental ingestion are used as cleanup objectives for this pathway.

Three chemicals (1,2-DCE, PCE, and TCE) exceeded their respective Tier-1 remediation objectives for inhalation in some boring locations/depths in the South Parcel (SB10, SB12, and SB13). No chemicals exceeded the Tier-1 objectives for incidental ingestion by any receptors. Consequently, Tier-2 remediation objectives were developed for the inhalation pathway.

METHODOLOGIES FOR DEVELOPING TIER-2 REMEDIATION OBJECTIVES

The TACO presents two sets of equations for this purpose: Soil Screening Level (SSL) Equation developed by USEPA (1996) and Risk-Based Corrective Actions (RBCA) Equations developed by ASTM (1995). These two sets of equations share the same principle and either set may be used for developing site-specific Tier-2 remediation objectives. For this project, the SSL equations were used. These equations are summarized in Section 742 Appendix C of the TACO.

SITE-SPECIFIC SOIL PHYSICAL AND CHEMICAL PARAMETERS

To develop Tier-2 site-specific remediation objectives, a set of site-specific physical and chemical parameters must be determined. Eight soil samples were taken from the site at the following locations: SB02-1, SB02-2, SB02-3, SB06-1, SB10-3, SB12-2, SB12-3, and SB13-3. All samples were analyzed for organic carbon content, specific gravity, moisture content, and particle size distribution, using the methods prescribed in TACO. Sampling and analysis procedures and results are described in the two Expanded Phase II Environmental Site Assessment reports. Because the chemicals exceeding the Tier-1 remediation objectives for inhalation were all found in the South Parcel of the site, the average value for each parameter determined in the South Parcel was used in the calculation. Table 8 presents the average value of each parameter, along with the methods used for analyzing these parameters.

Based on the soil gradation (fines > 90%), specific gravity (> 2.7 g/cm^3), moisture content, and SPT (>8), the soil can be classified as stiff to very stiff silt clay with bulk density between 120 pcf to 130 pcf, which is equivalent to 1.64 g/cm^3. This parameter was then used to calculate the total porosity (θ) using the following equation:

$$\theta = 1 - \frac{\rho_b}{\rho_s} .$$

Water-filled porosity equates volumetric water content, which is calculated as:

$$\theta_w = \theta_g \times \rho_b .$$

The air-filled porosity is the difference between the total porosity and water-filled porosity:

$$\theta_a = \theta - \theta_w .$$

EXPOSURE PARAMETERS

Exposure parameters for industrial/commercial workers and construction workers are summarized in Table 9. These parameters are taken from the TACO. It should be noted that these are standard parameters used in the TACO in developing the Tier-1 remediation objectives and are not allowed to change when developing Tier-2 remediation objectives.

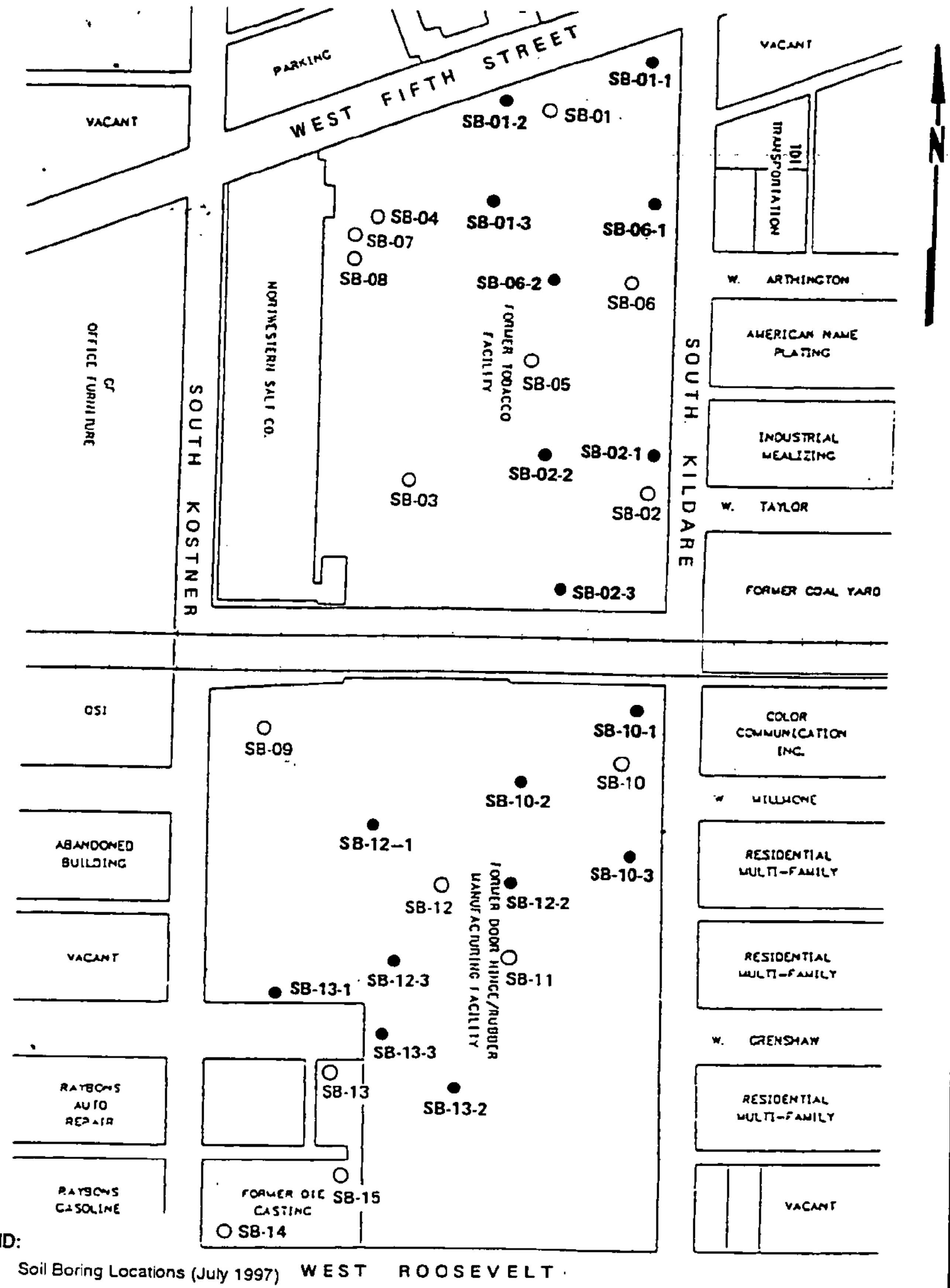
CHEMICAL-SPECIFIC PARAMETERS

Chemical-specific parameters required to calculate Tier-2 remediation objectives for inhalation of volatiles are either taken from the TACO or calculated using the equations (described below) set forth in the TACO. Because all the chemicals exceeding the Tier-1 remediation objectives are carcinogens, SSL equations (S-6 and S-7) for cleanup objectives for carcinogenic effects were used for industrial/commercial workers and construction workers, respectively. Chemical-specific parameters include chemical partition coefficient in soil-water (Kd), diffusion coefficient in air (Di), diffusion coefficient in water (Dw), Henry's Law constant (H'), and the inverse of the mean concentration at the center of a square source (Q/C). The Q/C term accounts for chemical dispersion effect and is modeled using USEPA's Industrial Source Complex Model (ISC2). USEPA (1996) has determined the Q/C values for 29 U.S. locations selected to be representative of a range of meteorologic conditions across the country. The City of Chicago is assigned the Zone VII. A value of 59 g/m^2-s per kg/m^3 for Q/C was estimated from the USEPA's Soil Screening Guidance: Technical Background Document (1996). Kd, Di, Dw, H', and soil physical parameters are used to calculate the Apparent Diffusivity (Da) (Equation S-10 of TACO), which in turn is used to calculate the Volatilization Factors (VF and VF') using Equations S-9 and S-10 of TACO. The VF and VF' are eventually used to calculate the Tier-2 remediation objectives for inhalation for industrial/commercial workers and construction workers, respectively.

Table 8. Site-Specific Soil Physical and Chemical Parameters Used in Developing Tier-2 Remediation Objectives

Parameter	Unit	Value	Method
Total Organic Carbon	%	1.975	ASTM Method D2974
Particle Size Distribution	%	41.7% of Clay 44.8% of Silt 13.5% of sand and gravel	ASTM Method D422
Water-Filled Porosity (θw)	%	36.0	Calculated
Air-Filled Porosity (θa)	%	5.0	Calculated
Specific Gravity (ρ_s)	g/cm^3	2.79	ASTM Method D854
Porosity (θ)	%	41*	Calculated
Bulk Density (ρ_b)	g/cm^3	1.64	Derived

* Original porosity error corrected



LEGEND:

- ● Soil Boring Locations (July 1997)
- ○ Soil Boring Locations (April 1997)

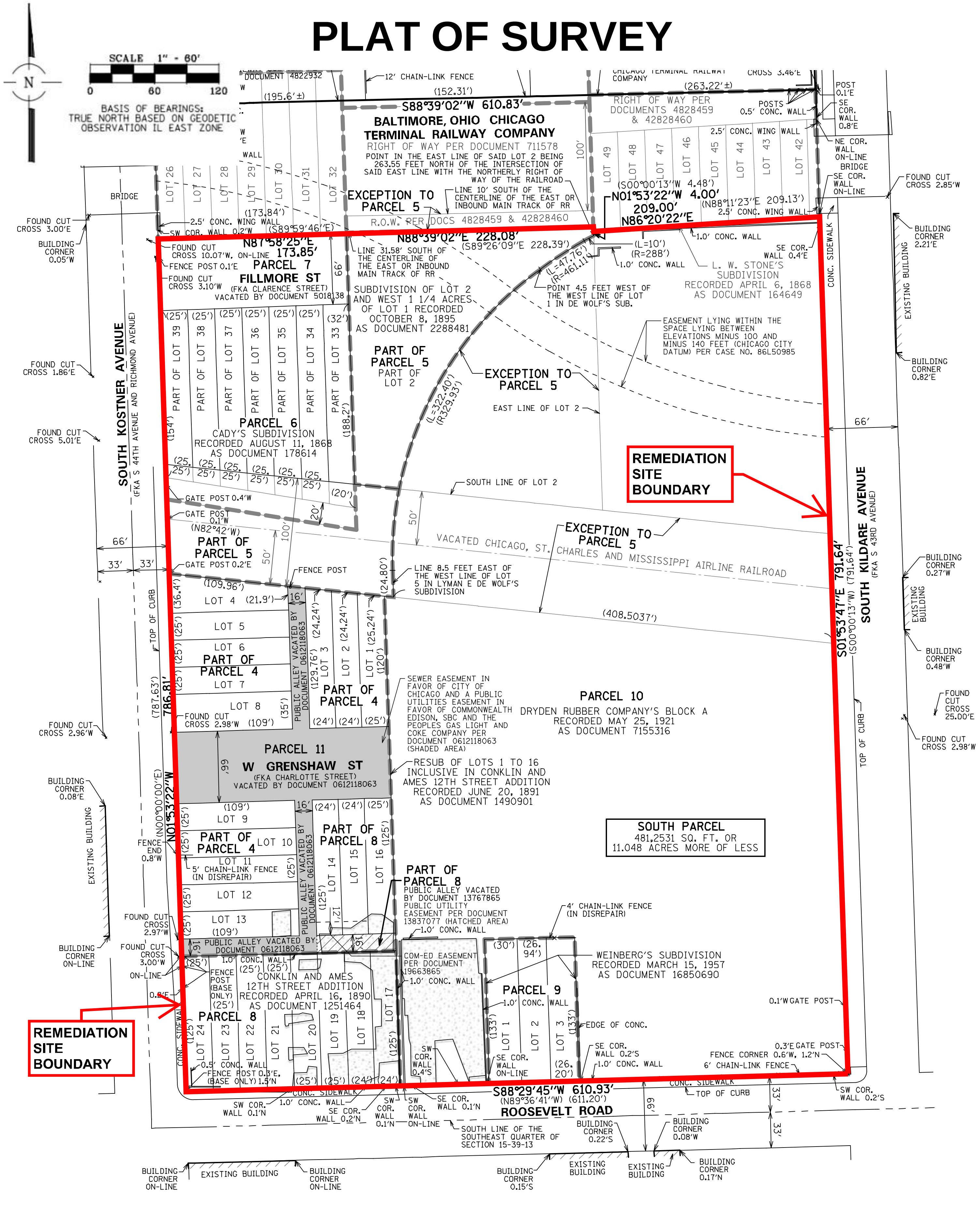
Figure 2
SOIL BORING LOCATION MAP
REMEDIATION OBJECTIVES REPORT
916 South Kildare Avenue
City of Chicago, Illinois

HARZA *Consulting Engineers and Scientists*

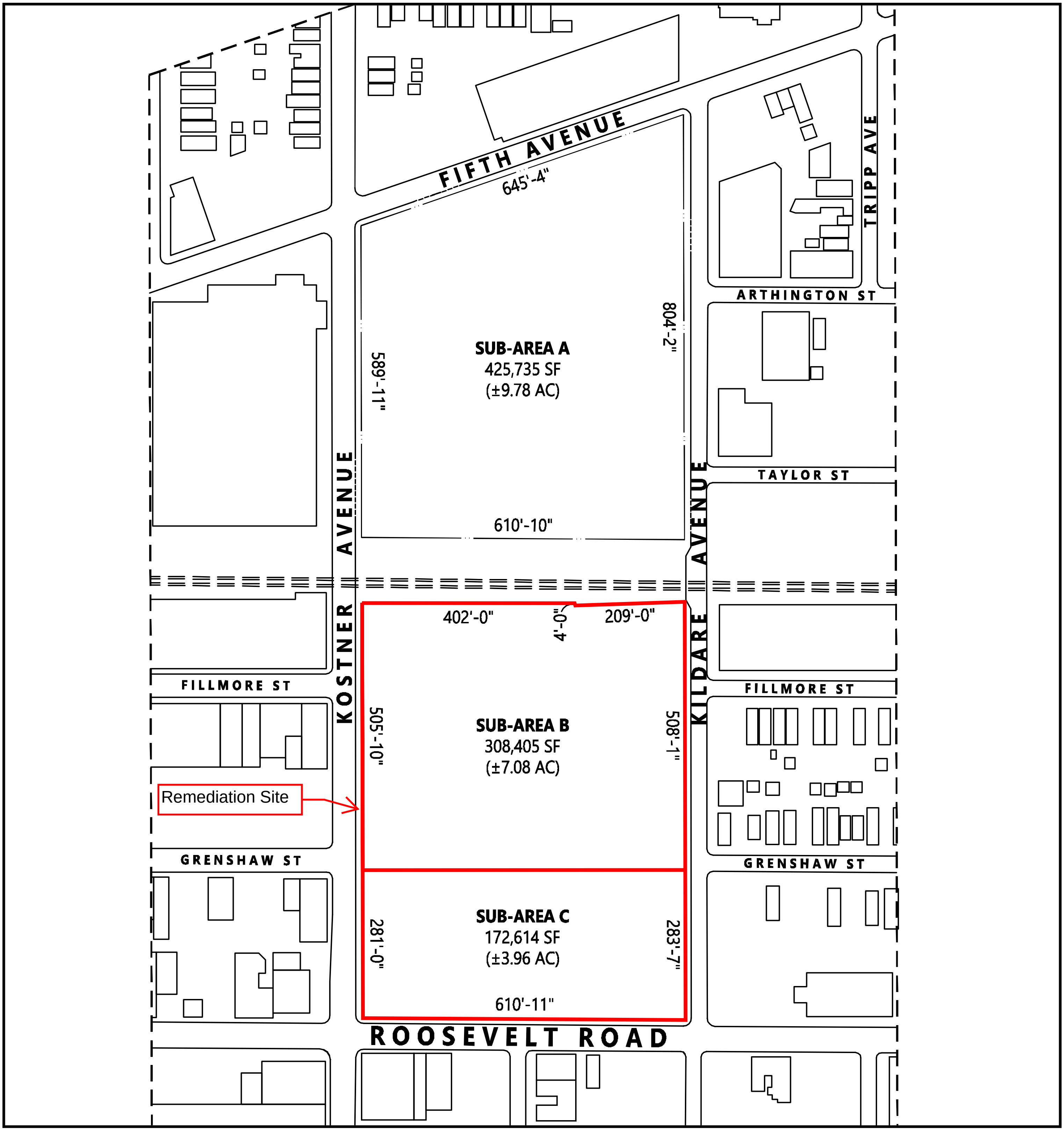
Terracon

Attachment 9
Survey and Legal Description

PLAT OF SURVEY



Source: Portion of Survey from SPACECO Inc. Dated 01/15/2016, Revised 02/01/2016

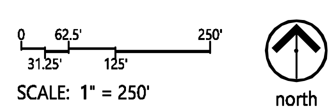


APPLICANT: **CP WESTSIDE, LLC**

ADDRESS: 819-1171 SOUTH KOSTNER AVENUE
4303-4365 WEST 5TH AVENUE
802-1156 SOUTH KILDARE AVENUE
4300-4358 WEST ROOSEVELT ROAD

PLAN DATE: 09-15-2016

PLAN COMMISSION: ____________________



SUB-AREA PLAN

SUB-AREA B

PARCEL 1:

ALL THAT PART OF WEST GRENSHAW STREET, VACATED BY ORDINANCE RECORDED AS DOCUMENT 0612118063, LYING NORTH OF A LINE BEGINNING AT A POINT IN THE EAST LINE OF S KOSTNER AVENUE BEING 281.00 FEET NORTH OF THE INTERSECTION OF THE EAST LINE OF S KOSTNER AVENUE AND NORTH LINE OF ROOSEVELT ROAD (AS MEASURED ALONG SAID EAST LINE) TO A POINT IN THE WEST LINE OF S KILDARE AVENUE BEING 283.58 FEET NORTH OF THE INTERSECTION OF S KILDARE AVENUE AND THE NORTH LINE OF ROOSEVELT ROAD (AS MEASURED ALONG SAID WEST LINE) IN THE SOUTHEAST QUARTER OF SECTION 15, TOWNSHIP 39 NORTH, RANGE 13, EAST OF THE THIRD PRINCIPAL MERIDIAN, IN COOK COUNTY, ILLINOIS,

PARCEL 2:

THAT PART OF BLOCK A IN DRYDEN RUBBER COMPANY CONSOLIDATION OF SUNDRY TRACTS OF LAND IN LYMAN DE WOLF'S SUBDIVISION OF THE SOUTHEAST 1/4 OF SECTION 15, TOWNSHIP 39 NORTH, RANGE 13, EAST OF THE THIRD PRINCIPAL MERIDIAN, LYING NORTH OF A LINE BEGINNING AT A POINT IN THE EAST LINE OF S KOSTNER AVENUE BEING 281.00 FEET NORTH OF THE INTERSECTION OF THE EAST LINE OF S KOSTNER AVENUE AND NORTH LINE OF ROOSEVELT ROAD (AS MEASURED ALONG SAID EAST LINE) TO A POINT IN THE WEST LINE OF S KILDARE AVENUE BEING 283.58 FEET NORTH OF THE INTERSECTION OF S KILDARE AVENUE AND THE NORTH LINE OF ROOSEVELT ROAD (AS MEASURED ALONG SAID WEST LINE) IN COOK COUNTY, ILLINOIS.

PARCEL 3:

ALL OF THE REMAINING EAST/WEST 16 FOOT PUBLIC ALLEY, AS VACATED BY ORDINANCE RECORDED AS DOCUMENT 0612118063, LYING SOUTH OF THE SOUTH LINE OF LOT 13 IN RESUBDIVISION OF LOTS 1 TO 16, INCLUSIVE, IN CONKLIN AND AMES'12TH STREET ADDITION AFORESAID, LYING SOUTH OF A LINE DRAWN FROM THE SOUTHEAST CORNER OF LOT 13 IN RESUBDIVISION OF LOTS 1 TO 16, INCLUSIVE, IN CONKLIN AND AMES' 12TH STREET ADDITION AFORESAID TO THE SOUTHWEST CORNER OF LOT 14 IN RESUBDIVISION OF LOTS 1 TO 16, INCLUSIVE, IN CONKLIN AND AMES' 12TH STREET ADDITION AFORESAID, LYING NORTH OF THE NORTH LINE OF LOTS 20 TO 24, BOTH INCLUSIVE, ALSO BEING COINCIDENT WITH THE SOUTH LINE OF THE EAST/WEST 16 FOOT PUBLIC ALLEY, BEING DESCRIBED AS A LINE 16 FEET SOUTH OF AND PARALLEL WITH SAID LINE DRAWN FROM THE SOUTHEAST CORNER OF LOT 13 IN RESUBDIVISION OF LOTS 1 TO 16, INCLUSIVE, IN CONKLIN AND AMES' 12TH STREET ADDITION AFORESAID TO THE SOUTHWEST CORNER OF LOT 14 IN RESUBDIVISION OF LOTS 1 TO 16, INCLUSIVE, IN CONKLIN AND AMES' 12TH STREET ADDITION AFORESAID TO THE NORTHWEST COMER OF LOT 24 IN CONKLIN AND AMES' 12TH STREET ADDITION AFORESAID AND LYING WEST OF THE WEST LINE OF THE VACATED EAST/WEST 16 FOOT ALLEY, VACATED BY ORDINANCE APPROVED FEBRUARY 28, 1946 BY THE CITY COUNCIL OF THE CITY OF CHICAGO AND RECORDED APRIL 15, 1946 IN THE OFFICE OF THE RECORDER OF DEEDS OF COOK COUNTY, ILLINOIS AS DOCUMENT NUMBER 13767865;

ALSO ALL OF THE NORTHWESTERLY/SOUTHEASTERLY 20 FOOT PUBLIC ALLEY, AS VACATED BY ORDINANCE RECORDED AS DOCUMENT 0612118063, LYING SOUTH AND SOUTHWESTERLY OF THE SOUTHWESTERLY LINE OF LOTS 33 TO 39, BOTH INCLUSIVE, LYING NORTH AND NORTHEASTERLY OF A LINE 20 FEET SOUTHWESTERLY OF AND PARALLEL WITH THE SOUTHWESTERLY LINE OF LOTS 33 TO 39, BOTH INCLUSIVE

(AS MEASURED PERPENDICULAR TO SAID SOUTHWESTERLY LINE OF LOTS 33 TO 39, BOTH INCLUSIVE), LYING WEST AND NORTHWESTERLY OF THE SOUTHERLY EXTENSION OF THE EAST LINE OF LOT 33 AND LYING EAST AND SOUTHEASTERLY OF THE SOUTHERLY EXTENSION OF THE WEST LINE OF LOT 39 IN CADY'S SUBDIVISION OF LOT 3 OF DE WOLF'S SUBDIVISION OF THE WEST 27 ACRES OF THE SOUTHEAST QUARTER AFOREMENTIONED, SAID PART OF PUBLIC STREET, PUBLIC ALLEYS AND PART OF PUBLIC ALLEY HEREIN VACATED BEING FURTHER DESCRIBED AS WEST GRENSHAW STREET LYING BETWEEN THE EAST LINE OF SOUTH KOSTNER AVENUE AND A LINE 198.0 FEET, MORE OR LESS, EAST OF AND PARALLEL WITH THE EAST LINE OF SOUTH KOSTNER AVENUE, TOGETHER WITH ALL OF THE REMAINING PUBLIC ALLEYS IN THE AREA BOUNDED BY SOUTH KOSTNER AVENUE, A LINE 198.0 FEET, MORE OR LESS, EAST OF THE PARALLEL WITH THE EAST LINE OF SOUTH KOSTNER AVENUE, THE ABANDONED RIGHT-OF-WAY OF THE CHICAGO, ST. CHARLES AND MISSISSIPPI AIRLINE RAILROAD AND WEST ROOSEVELT ROAD AND ALL OF THE NORTHWESTERLY/SOUTHEASTERLY 20 FOOT PUBLIC ALLEY RUNNING SOUTHEASTERLY FROM THE EAST LINE OF SOUTH KOSTNER AVENUE FOR A DISTANCE OF 171.50 FEET, MORE OR LESS, AS MEASURED ALONG THE NORTHEASTERLY LINE OF SAID 20 FOOT PUBLIC ALLEY LYING BETWEEN WEST GRENSHAW STREET AND VACATED WEST FILLMORE STREET, IN COOK COUNTY, ILLINOIS.

PARCEL 4:

LOTS 1 TO 8, BOTH INCLUSIVE, IN THE RESUBDIVISION OF LOTS 1 TO 16 IN CONKLIN AND AMES' 12TH STREET ADDITION, BEING A SUBDIVISION IN THE SOUTHEAST 1/4 OF SECTION 15, TOWNSHIP 39 NORTH, RANGE 13, EAST OF THE THIRD PRINCIPAL MERIDIAN, SOUTH OF BARRY POINT ROAD, IN COOK COUNTY, ILLINOIS.

PARCEL 5:

LOT 2 IN THE SUBDIVISION OF LOT 2 AND THE WEST 1 1/4 ACRES OF LOT 1 OF LYMAN E. DE WOLF'S SUBDIVISION OF THE WEST 27 ACRES, SOUTH OF BARRY POINT ROAD OF THE SOUTHEAST 1/4 OF SECTION 15, TOWNSHIP 39 NORTH, RANGE 13, EAST OF THE THIRD PRINCIPAL MERIDIAN, IN COOK COUNTY, ILLINOIS;

ALSO THAT PART LYING BETWEEN THE WEST LINE OF SOUTH 43RD AVENUE (NOW KNOWN AS KILDARE AVE) AND THE EAST LINE OF SOUTH 44TH (NOW KNOWN AS KOSTNER AVE) AVENUE, OF A STRIP OF LAND 100 FEET IN WIDTH ON EACH SIDE OF THE CENTER LINE OF FORMER CHICAGO, ST. CHARLES AND MISSISSIPPI AIR LINE RAILROAD, THROUGH SAID SECTION 15, SAID CENTER LINE ENTERING SAID SECTION AT A POINT IN THE EAST LINE THEREOF 3.22 CHAINS NORTH OF THE SOUTHEAST CORNER OF SAID SECTION AND RUNNING THENCE NORTH 82 DEGREES 42 MINUTES WEST TO THE WEST LINE THEREOF.

(EXCEPTING FROM BOTH OF THE ABOVE DESCRIBED PROPERTIES THE FOLLOWING TWO TRACTS: (A) THAT PART OF THE ABOVE DESCRIBED PROPERTY LYING EAST OF AND SOUTHEAST OF A LINE DESCRIBED AS BEGINNING AT A POINT IN THE SOUTHERLY RIGHT OF WAY OF THE AFORESAID CHICAGO, ST. CHARLES AND MISSISSIPPI AIR LINE RAILROAD, 408.5037 FEET (MEASURED ALONG SAID SOUTHERLY RIGHT OF WAY LINE) NORTHWESTERLY OF THE WEST LINE OF SAID SOUTH 43RD AVENUE, SAID POINT BEING 8.5 FEET EAST OF MEASURED AT RIGHT ANGLES TO, THE WEST LINE EXTENDED OF LOT 5 IN AFORESAID LYMAN E. DE WOLF'S SUBDIVISION; RUNNING THENCE NORTH PARALLEL TO SAID WEST LINE EXTENDED 24.80 FEET; THENCE NORTHEASTERLY ON A CURVED LINE CONVEX TO THE NORTHWEST AND TANGENT TO THE PRECEDING COURSE, WITH A RADIUS OF 329.93 FEET; A DISTANCE OF 322.40 FEET TO A POINT 4.5 FEET WEST OF THE WEST LINE OF LOT 1 IN SAID DE WOLF'S SUBDIVISION, THENCE CONTINUING NORTHEASTERLY ON A CURVED LINE CONVEX TO THE NORTHWEST AND TANGENT TO THE PRECEDING

COURSE, WITH A RADIUS OF 461.11 FEET, A DISTANCE OF 47.76 FEET; THENCE CONTINUING NORTHEASTERLY ON A CURVED LINE CONVEX TO THE NORTHWEST AND TANGENT TO THE PRECEDING COURSE, HAVING A RADIUS OF 288 FEET, A DISTANCE OF 10 FEET TO A POINT IN THE EAST LINE OF SAID LOT 2 IN THE SUBDIVISION OF LOT 2, AND THE WEST 1 1/4 ACRES OF LOT 1 OF AFORESAID DE WOLF'S SUBDIVISION, SAID POINT BEING 253.55 FEET, MORE OR LESS, NORTH OF THE INTERSECTION OF THE EAST LINE OF SAID LOT 2 WITH THE NORTHERLY RIGHT OF WAY OF THE ABANDONED CHICAGO, ST. CHARLES AND MISSISSIPPI AIR LINE AFORESAID; IN COOK COUNTY, ILLINOIS; (B) ALSO EXCEPTING THAT PART OF LOT 2 AFORESAID, FALLING WITHIN THE FOLLOWING DESCRIBED LAND: BEGINNING AT A POINT IN THE EAST LINE OF LOT 32 OF CADY'S SUBDIVISION OF LOT 3 IN LYMAN DE WOLF'S SUBDIVISION HEREINBEFORE DESCRIBED, SAID POINT BEING 10 FEET SOUTH OF THE CENTER LINE OF THE EAST OR INBOUND MAIN TRACK OF THE BALTIMORE AND OHIO TERMINAL RAILROAD COMPANY, AS THE SAME EXISTED ON MAY 23, 1911, AND 173.85 FEET EAST OF A POINT IN THE EAST LINE OF SOUTH 44TH AVENUE, WHICH LAST MENTIONED POINT IS 688.72 FEET SOUTH OF THE INTERSECTION OF THE EAST LINE OF SOUTH 44TH AVENUE WITH THE SOUTHERLY LINE OF COLORADO AVENUE; THENCE SOUTH ALONG SAID EAST LINE OF SAID LOT 32, A DISTANCE OF 21.58 FEET TO A POINT WHICH IS THE SOUTHEAST CORNER OF SAID LOT 32; THENCE EAST ALONG A LINE PARALLEL WITH AND 31.58 FEET SOUTH OF THE CENTER LINE OF THE EAST OR INBOUND MAIN TRACK OF THE BALTIMORE AND OHIO CHICAGO TERMINAL RAILROAD COMPANY, AS THE SAME EXISTED MAY 23, 1911, A DISTANCE OF 228.41 FEET TO A POINT; THENCE NORTH A DISTANCE OF 21.58 FEET TO A POINT WHICH IS 96.42 FEET SOUTH OF THE CENTER LINE OF VACATED WEST TAYLOR STREET AND 10 FEET SOUTH OF THE CENTER LINE OF THE EAST OR INBOUND MAIN TRACK OF THE BALTIMORE AND OHIO CHICAGO TERMINAL RAILROAD COMPANY, AS THE SAME EXISTED ON MAY 23, 1911; THENCE WEST A DISTANCE OF 228.41 FEET TO THE POINT OF BEGINNING), IN COOK COUNTY, ILLINOIS.

PARCEL 6:

LOTS 33, 34, 35, 36, 37, 38 AND 39 IN CADY'S SUBDIVISION OF LOT 3 IN DE WOLF'S SUBDIVISION OF THE WEST 27 ACRES (SOUTH OF BARRY POINT ROAD) IN THE WEST 1/2 OF THE SOUTHEAST 1/4 OF SECTION 15, TOWNSHIP 39 NORTH, RANGE 13, EAST OF THE THIRD PRINCIPAL MERIDIAN, IN COOK COUNTY, ILLINOIS.

PARCEL 7:

THAT PART OF VACATED FILLMORE STREET (FORMERLY CLARENCE STREET) WHICH LIES SOUTH OF AND ADJOINING LOTS 26 TO 32 INCLUSIVE, IN CADY'S SUBDIVISION OF LOT 3, IN LYMAN E. DE WOLF'S SUBDIVISION OF THE WEST 27 ACRES (SOUTH OF BARRY POINT ROAD) OF THE WEST 1/2 OF THE SOUTHEAST 1/4 OF SECTION 15, TOWNSHIP 39 NORTH, RANGE 13, EAST OF THE THIRD PRINCIPAL MERIDIAN, (EXCEPTING THEREFROM THAT PART THEREOF FALLING IN LOT 2 IN LYMAN E. DE WOLF'S SUBDIVISION AFORESAID), IN COOK COUNTY, ILLINOIS.

SUB-AREA C

PARCEL 1:

LOTS 1, 2 AND 3 IN WEINBERG'S SUBDIVISION OF THE SOUTH 166.0 FEET OF THE EAST 1.26 CHAINS OF THE WEST 6.0 CHAINS OF THE WEST 1/2 OF THE SOUTH EAST 1/4 OF SECTION 15, TOWNSHIP 39 NORTH, RANGE 13, EAST OF THE THIRD PRINCIPAL MERIDIAN, (EXCEPT THE SOUTH 33 FEET THEREOF TAKEN FOR A PUBLIC STREET), IN COOK COUNTY, ILLINOIS.

PARCEL 2:

LOTS 17 TO 24, BOTH INCLUSIVE, IN CONKLIN AND AMES' 12TH STREET ADDITION, BEING A SUBDIVISION IN THE SOUTHEAST 1/4 OF SECTION 15, TOWNSHIP 39 NORTH, RANGE 13, EAST OF THE THIRD PRINCIPAL MERIDIAN;

ALSO LOTS 14, 15 AND 16 IN THE RESUBDIVISION OF LOTS 1 TO 16, BOTH INCLUSIVE, IN CONKLIN AND AMES' 12TH STREET ADDITION, BEING A SUBDIVISION IN THE SOUTHEAST 1/4 OF SECTION 15, TOWNSHIP 39 NORTH, RANGE 13, EAST OF THE THIRD PRINCIPAL MERIDIAN;

TOGETHER WITH THAT PART OF THE VACATED ALLEY LYING SOUTH OF LOTS 14, 15 AND 16 AFORESAID AND LYING NORTH OF LOTS 17, 18 AND 19 AFORESAID, IN COOK COUNTY, ILLINOIS.

PARCEL 3:

LOTS 9 TO 13, BOTH INCLUSIVE, IN THE RESUBDIVISION OF LOTS 1 TO 16 IN CONKLIN AND AMES' 12TH STREET ADDITION, BEING A SUBDIVISION IN THE SOUTHEAST 1/4 OF SECTION 15, TOWNSHIP 39 NORTH, RANGE 13, EAST OF THE THIRD PRINCIPAL MERIDIAN, SOUTH OF BARRY POINT ROAD, IN COOK COUNTY, ILLINOIS.

PARCEL 4:

ALL OF THE NORTH/SOUTH 16 FOOT PUBLIC ALLEY, AS VACATED BY ORDINANCE RECORDED AS DOCUMENT 0612118063, LYING EAST OF THE EAST LINE OF LOTS 9 TO 13, BOTH INCLUSIVE, LYING WEST OF THE WEST LINE OF LOT 14, LYING SOUTH OF A LINE DRAWN FROM THE NORTHEAST CORNER OF LOT 9 TO THE NORTHWEST CORNER OF LOT 14 AND LYING NORTH OF A LINE DRAWN FROM THE SOUTHEAST CORNER OF LOT 13 TO THE SOUTHWEST CORNER OF LOT 14 ALL IN RESUBDIVISION OF LOTS 1 TO 16, INCLUSIVE, IN CONKLIN AND AMES' 12TH STREET ADDITION AFORESAID,

ALSO ALL OF THE REMAINING EAST/WEST 16 FOOT PUBLIC ALLEY, AS VACATED BY ORDINANCE RECORDED AS DOCUMENT 0612118063, LYING SOUTH OF THE SOUTH LINE OF LOT 13 IN RESUBDIVISION OF LOTS 1 TO 16, INCLUSIVE, IN CONKLIN AND AMES'12TH STREET ADDITION AFORESAID, LYING SOUTH OF A LINE DRAWN FROM THE SOUTHEAST CORNER OF LOT 13 IN RESUBDIVISION OF LOTS 1 TO 16, INCLUSIVE, IN CONKLIN AND AMES' 12TH STREET ADDITION AFORESAID TO THE SOUTHWEST CORNER OF LOT 14 IN RESUBDIVISION OF LOTS 1 TO 16, INCLUSIVE, IN CONKLIN AND AMES' 12TH STREET ADDITION AFORESAID, LYING NORTH OF THE NORTH LINE OF LOTS 20 TO 24, BOTH INCLUSIVE, ALSO BEING COINCIDENT WITH THE SOUTH LINE OF THE EAST/WEST 16 FOOT PUBLIC ALLEY, BEING DESCRIBED AS A LINE 16 FEET SOUTH OF AND PARALLEL WITH SAID LINE DRAWN FROM THE SOUTHEAST CORNER OF LOT 13 IN RESUBDIVISION

OF LOTS 1 TO 16, INCLUSIVE, IN CONKLIN AND AMES' 12TH STREET ADDITION AFORESAID TO THE SOUTHWEST CORNER OF LOT 14 IN RESUBDIVISION OF LOTS 1 TO 16, INCLUSIVE, IN CONKLIN AND AMES' 12TH STREET ADDITION AFORESAID TO THE NORTHWEST COMER OF LOT 24 IN CONKLIN AND AMES' 12TH STREET ADDITION AFORESAID AND LYING WEST OF THE WEST LINE OF THE VACATED EAST/WEST 16 FOOT ALLEY, VACATED BY ORDINANCE APPROVED FEBRUARY 28, 1946 BY THE CITY COUNCIL OF THE CITY OF CHICAGO AND RECORDED APRIL 15, 1946 IN THE OFFICE OF THE RECORDER OF DEEDS OF COOK COUNTY, ILLINOIS AS DOCUMENT NUMBER 13767865;

PARCEL 5:

ALL THAT PART OF WEST GRENSHAW STREET, VACATED BY ORDINANCE RECORDED AS DOCUMENT 0612118063, LYING SOUTH OF A LINE BEGINNING AT A POINT IN THE EAST LINE OF S KOSTNER AVENUE BEING 281.00 FEET NORTH OF THE INTERSECTION OF THE EAST LINE OF S KOSTNER AVENUE AND NORTH LINE OF ROOSEVELT ROAD (AS MEASURED ALONG SAID EAST LINE) TO A POINT IN THE WEST LINE OF S KILDARE AVENUE BEING 283.58 FEET NORTH OF THE INTERSECTION OF S KILDARE AVENUE AND THE NORTH LINE OF ROOSEVELT ROAD (AS MEASURED ALONG SAID WEST LINE) IN THE SOUTHEAST QUARTER OF SECTION 15, TOWNSHIP 39 NORTH, RANGE 13, EAST OF THE THIRD PRINCIPAL MERIDIAN, IN COOK COUNTY, ILLINOIS,

PARCEL 6:

THAT PART OF BLOCK A IN DRYDEN RUBBER COMPANY CONSOLIDATION OF SUNDRY TRACTS OF LAND IN LYMAN DE WOLF'S SUBDIVISION OF THE SOUTHEAST 1/4 OF SECTION 15, TOWNSHIP 39 NORTH, RANGE 13, EAST OF THE THIRD PRINCIPAL MERIDIAN, LYING SOUTH OF A LINE BEGINNING AT A POINT IN THE EAST LINE OF S KOSTNER AVENUE BEING 281.00 FEET NORTH OF THE INTERSECTION OF THE EAST LINE OF S KOSTNER AVENUE AND NORTH LINE OF ROOSEVELT ROAD (AS MEASURED ALONG SAID EAST LINE) TO A POINT IN THE WEST LINE OF S KILDARE AVENUE BEING 283.58 FEET NORTH OF THE INTERSECTION OF S KILDARE AVENUE AND THE NORTH LINE OF ROOSEVELT ROAD (AS MEASURED ALONG SAID WEST LINE) IN COOK COUNTY, ILLINOIS.

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 · (217)782-3397
J.B. PRITZKER, GOVERNOR ALEC MESSINA, DIRECTOR

217/524-3300

January 14, 2019

City of Chicago
Department of Fleet and Facility Management
Attn: Kimberly Worthington
30 North LaSalle, 3rd Floor
Chicago, Illinois 60602-2575

Re: 0316255161--Cook County
Chicago/4300 West Roosevelt Road
Site Remediation Program/Technical Reports

Dear Ms. Worthington:

The *Response to Comments to ROR/RAP Addendum* (received October 18, 2018/Log No. 18-68041), as prepared by Terracon Consultants, Inc. for the above-referenced site, has been reviewed by the Illinois Environmental Protection Agency ("Illinois EPA"). Based on the Illinois EPA review, the *Response to Comments to ROR/RAP Addendum* is approved and work may begin at the site.

The Illinois EPA requests not less than a fourteen (14) calendar day notification of all future site investigation and remedial activities in order to coordinate potential Illinois EPA oversight. Please submit the original and two copies of all future reports or correspondence to the Illinois EPA regarding this site. If you have any questions regarding this letter, I may be contacted at the address above, todd.gross@illinois.gov, or by phone at (217) 524-4862.

Sincerely,

Todd Gross by M.C.

Todd Gross
Project Manager
Voluntary Site Remediation Unit
Remedial Project Management Section
Division of Remediation Management
Bureau of Land

cc: Richard O'Brien
Terracon Consultants, Inc.
rmobrien@terracon.com

Bureau of Land File

April 27, 2017

Illinois Environmental Protection Agency
Bureau of Land
Remedial Project Management Section
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276

Attn: Mr. Jim Baldwin

Re: RAP Addendum
Chicago/Northwestern Salt Company
916 S. Kildare Avenue
LPC# 0316265052 – Cook County
Terracon Project No. A2147008 Task 3b
2FM TOR No.:14-2FMEHS-0009

Dear Mr. Baldwin,

Terracon Consultants, Inc. (Terracon) is pleased to submit this Remedial Action Plan (RAP) Addendum letter, which includes results of a geophysical survey for suspected underground storage tank at the above referenced site. This letter also includes a revised site remediation boundary and legal description based on a site survey dated February 1, 2016, an updated development plan for the site showing locations of proposed engineered barriers, and a proposed alternative engineered barrier. This work was conducted on behalf of the current site owner and Remediation Applicant, the City of Chicago Department of Fleet and Facility Management (2FM), as a follow up to the Comprehensive Site Investigation Report, Remediation Objectives Report, and Remedial Action Plan (CSIR/ROR/RAP) dated January 5, 2015.

1.0 PROJECT INFORMATION

The site was formerly occupied by the Northwestern Salt Company, a tobacco factory, and other industrial/commercial occupants, and has had various environmental site investigations conducted since 1992. Terracon submitted a CSIR/ROR/RAP to the IEPA, which was approved in correspondence dated March 9, 2015. Since the IEPA approval of the CSIR/ROR/RAP, the site survey was updated; and the remediation site boundary and legal description was revised as provided in Attachment 1.

In the RAP, additional investigation was planned regarding a potential 10,000 gallon underground storage tank (UST) located in the west-central portion of the site at 909 S. Kostner Avenue based on permit records. Additionally, a potential triple trap system was noted in the north-central portion of the site during site reconnaissance activities. To evaluate the potential presence of a UST and a triple trap, Terracon conducted a geophysical survey in these areas in June 2016, with results provided in Attachments 2 and 3.

An updated site development map is provided in Attachment 2. A discussion of the engineered barriers described in the RAP relative to the development plan is provided below in Section 3.

2.0 UST EVALUATION

During the 2014 Phase I Environmental Site Assessment (ESA), a permit for a 10,000-gallon UST was noted in the west-central portion of the site addressed as 909 South Kostner Avenue. Documentation of the UST status other than the permit was not identified. In the RAP, Terracon proposed that further evaluation of the suspected UST area be conducted prior to or during development.

On June 9, 2016, personnel from Ground Penetrating Radar Systems (GPRS), Inc. mobilized to the site with environmental oversight to conduct a geophysical survey. The suspected UST survey area consisted of an approximate 190-foot by 125-foot area with approximately ½-acre in size. The suspected triple trap survey area consisted of an approximate 60-foot by 60- foot grid around the metallic objects. The areas were surveyed using an electromagnetic induction (EMI) instrument set at variable frequencies of 1,000 KHz, 8,000 KHz and 16,000 KHz to investigate metallic objects at various depths. The same areas were scanned using a GSSI SIR – 3000 ground penetrating radar unit with 400-megahertz antenna. A copy of the GPRS report is provided in Attachment 3. The geophysical survey area is shown in Exhibit 1 of Attachment 2.

As outlined in the GPRS report, results of the survey did not indicate anomalies representative of a UST, except for one anomaly located in the southeastern portion of the scanned area. The anomaly was identified using the software downloaded from the EMI instrumentation data collected in the field. GPRS notes that the anomaly may be indicative of a structure or UST. The scan of the north-central area of the site did not find evidence of a triple trap system.

To investigate the anomaly identified, test pits will be conducted in the anomaly area during the redevelopment activities. If an UST is identified, it will be communicated with the IEPA Project Manager and removed by a licensed contractor in accordance with Office of the Illinois State Fire Marshal (OSFM) regulations. Samples will be collected per applicable OSFM and IEPA regulations, including Illinois Administration Code Title 35 Part 734. Results will be communicated to the IEPA and reported in the Remedial Action Completion Report (RACR).

3.0 SITE DEVELOPMENT PLAN

Since the issuance of the CSI/ROR/RAP, the proposed developer, Clarius Partners, has developed additional redevelopment plans. The concept for redevelopment of the site with industrial buildings remains the same, with the addition of a stormwater detention pond in the northeastern corner of the site. A copy of the updated site development plan is provided as Exhibit 2 of Attachment 2.

As noted in the RAP, engineered barriers to exclude the ingestion exposure route are proposed to consist of asphalt pavement, concrete building foundations, or excavation and imported clean soil where landscaping will be placed. The engineered barriers are shown in Exhibit 2 of Attachment 2.

As an alternative to the 3-foot clean fill engineered barrier in landscaped areas presented in the RAP, excluding the stormwater detention pond area, the developer proposes to provide a barrier of 12 inches in depth with a geotextile indicator fabric (TerraTex® N08) placed between existing site soil and imported clean fill as a visual indicator. Landscaped areas of the site will surrounded parking lots and buildings and are anticipated to be infrequently accessed by the industrial/commercial occupants. A fence will restrict access to the site from the adjacent public sidewalks. In the stormwater detention area, a minimum of 12 inches of clean soil will overlay a Geosynthetic clay liner (GSE BentoLiner CNSL Geosynthetic Clay Liner). In areas planned to have trees, a 3-foot engineered barrier will be placed instead of the geotextile fabric liner to prevent restriction of root growth. The 3-foot engineered barrier areas would be placed around each tree and be approximately 6 feet in diameter. The location of the trees is unknown at this time and would be provided in the RACR. The alternative geotextile fabric liner and 12 inches of clean soil covered by grass and other landscaping features will provide an adequate barrier to exclude the industrial/commercial ingestion exposure route and would not adversely impact human health or the environment. Therefore, IEPA acceptance of this 12-inch barrier is sought to help the economic viability of this important redevelopment project.

4.0 CLOSING

We appreciate the opportunity to provide this RAP Addendum for IEPA approval. If you should have any questions or comments regarding this letter, please contact us at (312) 575-0014.

Sincerely,
Terracon Consultants, Inc.

Richard O'Brien, P.E.
Senior Project Engineer

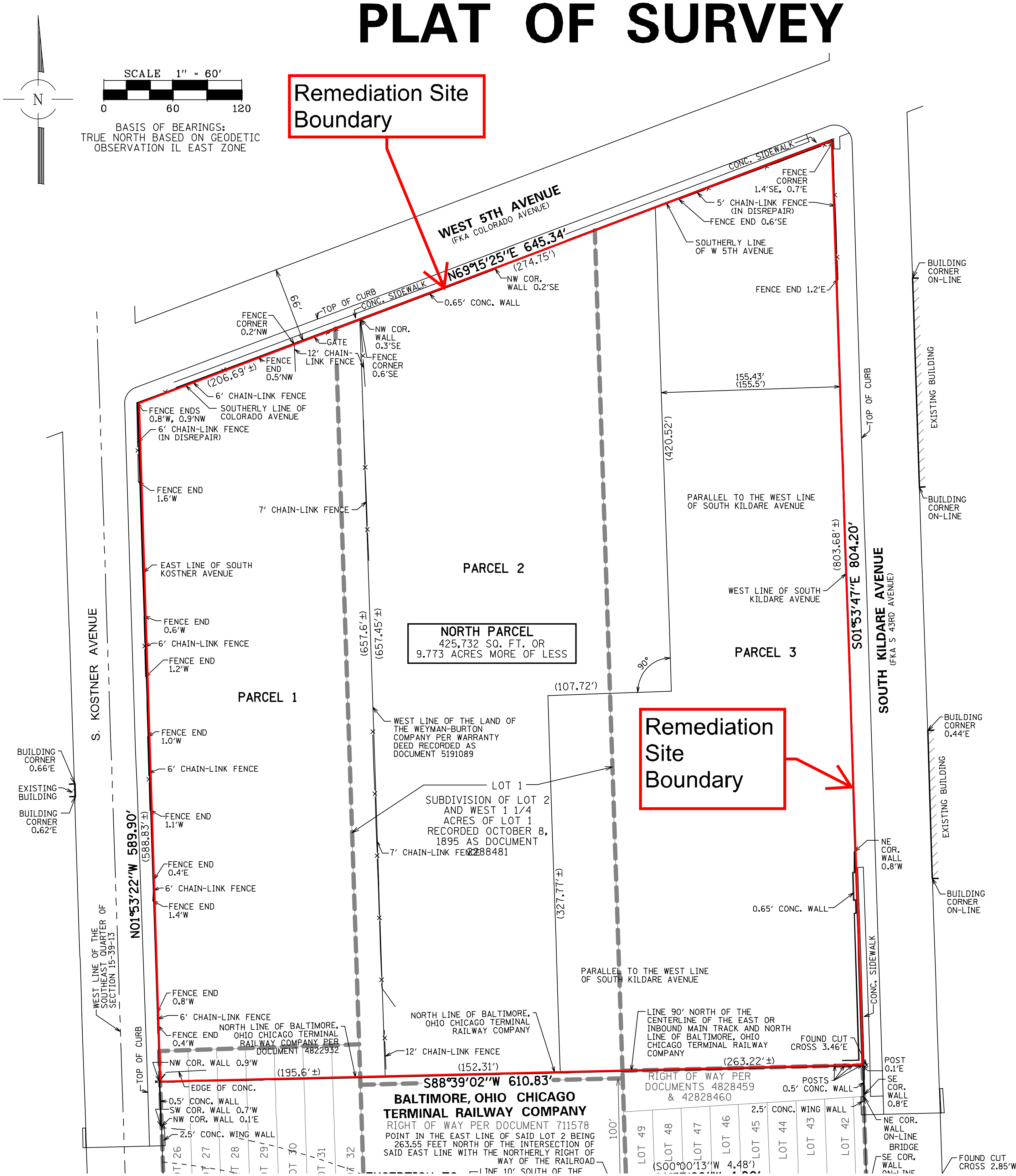
Linda Yang, P.G.
Senior Principal

Attachments: Attachment 1 – Updated Site Survey and Revised Remediation Site Boundary
Attachment 2 - Exhibits
Attachment 3 - GPRS Report
Attachment 4 - Proposed Geotextile Fabric and Geosynthetic Clay Liner

CC: Ms. Sarah Rubin, Chicago 2FM
Mr. Kevin Matzke; Mr. Eric Johnson – Clarius Partners

Attachment 1 – Updated Site Survey, Revised Remediation Site Boundary and Legal Description

PLAT OF SURVEY



Source: Portion of Survey from SPACECO Inc. Dated 01/15/2016, Revised 02/01/2016

PROPERTY DESCRIPTION

PARCEL 1:

THAT PART OF THE WEST 1/2 OF THE SOUTHEAST 1/4 OF SECTION 15, TOWNSHIP 39 NORTH, RANGE 13, EAST OF THE THIRD PRINCIPAL MERIDIAN, WHICH IS BOUNDED ON THE NORTH BY THE SOUTHERLY LINE WEST 5TH AVENUE, (FORMERLY COLORADO AVENUE); ON THE EAST BY THE WEST LINE OF THE LAND OF THE WEYMAN-BURTON COMPANY (DESCRIBED IN THE WARRANTY DEED FROM SPAULDING AND MERRICK TO SAID WEYMAN-BURTON COMPANY DATED APRIL 3, 1913, AND FILED FOR RECORD IN THE RECORDER'S OFFICE OF COOK COUNTY, ILLINOIS, MAY 22, 1913, AS DOCUMENT 5191089 AND RECORDED IN BOOK 12346 OF RECORDS, PAGE 452, AND IN BOOK 122 OF PLATS, PAGE 11); ON THE SOUTH BY THE NORTH LINE OF THE BALTIMORE AND OHIO CHICAGO TERMINAL RAILROAD COMPANY'S RIGHT OF WAY AND ON THE WEST BY THE EAST LINE OF SOUTH KOSTNER AVENUE (FORMERLY SOUTH 44TH AVENUE) AND MORE PARTICULARLY BOUNDED AND DESCRIBED AS FOLLOWS: COMMENCING AT THE POINT OF INTERSECTION OF THE SOUTHERLY LINE OF COLORADO AVENUE WITH EAST LINE OF SOUTH KOSTNER AVENUE (FORMERLY SOUTH 44TH AVENUE), RUNNING THENCE EASTERLY ALONG SOUTHERLY LINE OF COLORADO AVENUE 206.69 FEET, MORE OR LESS, TO ITS INTERSECTION WITH THE WEST LINE OF THE LAND OF WEYMAN-BURTON COMPANY (DESCRIBED IN A WARRANTY DEED FROM SPAULDING AND MERRICK TO SAID WEYMAN-BURTON COMPANY DATED APRIL 13, 1913, AND FILED FOR RECORD IN THE RECORDER'S OFFICE OF COOK COUNTY, ILLINOIS, ON MAY 22, 1913, AS DOCUMENT 5191089 AND RECORDED IN BOOK 12346 OF RECORDS, PAGE 452, AND IN BOOK 122 OF PLATS AT PAGE 11); THENCE SOUTH ALONG THE WEST LINE OF THE LAND OF THE WEYMAN-BURTON COMPANY 657.6 FEET, MORE OR LESS, TO THE NORTH LINE OF THE BALTIMORE AND OHIO CHICAGO TERMINAL RAILROAD COMPANY'S RIGHT OF WAY; THENCE WEST ALONG SAID NORTH LINE 195.6 FEET, MORE OR LESS, TO THE EAST LINE OF SOUTH KOSTNER AVENUE (FORMERLY 44TH AVENUE); THENCE NORTH ALONG SAID EAST LINE 588.83 FEET, MORE OR LESS, TO THE PLACE OF BEGINNING ALL IN COOK COUNTY, ILLINOIS.

PARCEL 2:

ALL THAT PART OF THE WEST HALF OF THE SOUTH EAST QUARTER OF SECTION 15, TOWNSHIP 39, NORTH, RANGE 13, EAST OF THE THIRD PRINCIPAL MERIDIAN, BOUNDED AND DESCRIBED AS FOLLOWS:

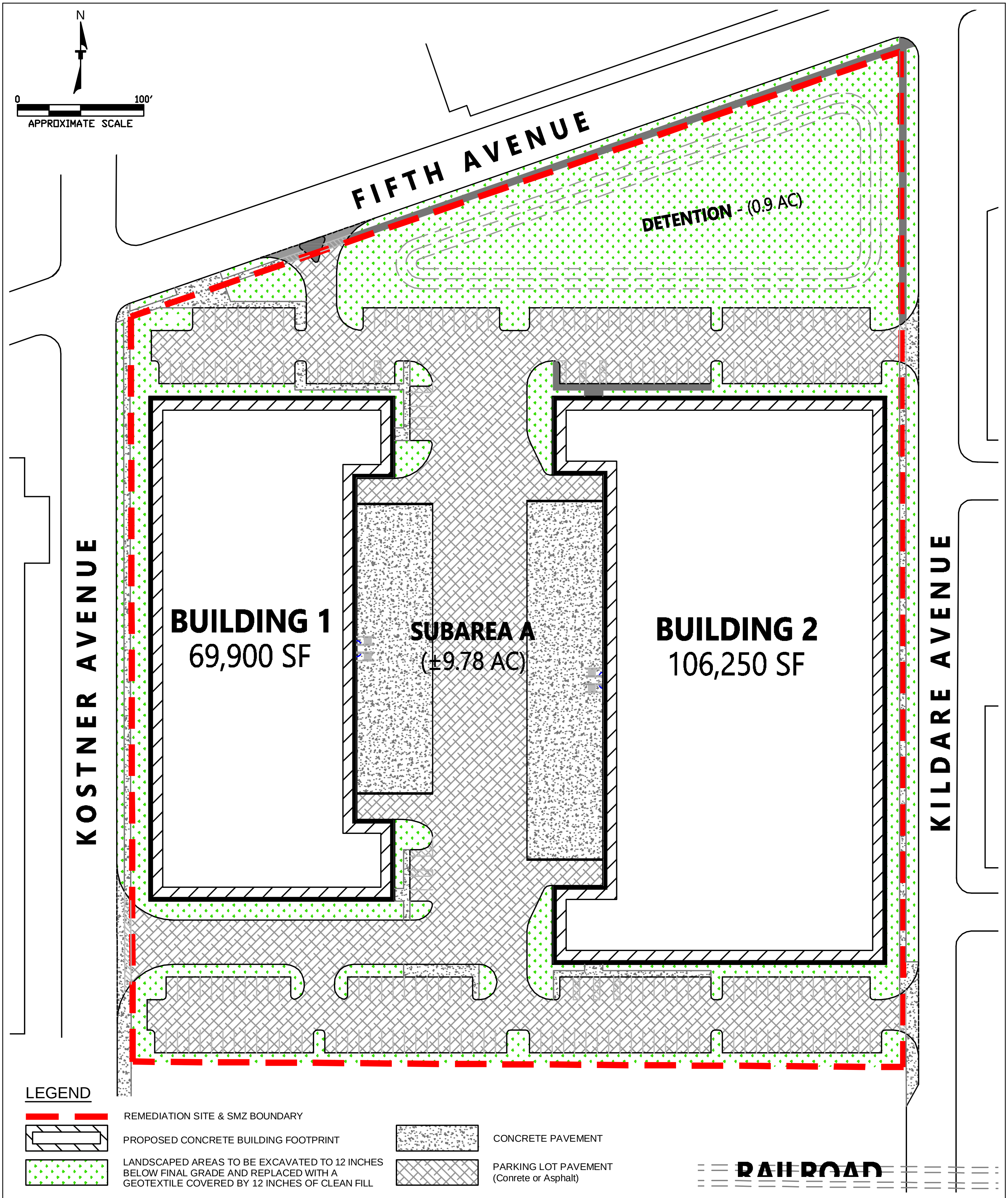
COMMENCING AT THE INTERSECTION OF THE SOUTHERLY LINE OF 5TH AVENUE (FORMERLY COLORADO AVENUE) WITH THE WEST LINE OF SOUTH KILDARE AVENUE (FORMERLY SOUTH 43RD AVENUE); THENCE WESTERLY ALONG THE SOUTHERLY LINE OF SAID 5TH AVENUE TO A POINT OF INTERSECTION WITH A LINE WHICH IS 155 FEET 6 INCHES WEST OF AND AT RIGHT ANGLES TO THE WEST LINE OF SAID KILDARE AVENUE AND THE POINT OF BEGINNING; THENCE SOUTH ALONG A LINE PARALLEL TO THE WEST LINE OF SAID SOUTH KILDARE AVENUE A DISTANCE OF 420.52 FEET; THENCE WEST ALONG A LINE AT RIGHT ANGLES TO LAST DESCRIBED LINE 107.72 FEET TO THE CENTER OF A 24 INCH BRICK WALL EXTENDED NORTH; THENCE SOUTH PARALLEL TO SAID WEST LINE OF SOUTH KILDARE AVENUE AND THROUGH THE CENTER OF A 24 INCH BRICK WALL 327.77 FEET MORE OR LESS TO THE NORTH LINE OF THE BALTIMORE, OHIO AND CHICAGO TERMINAL RAILWAY COMPANY RIGHT OF WAY; THENCE WEST ON SAID NORTH RIGHT OF WAY LINE A DISTANCE OF 152.31 FEET; THENCE NORTH ON A LINE PARALLEL TO THE WEST LINE OF SOUTH KILDARE AVENUE A DISTANCE OF 657.45 FEET MORE OR LESS TO THE SOUTH LINE OF 5TH AVENUE: THENCE NORTHEASTERLY ALONG THE SOUTH LINE OF SAID 5TH AVENUE, A DISTANCE OF 274.75 FEET TO THE POINT OF BEGINNING, IN COOK COUNTY, ILLINOIS.

PARCEL 3:

ALL THAT PART OF THE WEST 1/2 OF THE SOUTHEAST 1/4 OF SECTION 15, TOWNSHIP 39 NORTH, RANGE 13, EAST OF THE THIRD PRINCIPAL MERIDIAN, BOUNDED AND DESCRIBED AS FOLLOWS: BEGINNING AT THE INTERSECTION OF THE SOUTHERLY LINE OF 5TH AVENUE (FORMERLY COLORADO AVENUE) WITH THE WEST LINE OF SOUTH KILDARE AVENUE (FORMERLY SOUTH 43RD AVENUE); THENCE WESTERLY ALONG THE SOUTHERLY LINE OF SAID 5TH AVENUE TO A POINT OF INTERSECTION WITH A LINE WHICH IS 155 FEET 6 INCHES WEST OF AND AT RIGHT ANGLES TO THE WEST LINE OF SAID KILDARE AVENUE; THENCE SOUTH ALONG A LINE PARALLEL TO THE WEST LINE OF SAID SOUTH KILDARE AVENUE A DISTANCE OF 420.52 FEET; THENCE WEST ALONG A LINE AT RIGHT ANGLES TO LAST DESCRIBED LINE 107.72 FEET TO THE CENTER OF A 24 INCH BRICK WALL EXTENDED NORTH; THENCE SOUTH AT RIGHT ANGLES TO THE LAST DESCRIBED LINE 327.77 FEET MORE OR LESS TO THE NORTH LINE OF THE BALTIMORE AND OHIO, CHICAGO TERMINAL RAILWAY COMPANY RIGHT OF WAY; THENCE EAST ON SAID NORTH RIGHT OF WAY LINE A DISTANCE OF 263.22 FEET MORE OR LESS TO THE WEST LINE OF SAID SOUTH KILDARE AVENUE; THENCE NORTH ALONG THE WEST LINE OF SAID SOUTH KILDARE AVENUE A DISTANCE OF 803.68 FEET MORE OR LESS TO THE POINT OF BEGINNING, IN COOK COUNTY, ILLINOIS.

Attachment 2- Exhibits

Project Mngr: RMO	Project No. A2147008	Terracon Consulting Engineers and Scientists	GPR/EM INVESTIGATION AREAS	EXHIBIT
Drawn By: KMK	Scale: AS-SHOWN		916 South Kildare Road Chicago, Illinois	1
Checked By: MAC	Revised By: ~	650 W. LAKE ST., SUITE 420 CHICAGO, ILLINOIS 60661		
Approved By: MAC	Date: January 2017	PH. (312) 575-0014 FAX. (312) 575-0111		



Project Mngr: RMO	Project No. A2147008	Terracon Consulting Engineers and Scientists 650 W. LAKE ST., SUITE 420 CHICAGO, ILLINOIS 60661	**REDEVELOPMENT PLAN AND EXTENT OF REQUIRED ENGINEERED BARRIERS** **916 South Kildare Road** **Chicago, Illinois**
Drawn By: KMK	Scale: AS-SHOWN		
Checked By: MAC	Revised By: ~		
Approved By:	Date:		

EXHIB

2

Terracon

Attachment 3 - GPRS Report

June 24, 2016

Ricenhard O'Brien
Terracon Consultants
650 W Lake, STE. 420
Chicago, IL 60651
rmobien @terracon.com

Subject: Ground Penetrating Radar (GPR) UST scanning at 909 S. Kostner Ave Chicago, IL.

Lead Technician: Shaun Ashley
Ground Penetrating Radar Systems, Inc.
Mobile: 773.717.6935
shaun.ashley@gp-radar.com

Table of Contents

1. Overview of GPR

Ground Penetrating Radar (GPR) is a non-destructive testing technology that sends a series of radar pulses into the surface which reflect back off of anomalies below. As the radar pulses pass through the ground, the waves bend slightly when encountering a material with differing physical properties, particularly density and conductivity. Thousands of pulses are sent and received in a small area, and the received signals are combined to form a real-time image of what is in the ground. The various places where the radar waves bend are displayed as anomalies which can be interpreted as steel pipes, PVC conduits, underground storage tanks, voids, foundations, etc. One of the many advantages of the technology is the ability to locate non-metallic objects as well as determining depth to the object. GPR data acquisition is very fast and results are available immediately, allowing any discovered anomalies to be marked directly in the field. Although sometimes confused with X-Ray, GPR uses no radiation emissions and is perfectly safe to work with human presence in close proximity.

2. Equipment and Capabilities

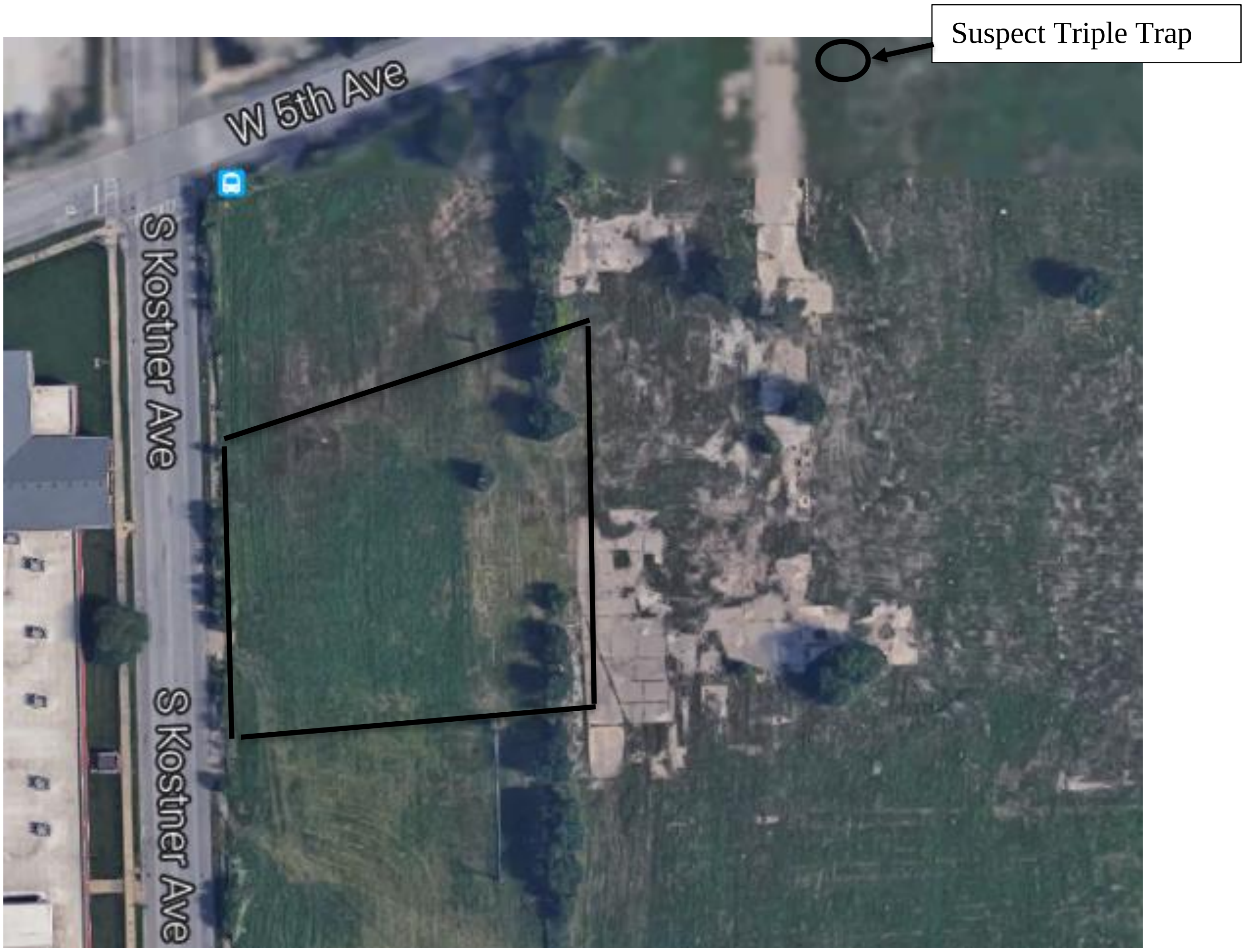
Ground Penetrating Radar (GPR)

- **GSSI SIR – 3000**
  - GPRS uses a Geophysical Survey Systems Inc. (GSSI) SIR-3000 Radar unit. This is the most advanced GPR available. It allows for onsite interpretation, as well as stores data for later processing. This equipment is self-calibrating, allowing more precise depth and location measurements.
- **400 MHz GSSI antenna**
  - For this project, a 400 MHz antenna was used with the GPR. This antenna allows data collection to a maximum depth of approximately eight feet, depending on soil conditions. At this site, the signal was effective to a depth of approximately four feet.
- **EMI- Electro Magnetic Induction**
  - EMI instruments transmits a primary magnetic field, which induces an electrical current in the earth. The current in the earth produces a secondary magnetic field. The characteristics of the secondary magnetic field indicates the conductivity of the earth. The In-Phase will show Metal Components and the Quadrature will show the overall targets. It can collect up to 3 meters in depth.

3. Site Description

This scanning was conducted at 909 S Kostner *in Chicago, IL.* Underground storage tank/s were known to have been identified for the historical 909 S Kostner address based on permit records. The total scanned area of the facility is approximately 190'x125'. The site was scanned to attempt to locate evidence of the presence of underground storage tanks.

Date: June 9, 2016



4. Inspection Methods

The primary purpose of this scanning was to locate any evidence of the presence of underground storage tanks and other significant underground anomalies. By using the two methods of equipment, we tried to determine where possible underground storage tanks existed. The first method was with the SIR-3000 and 400MHz. This gave us the chance to scan roughly 3'-4' in the ground. The depth penetration at 3-4' is due to the soil conditions of the site.

The inspection method for this portion of the project consisted of conducting GPR scanning of all ground-level areas outside the building. Scans were taken in a grid pattern, with adjacent scans no more than two feet apart. The GPR detects differences in physical properties such as conductivity and density; metallic objects are most clearly visible, but it can also detect PVC, concrete (especially reinforced), and often old excavations if the backfill is different from native soil. As each scan progresses, the GPR presents a sub-surface image in real time, allowing USTs, foundations, and other significant anomalies to be marked out directly in the field.

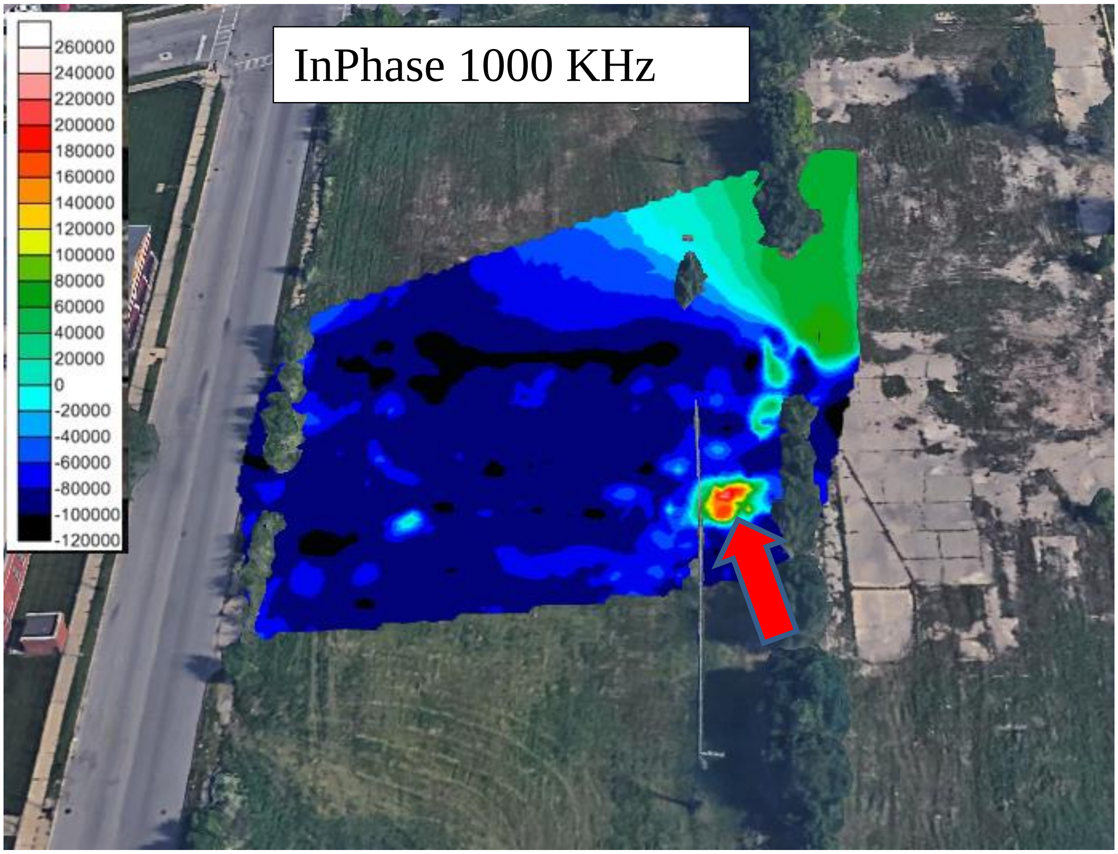
Using the EMI, we set the frequencies at 1000KHz, 8000KHz and 16,000KHz. The higher the frequency, the shallower the penetration and the lower the frequency, the deeper the penetration. This will give us a range from 0-3 meters below the surface, but if the soils are conductive it could penetrate further, there is no way to determine the actual depths of these findings. With this process everything is collected and post processed. Below is the data we collected.

5. Findings

GPRS was able to locate an anomaly at the time of scanning. The anomaly in question may be a structure, possible UST or other unknown anomaly. Further investigation will be required to determine what anomaly may be. All ground-level areas at the site were scanned on a grid with transects of 2' or less apart, with repeated scanning in the area where older USTs were believed to have been installed. The locations of any USTs or other significant anomalies were marked directly on the surface. Depth of data at the time of scanning was approximately 3.5'.

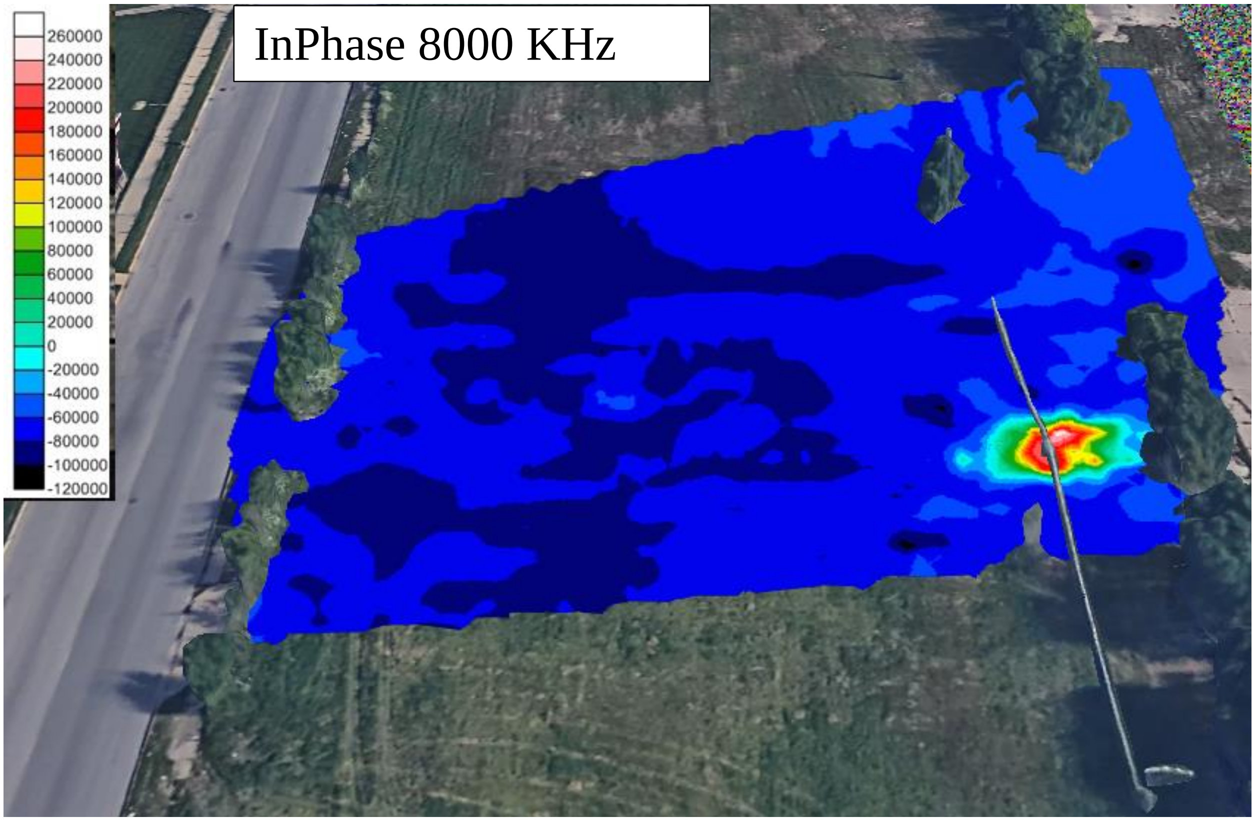
GPRS did not see evidence of a triple trap in the 60'x60 area scanned. Conditions during that scan included half the area to be covered in rubble. Further investigation may be needed.

The below is data taken from the EMI. This data is post processed. The Chart on the side will show the most conductive material to the least conductive material.

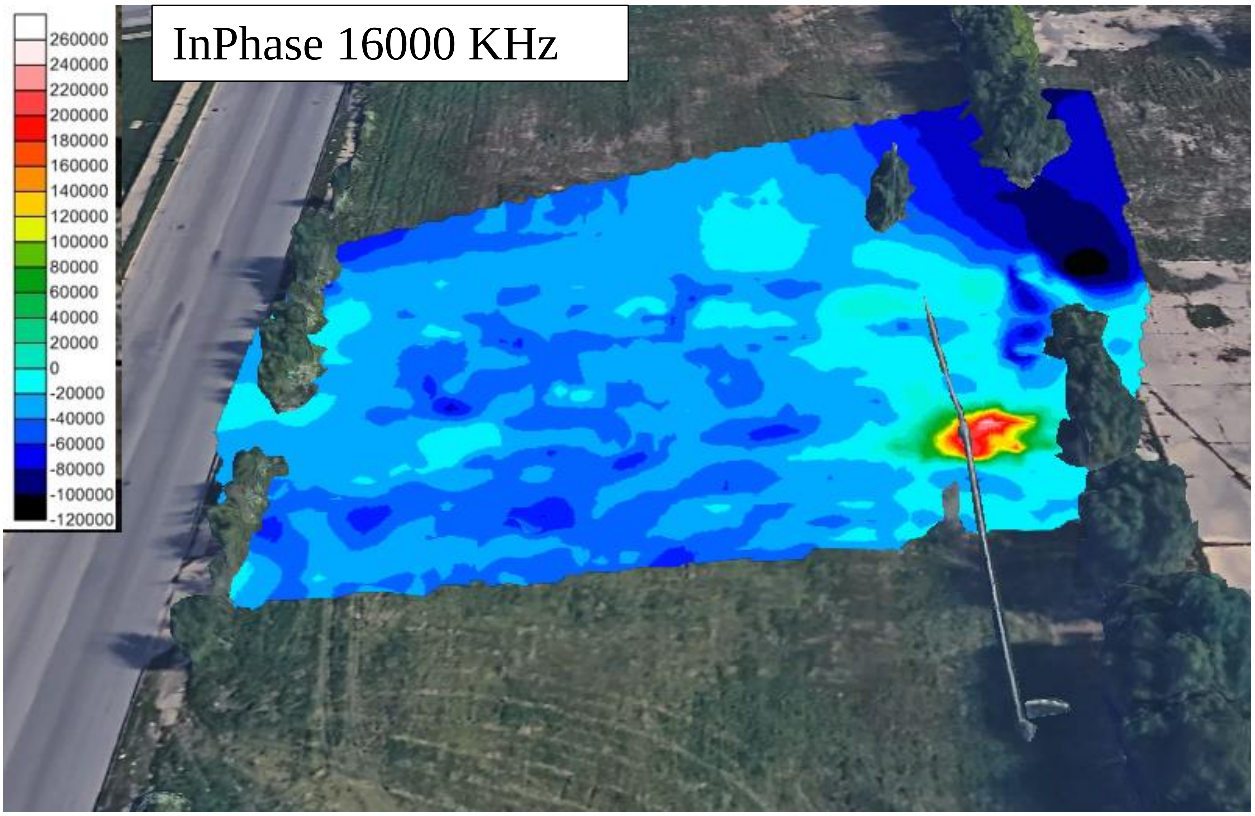


In the data above and below you will see data processed to focus on the InPhase. The InPhase focuses on the overall targets on site (metallic/non-metallic). The areas pointed with Red arrows appear to be conductive

Shaun Ashley • Chicago, IL
773.717.6935 • 866-851-8247 fax • shaun.ashley@gp-radar.com • www.gp-radar.com



InPhase 8000 KHz
260000
240000
220000
200000
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
-20000
-40000
-60000
-80000
-100000
-120000


InPhase 16000 KHz
260000
240000
220000
200000
180000
160000
140000
120000
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20000
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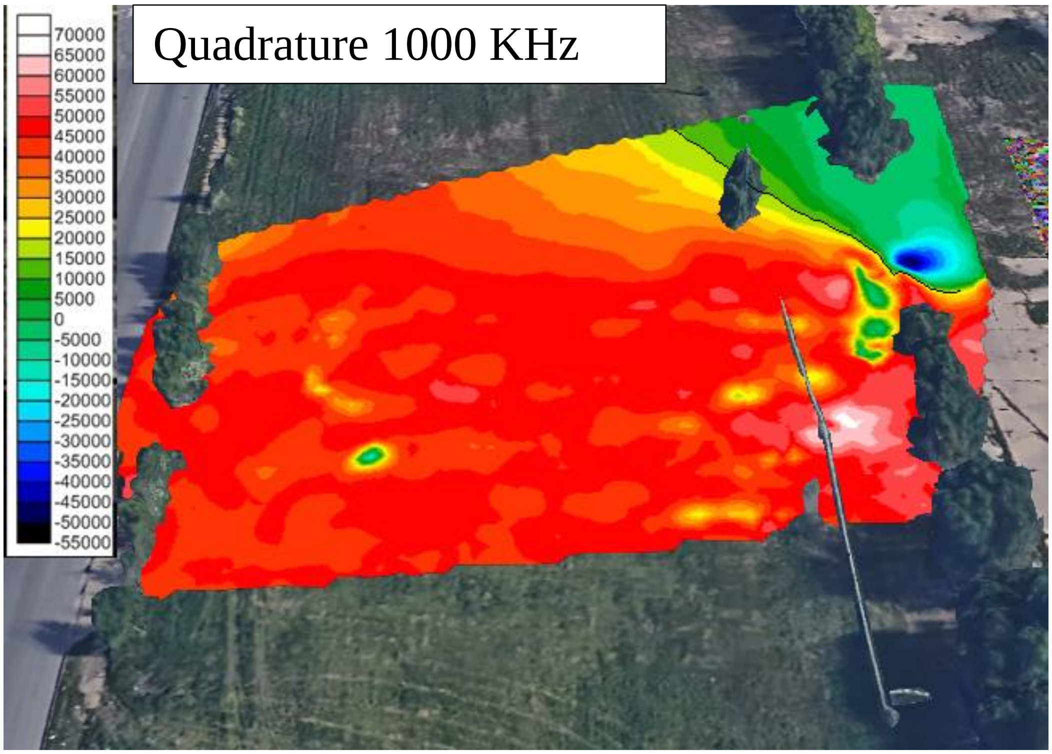
Quadrature 1000 KHz
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65000
60000
55000
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
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-10000
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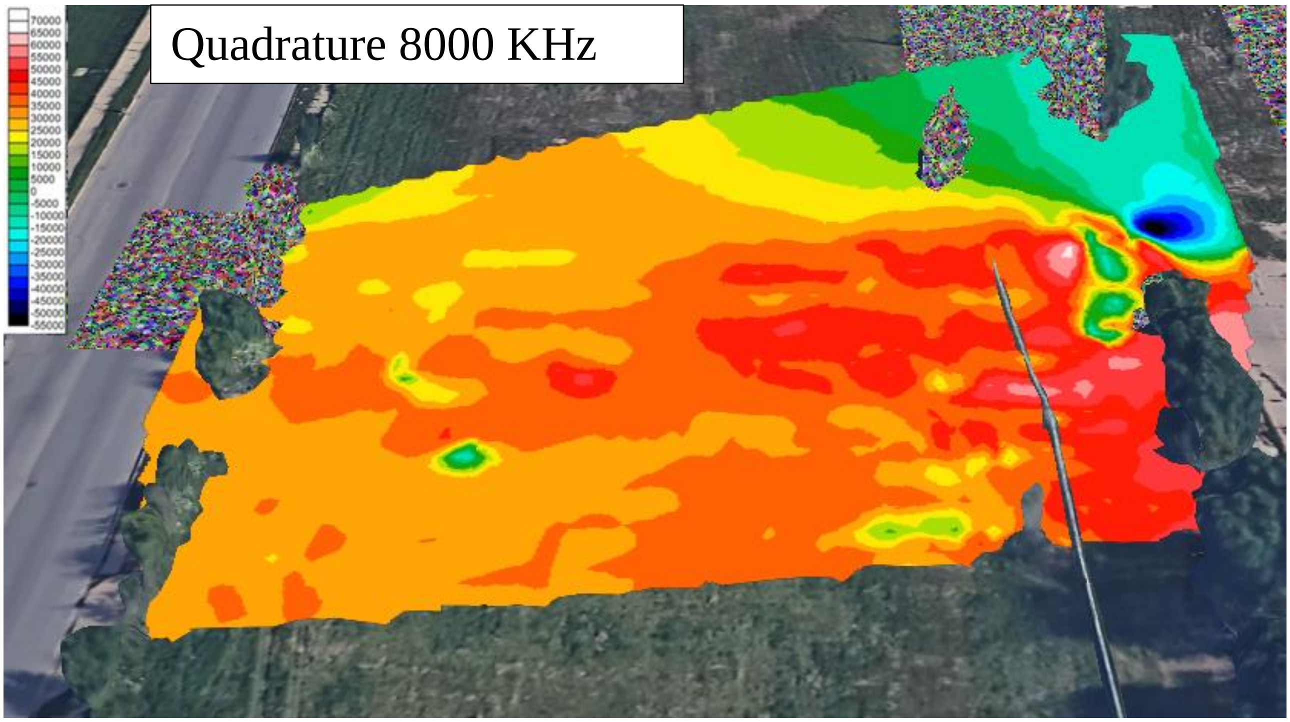
-55000


Quadrature 8000 KHz
70000
65000
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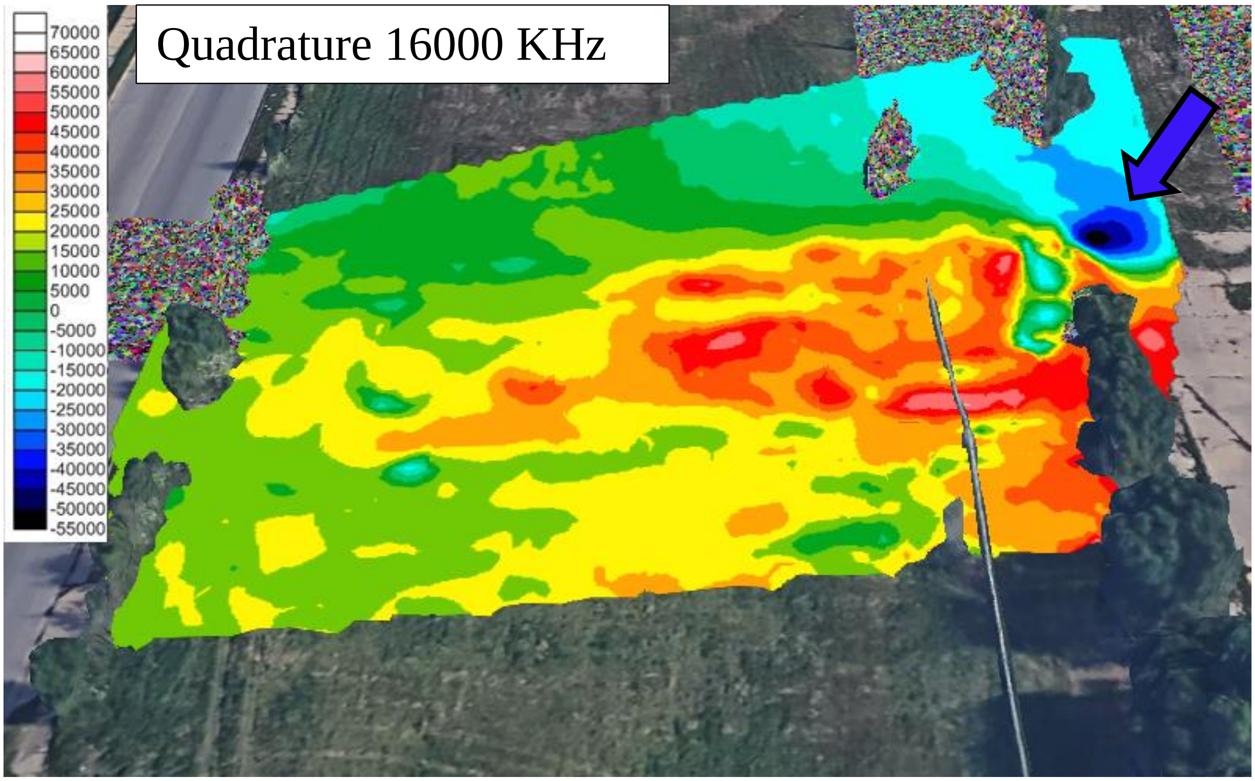

The data above and is referenced as the Quadrature files. The Quadrature allows us to focus on Metal Targets compared to the InPhase which allows us to see more the overall targets. We are again seeing less reflective/conductive material spikes in a few areas (dark blue areas/blue arrows). We believe these were near storm lines/catch basins.

Closing

Thank you for the opportunity to serve you on this project. I hope this report has answered all the questions you had regarding this survey. However, if there is anything you have questions about or feel was omitted, please do not hesitate to call.

Thank you,

Shaun Ashley
Ground Penetrating Radar Systems
773.717.6935 Phone
419-843-5829 Fax
shaun.ashley@gp-radar.com

Attachment 4 - Proposed Geotextile Fabric Liner and Geosynthetic Clay Liner

HANES® GEO COMPONENTS™
A Leggett & Platt® COMPANY

815 Buxton Street | Winston Salem, NC | 27101
PH: 888.239.4539 | FAX: 336.747.1652
www.HanesGeo.com

TerraTex® N08

TerraTex® N08 is a nonwoven geotextile made up of polypropylene fibers. These fibers are needled to form a stable and durable network such that the fibers retain their relative position. It is non-biodegradable and resistant to most soil chemicals, acids, and alkali with a pH range of 3 to 12. TerraTex® N08 is manufactured to meet or exceed the following minimum average roll values:

Unless noted otherwise, all values are minimum average roll values (MARV).

PROPERTY	TEST METHOD	ENGLISH	METRIC
Weight (Typical) [1]	ASTM D5261	**8.0** oz/yd^2	**271** g/m^2
Grab Tensile	ASTM D4632	**205** lbs	**0.911** kN
Grab Elongation	ASTM D4632	**50** %	**50** %
Trapezoid Tear	ASTM D4533	**85** lbs	**0.378** kN
CBR Puncture	ASTM D6241	**535** lbs	**2.38** kN
Permittivity [1]	ASTM D4491	**1.35** sec^{-1}	**1.35** sec^{-1}
Water Flow Rate [1]	ASTM D4491	**90** gpm/ft^2	**3,657** Lpm/m^2
AOS [1, 2]	ASTM D4751	**80** US Std. Sleve	**0.180** mm
UV Resistance	ASTM D4355	**70** % @ 500 hrs	**70** % @ 500 hrs

1 At the time of manufacturing. Handling, storage, and shipping may change these properties.
2 Value represents maximum average roll value.

KEELEY
CONSTRUCTION, INC.

REVIEWED
By mike at 10:31 am, Apr 06, 2016

PRODUCT DATA SHEET

GSE BentoLiner CNSL Geosynthetic Clay Liner

GSE BentoLiner "CNSL" is a needle-punched reinforced composite geosynthetic clay liner (GCL) comprised of a uniform layer of granular sodium bentonite encapsulated between a woven and a nonwoven geotextile with a uniform polypropylene geofilm coating applied to the woven surface to lower the hydraulic conductivity. The product is intended for applications that require excellent hydraulic conductivity properties and/or bentonite protection for moderate to steep slopes and moderate to high load applications where increased internal shear strength is required.

[*] e

AT THE CORE:
This composite clay liner is intended for applications that require excellent hydraulic conductivity properties and/or the self-seaming characteristics of bentonite clay.

KEELEY CONSTRUCTION, INC.

REVIEWED
By mike at 10:25 am, Apr 06, 2016

Product Specifications

Tested Property	Test Method	Frequency	VALUE
Geotextile Property			
Cap Nonwoven, Mass/Unit Area	ASTM D 5261	1/200,000 ft^2	6.0 oz/yd^2 MARV(1)
Carrier Woven, Mass/Unit Area	ASTM D 5261	1/200,000 ft^2	3.1 oz/yd^2 MARV
Bentonite Property			
Swell Index	ASTM D 5890	1/100,000 lb	24 ml/2 g min
Moisture Content	ASTM D 4643	1/100,000 lb	12% max
Fluid Loss	ASTM D 5891	1/100,000 lb	18 ml max
Finished GCL Property			
Bentonite, Mass/Unit Area(2)	ASTM D 5993	1/40,000 ft^2	0.75 lb/ft^2 MARV
Tensile Strength(3)	ASTM D 6768	1/40,000 ft^2	40 lb/in MARV
Peel Strength	ASTM D 6496 ASTM D 4632(4)	1/40,000 ft^2	3.5 lb/in MARV 21 lb MARV
Hydraulic Conductivity(5)	ASTM D 5887	Periodically	5 x 10^{-10} cm/sec max
Index Flux(5)	ASTM D 5887	Periodically	1 x 10^{-9} m^3/m^2/sec max
Internal Shear Strength(6)	ASTM D 6243	Periodically	500 psf Typical
TYPICAL ROLL DIMENSIONS			
Width x Length(7)	Typical	Every Roll	15.5 ft x 150 ft
Area per Roll	Typical	Every Roll	2,325 ft^2
Packaged Weight	Typical	Every Roll	2,600 lb

NOTES:
- (1)Minimum Average Roll Value.
- (2)At 0% moisture content.
- (3)Tested in machine direction.
- (4)Modified ASTM D 4632 to use a 4 in wide grip. The maximum peak of five specimens averaged in machine direction.
- (5)Deaired, deionized water @ 5 psi maximum effective confining stress and 2 psi head pressure.
  Hydraulic Conductivity and Index Flux are performed only on a periodic basis because the polypropylene coating is essentialy impermeable.
- (6)Typical peak value for specimen hydrated for 24 hours and sheared under a 200 psf normal stress.
- (7)Roll widths and lengths have a tolerance of ±1%.

GSE is a leading manufacturer and marketer of geosynthetic lining products and services. We've built a reputation of reliability through our dedication to providing consistency of product, price and protection to our global customers.

Our commitment to innovation, our focus on quality and our industry expertise allow us the flexibility to collaborate with our clients to develop a custom, purpose-fit solution.

GSE ENVIRONMENTAL™

[DURABILITY RUNS DEEP] For more information on this product and others, please visit us at GSEworld.com, call 800.435.2008 or contact your local sales office.

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-3397
BRUCE RAUNER, GOVERNOR ALEC MESSINA, DIRECTOR

217/524-3300

July 7, 2017

City of Chicago
Department of Fleet and Facility Management
Attn: Kimberly Worthington
30 North LaSalle Street, 3rd Floor
Chicago, Illinois 60602-2575

Re: 0316265052--Cook County
Chicago/Northwestern Salt Company
Site Remediation/Technical Reports

Dear Ms. Worthington:

The Illinois Environmental Protection Agency ("Illinois EPA") has completed review of the Remedial Action Plan (RAP) Addendum (received May 3, 2017/Log No. 17-64615) submitted by Terracon Consultants for the remediation site located at 4343 West 5th Avenue, Chicago. The RAP Addendum proposes the placement of two (2) types of alternative engineered barriers, along with the customary building slab and asphalt/concrete parking areas, for purposes of excluding the soil ingestion exposure route. The proposed alternative engineered barriers, using a GSE BentoLiner CNSL Geosynthetic Clay Liner in the northern section of the property and a TerraTex No 8 geotextile fabric in landscaped areas across the site, are both approved. In addition, the proposed investigation regarding the on-site underground storage tank evaluation and the revision to the remediation site legal description are also approved.

The Illinois EPA requests not less than a fourteen (14) calendar day notification of all future site investigation and remedial activities in order to coordinate potential Illinois EPA oversight. This notification is particularly important when groundwater or soil samples are being collected. Failure to notify the Illinois EPA may invalidate sample analysis results and/or other site activities. In addition, pursuant to 35 Illinois Administrative Code ("IAC") Section 740.415(d)(6), all quantitative analyses of samples collected on or after January 1, 2003, and utilizing any of the approved test methods identified in 35 IAC Part 186.180, shall be completed by an accredited laboratory in accordance with the requirements of 35 IAC Section 186. Quantitative analyses not utilizing an accredited laboratory in accordance with Part 186 shall be deemed invalid.

Please submit the original and one (1) copy of all future reports or correspondence to the Illinois EPA regarding this site. If you have any questions regarding this letter, I may be contacted at the address above or at (217) 524-7207.

Sincerely,

James Baldwin

M.C. James L. Baldwin, LPG
Project Manager
Voluntary Site Remediation Unit
Remedial Project Management Section
Division of Remediation Management
Bureau of Land

Cc: Richard O'Brian
Terracon Consultants, Inc.
rmobrien@terracon.com

Bureau of Land file

R E P O R T

Central City Productions, Inc.

GEOTECHNICAL REPORT

Central City Productions, Inc.

Proposed Central City Studios
Chicago, Illinois

STS Project No. 30642

October 6, 1999

STS Consultants, Ltd.
Solutions through Science & Engineering

October 6, 1999

Mrs. Erma Gray Davis
Central City Productions, Inc.
c/o Mr. Robert J. Lenzke, AIA
d'Escoto, Inc.
1 East Erie Street, Suite 250
Chicago, IL 60611

RE: Geotechnical Engineering Report for Proposed Central City Studios, Northeast Corner of Kostner Avenue and Roosevelt Road, Chicago, Illinois STS Project No. 30642

Dear Mrs. Davis:

We are pleased to submit the results of our subsurface exploration and geotechnical engineering report for the above referenced site. This report presents the results of the field and laboratory testing programs and provides foundation design recommendations based on the soil and groundwater conditions as they relate to the proposed construction.

If there are any questions regarding the information contained in this report or if we may be of further service to you, please do not hesitate to contact us.

Respectfully,

STS CONSULTANTS, LTD.

Andrew J. Ptak

Andrew J. Ptak, P.E.
Project Engineer

Ted D. Bushell

Ted D. Bushell, P.E.
Principal Engineer

Attachments

750 Corporate Woods Parkway • Vernon Hills, IL 60061-3153 • (847) 279-2500 • (847) 279-2510 Fax

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PAGE NO.

GEOTECHNICAL ENGINEERING REPORT
PROPOSED CENTRAL CITY STUDIOS PROJECT
NORTHEAST CORNER OF KOSTNER AVENUE AND ROOSEVELT ROAD
CHICAGO, ILLINOIS

1.0 PROJECT OVERVIEW

1.1 Project Description

It is our understanding that the project consists of a proposed multiple one story high bay, slab-on-grade warehouse type structures to be utilized as studios for television productions. Column loads for the buildings were not available at the time this report was prepared, but bay spacing were estimated by the project architect to be as long as 120 feet in the longest direction. Parking and pavement will surround the studios with truck traffic expected on the majority of the roadways.

2.0 EXPLORATION PROCEDURES

2.1 Subsurface Explorations

As part of our subsurface program for this project, STS Consultants, Ltd. (STS) performed eighteen soil borings (B-1 through B-20, excluding B-2, B-12). Borings B-2 and B-12 were not drilled during this exploration due to time constraints in the budget and more difficult than expected soil conditions during drilling thru the existing fill materials. The boring locations were proposed by the project architect and were located in the field by STS. The boring locations are shown on the attached Soil Boring Location Diagram. The soil borings were extended to 30 feet below the ground surface except Boring B-9. A possible underground tank was encountered at a depth of 10.5 feet at this location and the boring was terminated at this depth. The approximate location of the actual boring locations are shown on the Boring Location Diagram located in the Appendix.

The soil borings were performed with a truck-mounted drill rig using continuous augers, split-barrel and Shelby tube sampling procedures in general accordance with ASTM D-1586 and ASTM D-1587. The proposed project site is currently vacant land with overgrowth vegetation covering the majority of the northern parcel. Old foundations from previously existing buildings were noticed on the north parcel. Ground surface elevations at each soil boring location were estimated from a topographic survey dated July 6, 1999 produced by Environmental Design International, Inc. located in Hillside, IL.

2.2 Laboratory Testing Program

Soil samples were returned to our Vernon Hills, Illinois laboratory for visual examination of all samples and water content and strength tests on select cohesive samples. Field logs were developed for each boring location recording the observed soil conditions, groundwater conditions, and drilling procedures. The results of the laboratory tests and a description of the soils encountered are included on the attached boring logs.

3.0 EXPLORATION RESULTS

3.1 Site Conditions

At the time of our exploration, the site was vacant and was relatively flat with overgrowth vegetation on the majority of the northern parcel. Existing old foundations were evident at grade on the north parcel.

3.2 Subsurface Conditions

Based on results of the eighteen (18) soil borings completed for this project, the following subsurface profile is presented. A description of each general soil unit has been identified and is described on the following page.

Miscellaneous Fill - Miscellaneous fill was encountered at the boring locations to elevations ranging from +19 to +22.5 feet City of Chicago Datum (CCD) (depths of 2 to 8 feet) at the boring locations on the south parcel. Bituminous and concrete areas at the surface are located at various locations on the parcels. Miscellaneous fill was encountered at the boring locations to elevations ranging from +15 to +24 feet City of Chicago Datum (CCD) (depths of 6 to 10 feet) at the boring locations on the north parcel. The fill generally consists of miscellaneous fill consisted of clay, sand, gravel, topsoil, cinders, slag, brick and concrete. Difficult drilling was encountered in this rubble fill on the northern parcel, generally on the eastern half. Buried topsoil below the fill was encountered at Borings B-10 and B-18.

Very Stiff Clay - Below the fill to the termination of the borings, natural, brown and gray to gray silty clay (CL) with trace amounts of shale was encountered at the boring locations. The consistency of the silty clay was generally from hard to very stiff.

The geologic profile described above generally represents the conditions encountered in the soil borings performed. Some variations in the descriptions should be expected and we refer you to our boring logs in the Appendix for specifics at each boring location. A geotechnical engineer grouped the various soil types in the major zones noted on the boring logs. The stratification lines designating the interfaces between earth materials shown on the boring logs and profiles are approximate; in-situ, the transition may be gradual.

3.3 Groundwater Conditions

Groundwater was encountered during our drilling exploration at an depth of approximately 4 to 23 feet during drilling. No groundwater was encountered at Borings B-7, 13 & 16. The groundwater encountered in the upper fill soils is likely perched groundwater that has yet to stabilize. The long-term groundwater table is usually indicated by the soil color change from brown and gray to gray which occurs at approximate elevation +10 to +15 feet CCD. For foundation design purposes, the water table can be assumed to be at +15 feet (CCD).

4.0 ANALYSIS AND RECOMMENDATIONS

4.1 Foundation Design Recommendations

Shallow Spread Footing Foundation System for the Studio Structures

Shallow spread footing foundations situated on the stratum of natural, very stiff silty clay (CL) encountered beneath the existing fill materials at an approximate depth of 2 to 8 feet (approximate elevation +19 to +22.5 feet CCD) from existing grade on the south parcel and 6 to 10 feet (approximate elevation 19.5 to 24 feet CCD) from existing grade on the north parcel may utilize a net allowable bearing pressure of 4,000 pounds per square foot (psf). The maximum net allowable soil bearing pressure is that pressure which may be transmitted to the foundation soils in excess of the original overburden pressure. Note that at B-1, natural soft clay soils were encountered beneath the fill to a depth of 14 feet (approximate elevation +11 feet CCD) which will require undercutting to reach suitable bearing soils. Also, a possible buried underground tank was encountered at a depth of 10.5 feet at Boring B-9 which would require removal and replacement with compacted structural fill.

Alternatively, the spread footings may be founded in a properly constructed pad of structural fill bearing on the stiff to very stiff silty clay (CL) encountered beneath the existing miscellaneous fill utilizing a net allowable bearing pressure of 4,000 psf for compacted structural fill as discussed below. Foundation excavation will need to be widened 1 foot for each foot of overexcavation beneath the design foundation depth. The extent of this new structural fill would be relatively large, both in lateral and vertical extent for this option.

Structural fill should consist of an approved, inorganic, well-graded granular material such as a crushed limestone or gravel IDOT CA-6. Structural fill should be placed in maximum 9-inch loose lifts and compacted to a minimum of 95% of the maximum dry density obtained in accordance with ASTM Standard D-1557, modified Proctor method. Periodic density testing should be performed to document that density requirements have been met.

It is estimated that settlement of the proposed shallow foundations situated on a properly constructed structural pad or on top of the stiff to very stiff silty clay would be in the range of 3/4 to 1 inch for loads on the order of 200 to 300 kips. When actual column loads are determined, we request that we be notified in order to estimate settlements from the actual loading conditions.

If wintertime construction is expected, all bearing soils and concrete should be protected from freezing during cold weather conditions. Also, to prevent disproportionately small footings, we recommend that continuous wall footings have a minimum width of 1.5 feet and that isolated column footings have a minimum lateral dimension of 2.5 feet. Perimeter footings in heated areas should be founded a minimum of 3.5 feet below final exterior grade to provide frost cover protection. Footings in non-heated areas should be extended to a depth of 4.0 feet.

Alternate Shallow Foundation with Dynamic Compaction Ground Improvement

A possible cost saving alternative to overexcavation of the fill is to densify the existing fill soils in place for shallow spread footing support. Dynamic compaction of the site to densify the existing fill and provide for a more uniform support for the foundations and slab-on-grade is a possible option. Dynamic compaction consists of dropping a large weight (4 to 8 tons typical) from a crane on 7 to 10 foot centers in the area of proposed development. A large portion of the site was considered granular type rubble fill which is ideal for dynamic compaction techniques. Note that there is sufficient clayey type material in some areas of the fill at this site that are not considered ideal for dynamic compaction, but can more than likely be densified adequately to limit foundation movements to tolerable values for the light loads anticipated for support. Shallow spread footing foundations situated on dynamically compacted fill may utilize a net allowable bearing pressure of 3,000 pounds per square foot (psf). Vibrations from dynamic compaction can impact adjacent structures and buildings within 50 to 75 feet of the compaction operations and would need to be monitored for structural distress during compaction operations. Permission from these adjacent owners may also be required. We would recommend that that if this alternative is chosen, that dynamic compaction be performed prior any other site work. Specific dynamic compaction design considerations and provisions are beyond the scope of this report, but we would be pleased to discuss this option with you further, if this option is considered desirable by the design team. It is recommended that several test pits be excavated throughout the site to visually determine the granular content of the fill prior to implementing the design for this option.

4.2 Construction Dewatering Recommendations

Perched groundwater will likely be encountered in excavations thru the existing fill and should be controlled with sump/pump dewatering techniques.

4.3 Slab-on-Grade and Pavement Areas

It is our understanding that all of the proposed structures at the site are to be of slab-on-grade construction. After removal of the surficial organic layer or pavement surface, we recommend that the subgrade be proof-rolled with a loaded semi-trailer or a heavy piece of construction equipment to delineate an soft, yielding areas. These soft, yielding areas (if any) should be removed and replaced with structural fill to the depth encountered or a maximum additional depth of 2 feet.

New fill for slab-on-grade should be an approved, inorganic material. This material could consist of onsite existing fill which is free of organic matter, topsoil, high moisture content clay and debris. The fill should be visually observed during excavation and large wood and concrete pieces greater than six (6) inches in diameter removed. New fill should be placed in maximum 9-inch-thick loose lifts and compacted to a minimum of 90 percent of maximum dry density as determined by ASTM Specification D-1557, Modified Proctor method. Where pavement areas are to be utilized by truck traffic or in slab-on-grade areas which will support loads in excess of 500 psf, heavy concentrated loads or masonry partition walls, the fill should be compacted to a minimum of 95% of the dry density referenced above. Periodic density testing should be performed on any fill in order to document that density requirements have been met.

Floor slabs should be isolated from foundations to permit relative displacement without cracking. Slabs should also be provided with adequate reinforcing and jointing to control minor slab cracking.

4.4 Construction Considerations

A possible underground storage tank was encountered at a depth of 10.5 feet during drilling. An investigation should be conducted to determine if this indeed is an underground tank. The soil sample taken directly above this possible tank had a strong solvent odor. Also, solvent odor was noted in Borings B-1, B-3, B-4 and B-8. Photo-ionization readings with an HNU meter indicating volatiles in the air space above the soil samples were taken and the readings are indicated on the boring logs. Readings ranged from 10 to 480 parts per million. No readings were taken in Boring B-1 since the solvent odor was slight. Environmental assessment of any possible contaminated areas is recommended.

All excavation sides should be constructed such that they provide a safe, stable excavation. OSHA regulations regarding excavations should be followed. Excavation safety is the responsibility of the contractor; however, we recommend that excavation sides be sloped at 1H:1V or flatter above the water table for this purpose. Stockpiles of materials or equipment should not be placed near the top of excavation slopes.

All soils which soften or loosen at the base of foundation excavations or subgrade areas should be carefully recompacted or removed prior to placement of foundation concrete or fill material. No foundation concrete or structural fill should be placed in areas of ponded water or frozen soil. Any groundwater seepage through the existing granular surficial soils may vary but sump pump procedures should be adequate to remove any accumulated water in foundation excavations.

4.5 General Qualifications

General Qualifications applicable to subsurface exploration, earthwork, construction, and the recommendations contained in this report are a part of this report and are included in the Appendix.

APPENDIX

1. General Qualifications
2. Changed Conditions
3. Site Map
4. Soil Boring Location Diagram
5. Soil Boring Logs
6. General Notes
7. Unified Soil Classification System
8. Field and Laboratory Procedures
9. Standard Boring Log Procedures
10. Sampling Procedures

    ASTM D-1587-83

    ASTM D-1586-84

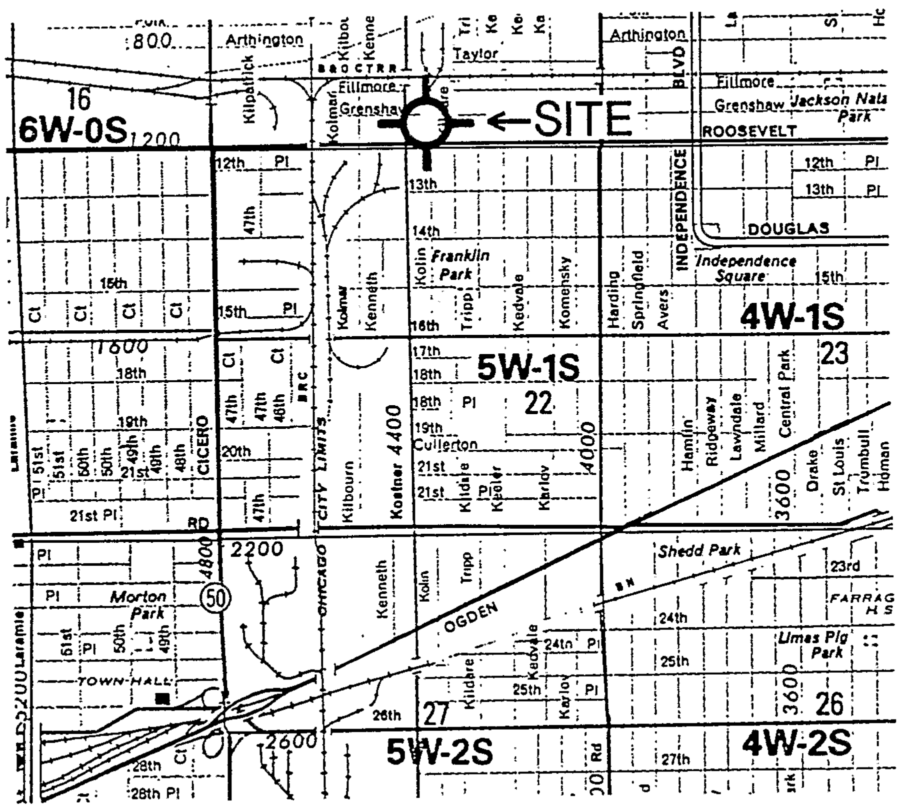
STS CONSULTANTS, LTD.

The following is a suggested standard clause for unanticipated subsurface conditions:

"The owner has had a subsurface exploration performed by a foundation consultant, the results of which are contained in the consultant's report. The consultant's report presents his conclusions on the subsurface conditions based on his interpretation of the data obtained in the exploration. The contractor acknowledges that he has reviewed the consultant's report and any addenda thereto, and that his bid for earthwork operations is based on the subsurface conditions, as described in that report. It is recognized that a subsurface exploration may not disclose all conditions as they actually exist and further, conditions may change, particularly groundwater conditions, between the time of subsurface exploration and the time of earthwork operations. In recognition of these facts, this clause is entered in the contract to provide a means of equitable additional compensation for the contractor if adverse unanticipated conditions are encountered and to provide a means of rebate to the owner if the conditions are more favorable than anticipated.

At any time during earthwork, paving and foundation construction operations that the contractor encounters conditions that are different than those anticipated by the foundation consultant's report, he shall immediately (within 24 hours) bring this fact to the owner's attention. If the owner's representative on the construction site observes subsurface conditions which are different than those anticipated by the foundation consultant's report, he shall immediately (within 24 hours) bring this fact to the contractor's attention. Once a fact of unanticipated conditions has been brought to the attention of either the owner or the contractor, and the consultant has concurred, immediate negotiations will be undertaken between the owner and the contractor to arrive at a change in contract price for additional work or reduction in work because of the unanticipated conditions. The contractor agrees that the following unit prices would apply for additional or reduced work under the contract. For changed conditions for which unit prices are not provided, the additional work shall be paid for on a time and material basis."

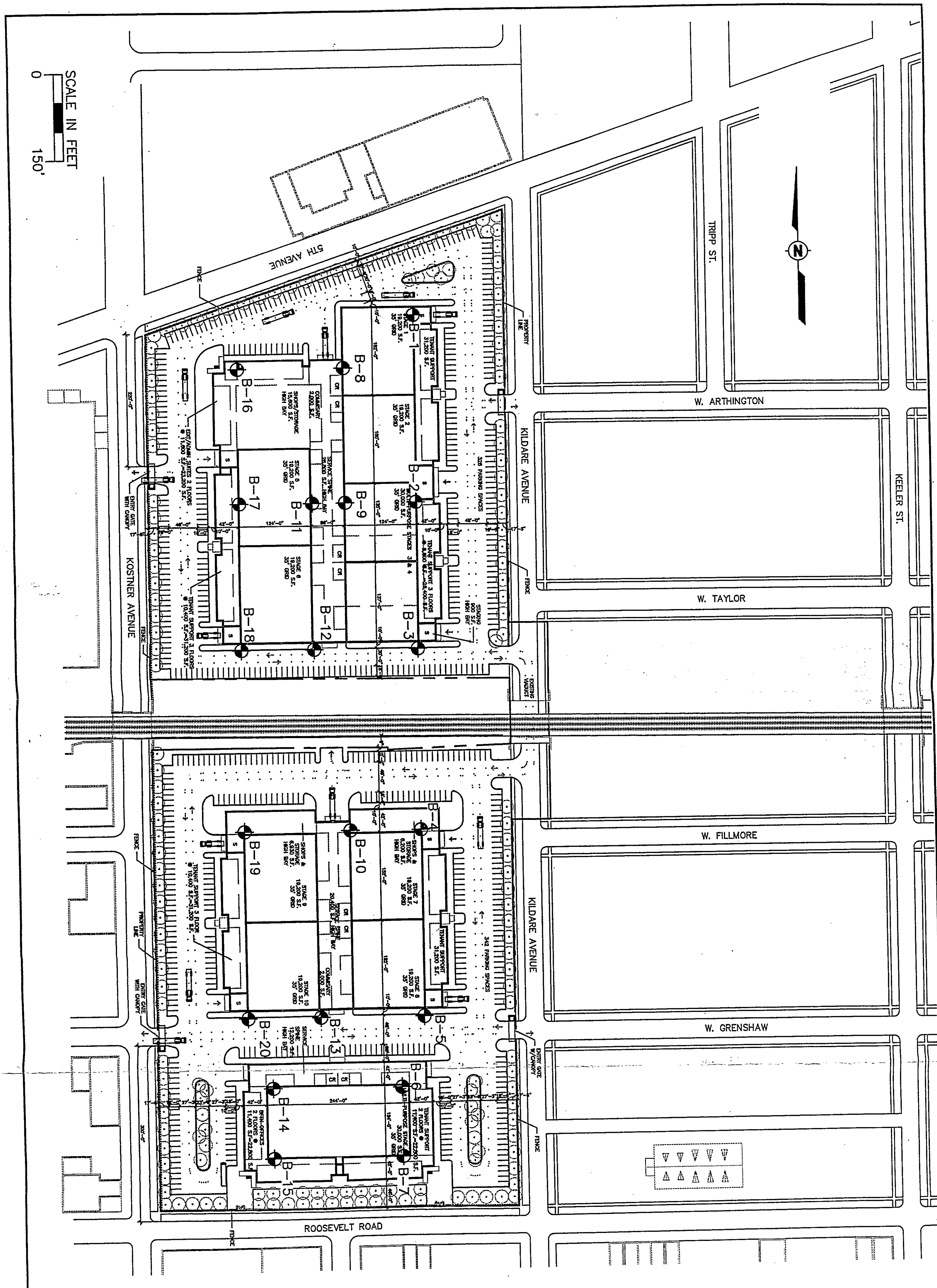
Another example of a changed conditions clause can be found in paper No. 4035 by Robert F. Borg, published in ASCE Construction Division Journal, No. CO2, September 1964, page 37.



SITE LOCATION MAP
CENTRAL CITY STUDIOS
NEC KOSTNER AVE. & ROOSEVELT RD.
CHICAGO, ILLINOIS

STS Consultants Ltd.
Consulting Engineers

DRAWN BY	KKB	9-21-99
CHECKED BY	AJP	9-21-99
APPROVED BY	TDB	9-21-99
CADFILE	SCALE NTS	
STS PROJECT NO. 30642	FIGURE NO. 1	



STS Consultants Ltd.
Consulting Engineers

SOIL BORING LOCATION DIAGRAM
CENTRAL CITY STUDIOS
NEC KOSTNER AVE. & ROOSEVELT ROAD
CHICAGO, ILLINOIS

DRAWN BY	KKB	DATE	9-21-99
CHECKED BY	AJP	DATE	9-21-99
APPROVED BY	TDB	DATE	9-21-99
CADFILE	X:\PROJECTS\30642\ G16421.dwg		

91/0'/1665 2 :1/

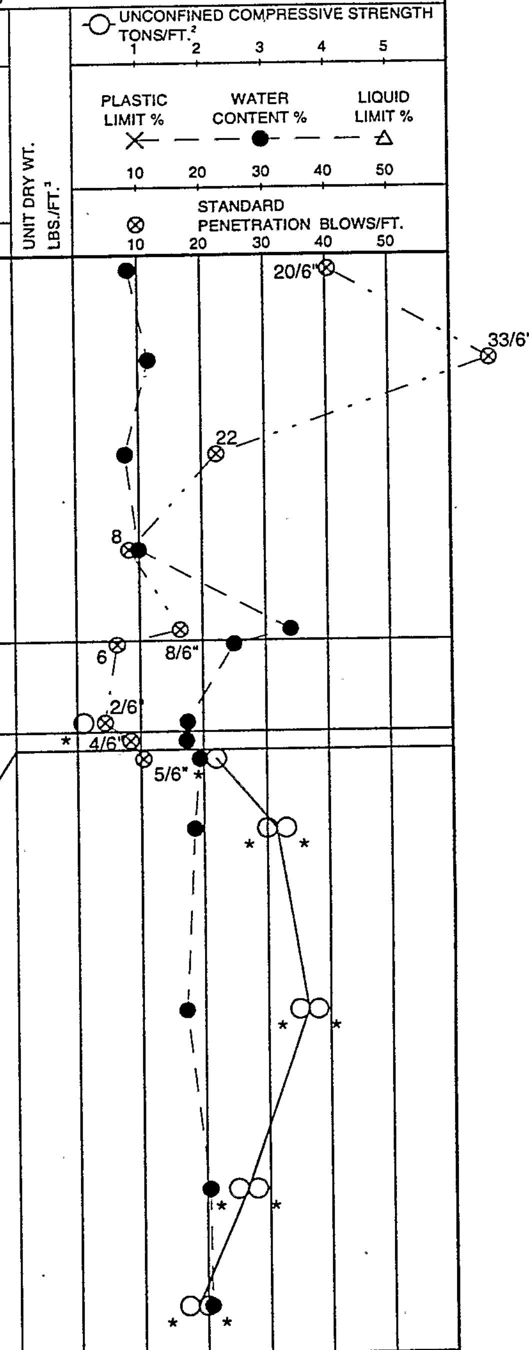
STS PROJECT NO. 30642
STS PROJECT FILE G16421.dwg
SCALE 1"=150'±
FIGURE NO. 2

STS Consultants Ltd.

OWNER: Central City Studios	LOG OF BORING NUMBER: B-1
PROJECT NAME: Central City Studios	ARCHITECT-ENGINEER: d'Escoto, Inc.

SITE LOCATION: NEC Kostner Ave. & Roosevelt Rd.; Chicago, IL

DEPTH(FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL
			SURFACE ELEVATION +25.2 +/-
	1	SS	Miscellaneous urban fill: Brick, sand, gravel, cinders, concrete and clay.
		PA	Note: Slight solvent odor noted in fill.
	2	SS	
5.0		PA	
	3	SS	
		PA	
	4	SS	
10.0		PA	
	5	SS*	
	5A	SS	Silty clay, some sand - gray - soft (CL)
		PA	
	6	SS*	
	6A	SS	Silt, little clay, trace gravel and sand - dark gray - loose - moist (ML)
	6B	SS	Silty clay, trace gravel and sand - gray - very stiff to stiff (CL)
15.0		PA	
	7	ST	
		PA	
20.0	8	ST	
		PA	
25.0	9	ST	
		PA	
	10	ST	
30.0			End of Boring Borehole backfilled upon completion. Automatic-Mobile Hammer used for Standard Penetration Tests.



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

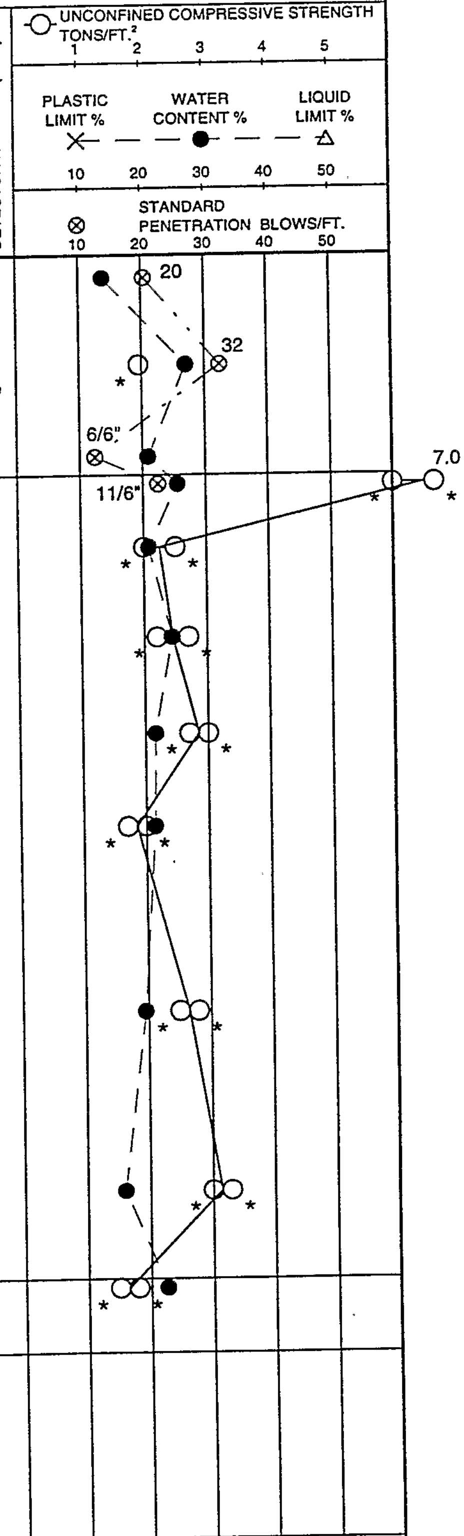
WL 10.5 ft. WS	BORING STARTED 9/21/99	STS OFFICE	Chicago Area - 01
WL 13.0 ft. AB	BORING COMPLETED 9/21/99	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN Mobile B-61/Baker	APP'D BY AJP	STS JOB NO. 30642

BORING_LOG 30642.GPJ STS.GDT 9/28/99

STS Consultants Ltd.

OWNER	Central City Studios
PROJECT NAME	Central City Studios
LOG OF BORING NUMBER	B-3
ARCHITECT-ENGINEER	d'Escoto, Inc.
SITE LOCATION	NEC Kostner Ave. & Roosevelt Rd.; Chicago, IL

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}	PHOTO-IONIZATION DETECTOR READING (PPM)
						SURFACE ELEVATION +29.8 +/-		
		1	SS			Fill: Silty clay, trace gravel, sand, roots, wood, topsoil, brick, slag and concrete - brown and black (OL-CL)		50
			PA			Note: Solvent odor noted in fill.		
		2	SS					120
5.0			PA					
		3	SS					
		3A	SS			Silty clay, trace gravel and sand - dark gray to brownish gray - hard to very stiff (CL)		
			PA					
		4	ST					
10.0			PA					
		5	ST					
			PA					
		6	ST					
15.0			PA					
		7	ST					
			PA					
20.0		8	ST					
			PA					
25.0		9	ST					
			PA					
		10	ST			Silty clay, trace gravel, sand and shale - gray - stiff (CL)		
30.0						End of Boring Borehole backfilled upon completion. Automatic-Mobile Hammer used for Standard Penetration Tests.		



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 23.0 ft. WD	BORING STARTED 9/21/99	STS OFFICE	Chicago Area - 01
WL 20.0 ft. AB	BORING COMPLETED 9/21/99	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN Mobile B-61/DeRubeis	APP'D BY AJP	STS JOB NO. 30642

BORING_LOG 30642.GPJ STS.GDT 10/4/99

STS Consultants Ltd.

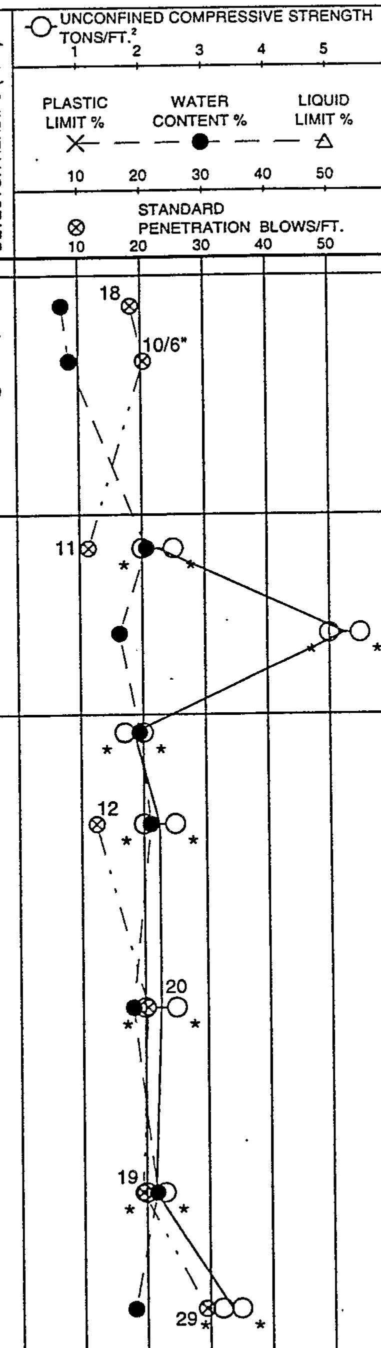
OWNER	Central City Studios	LOG OF BORING NUMBER	B-4
PROJECT NAME	Central City Studios	ARCHITECT-ENGINEER	d'Escoto, Inc.

SITE LOCATION
NEC Kostner Ave. & Roosevelt Rd.; Chicago, IL

SURFACE ELEVATION +26.7 +/-

DEPTH(FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL	PHOTO-IONIZATION DETECTOR READING (PPM)
		PA	Concrete	
	1	SS	Miscellaneous urban fill: Sand, gravel, cinders, clay, trace slag	210
	2	SS	Solvent odor noted.	300
5.0		PA	Driller's note: Concrete slab encountered from 3.5-4.5 f t.	
	3	SS	Silty clay, trace gravel and sand - mottled brownish gray - very stiff to hard (CL)	
10.0		PA		
	4	ST		
		PA		
	5	ST	Silty clay, trace gravel, sand and shale - gray - stiff to very stiff (CL)	
15.0		PA		
	6	SS		
		PA		
20.0	7	SS		
		PA		
25.0	8	SS		
		PA		
	9	SS		
30.0			End of Boring Borehole backfilled upon completion. Automatic-Mobile Hammer used for Standard Penetration Tests.	

Column headings also include: ELEVATION(FT), SAMPLE DISTANCE, RECOVERY, UNIT DRY WT. LBS./FT.^{3}



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 7.0 ft. WD	BORING STARTED 9/22/99	STS OFFICE	Chicago Area - 01
WL 5.0 ft. AB	BORING COMPLETED 9/22/99	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN CME-55/DeRubeis	APP'D BY AJP	STS JOB NO. 30642

BORING_LOG 30642.GPJ STS.GDT 9/28/99

STS Consultants Ltd.

OWNER	Central City Studios
PROJECT NAME	Central City Studios
LOG OF BORING NUMBER	B-5
ARCHITECT-ENGINEER	d'Escoto, Inc.
SITE LOCATION	NEC Kostner Ave. & Roosevelt Rd.; Chicago, IL

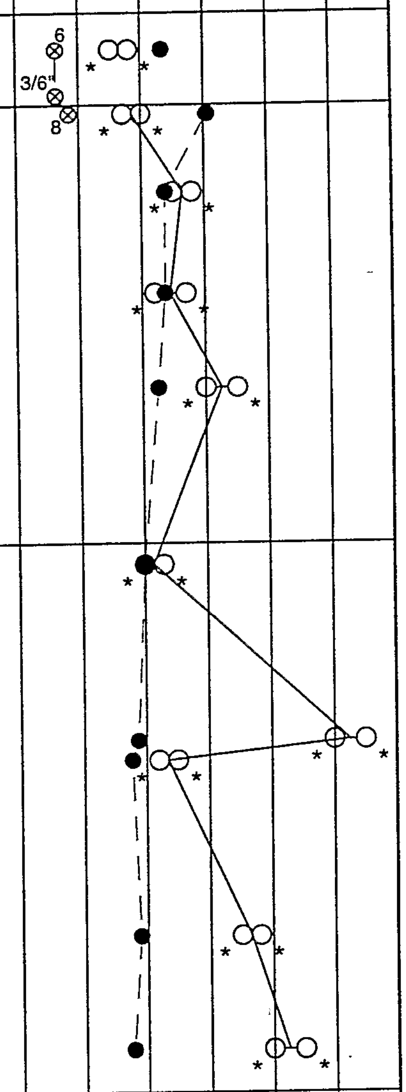
UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/FT. 10 20 30 40 50

SURFACE ELEVATION +24.8 +/-

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
			PA			Concrete	
		1	SS			Fill: Silty clay, little gravel and cinders, trace slag and concrete - gray to black - stiff (CL)	
		2	SS*				
		2A	SS			Silty clay, trace gravel, sand and shale - mottled brownish gray - very stiff (CL)	
5.0			PA				
		3	ST				
			PA				
		4	ST				
10.0			PA				
		5	ST				
			PA				
15.0		6	ST			Silty clay, trace gravel, sand and shale - gray - very stiff to hard (CL)	
			PA				
20.0		7	ST				
		7A	ST				
			PA				
25.0		8	ST				
			PA				
		9	ST				
30.0						End of Boring Borehole backfilled upon completion. Automatic-Mobile Hammer used for Standard Penetration Tests. SS* = SPT value based on first 6 in. of driving.	



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 7.5 ft. WS	BORING STARTED 9/22/99	STS OFFICE	Chicago Area - 01
WL Dry AB	BORING COMPLETED 9/22/99	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN CME-55/DeRubeis	APP'D BY AJP	STS JOB NO. 30642

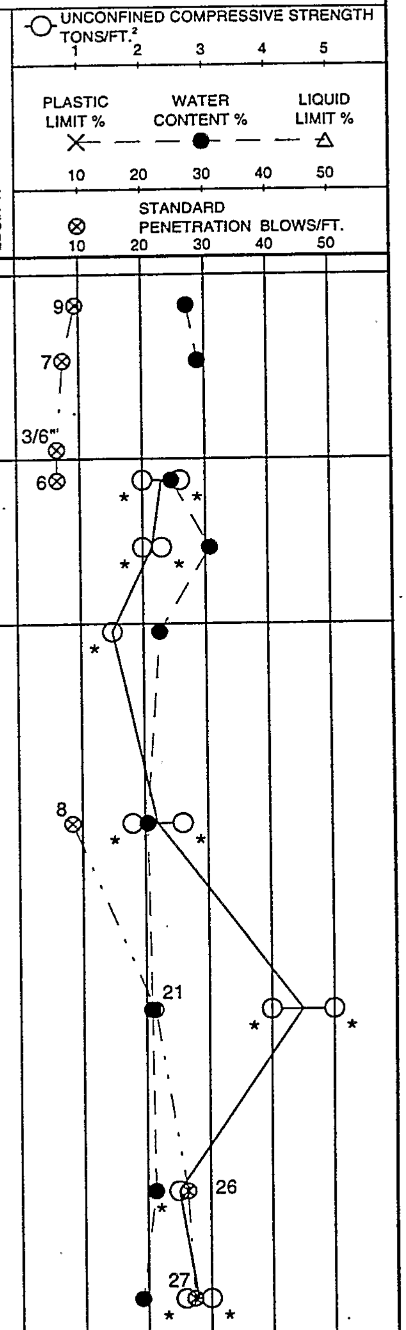
BORING_LOG 30642.GPJ STS.GDT 9/28/99

STS Consultants Ltd.

OWNER	Central City Studios
PROJECT NAME	Central City Studios
LOG OF BORING NUMBER	B-6
ARCHITECT-ENGINEER	d'Escoto, Inc.
SITE LOCATION	NEC Kostner Ave. & Roosevelt Rd.; Chicago, IL

SURFACE ELEVATION +24.8 +/-

DEPTH(FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL
		PA	Concrete
	1	SS	Miscellaneous fill: Sand, gravel, cinders, wet clay, topsoil and brick - medium dense - wet
	2	SS	
5.0		PA	
	3	SS*	
	3A	SS	Silty clay, trace gravel, sand and shale - brownish gray - very stiff (CL)
		PA	
	4	ST	
10.0		PA	
	5	ST	Silty clay, trace gravel, sand and shale - gray - stiff to very stiff (CL)
		PA	
15.0	6	SS	
		PA	
20.0	7	SS	
		PA	
25.0	8	SS	
		PA	
	9	SS	
29.5			End of Boring Borehole backfilled upon completion. Automatic-Mobile Hammer used for Standard Penetration Tests. SS* = SPT value based on first 6 in. of driving.



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 4.0 ft. WS	BORING STARTED 9/21/99	STS OFFICE	Chicago Area - 01
WL 4.0 ft. AB	BORING COMPLETED 9/21/99	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN CME-55/DeRubeis	APP'D BY AJP	STS JOB NO. 30642

BORING_LOG 30642.GPJ STS.GDT 9/28/99

STS Consultants Ltd.

OWNER: Central City Studios	LOG OF BORING NUMBER: B-7
PROJECT NAME: Central City Studios	ARCHITECT-ENGINEER: d'Escoto, Inc.
SITE LOCATION: NEC Kostner Ave. & Roosevelt Rd.; Chicago, IL	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2}: 1 2 3 4 5

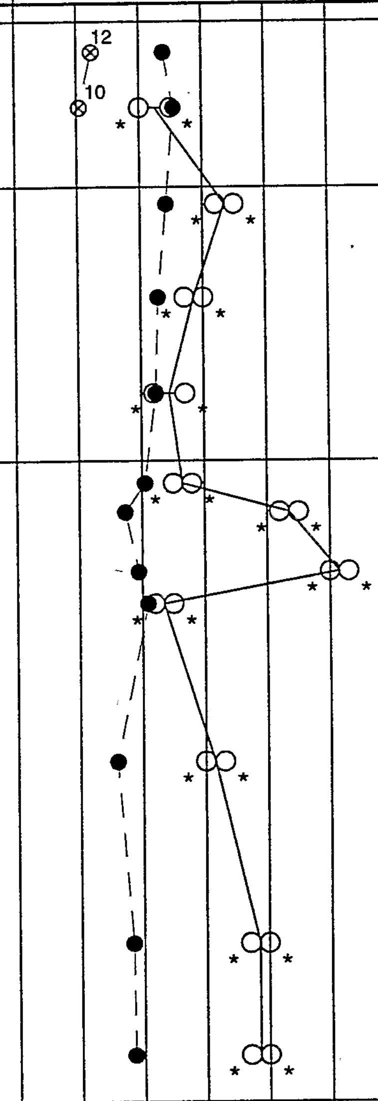
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %: 10 20 30 40 50

STANDARD PENETRATION BLOWS/FT.: 10 20 30 40 50

UNIT DRY WT. LBS./FT.^{3}

SURFACE ELEVATION +24.9 +/-

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL
			PA	Concrete
		1	SS	Miscellaneous fill: Wet clay, cinders, sand, gravel and concrete, trace wood and slag - black and dark gray - medium dense - wet
		2	SS	
5.0			PA	
		3	ST	Silty clay, trace gravel and sand - brownish gray - very stiff (CL)
			PA	
		4	ST	
10.0			PA	
		5	ST	
			PA	
		6	ST	Silty clay to clayey silt, trace gravel, sand and shale - gray - very stiff to hard (CL to CL-ML)
		6A	ST	
15.0			PA	
		7	ST	
		7A	ST	
			PA	
20.0		8	ST	
			PA	
25.0		9	ST	
			PA	
		10	ST	
30.0				End of Boring Borehole backfilled upon completion. Automatic-Mobile Hammer used for Standard Penetration Tests.



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL Dry	BORING STARTED 9/21/99	STS OFFICE	Chicago Area - 01
WL Dry AB	BORING COMPLETED 9/21/99	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN CME-55/DeRubeis	APP'D BY AJP	STS JOB NO. 30642

BORING_LOG 30642.GPJ STS.GDT 9/28/99

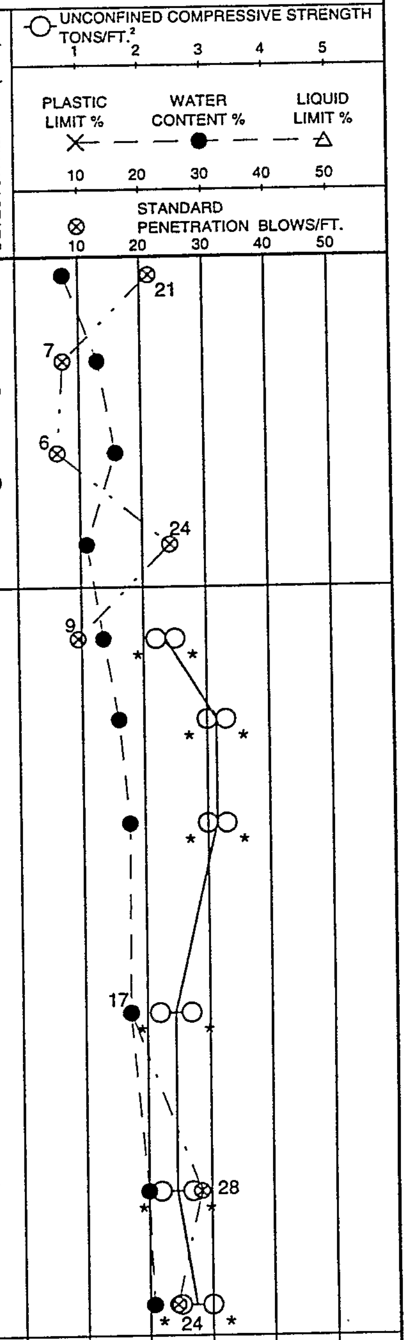
STS Consultants Ltd.

OWNER	Central City Studios
PROJECT NAME	Central City Studios
LOG OF BORING NUMBER	B-8
ARCHITECT-ENGINEER	d'Escoto, Inc.
SITE LOCATION	NEC Kostner Ave. & Roosevelt Rd.; Chicago, IL

SURFACE ELEVATION +25.3 +/-

DEPTH(FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL	PHOTO-IONIZATION DETECTOR READING (PPM)
	1	SS	Fill: Silty sand, little cinders, brick and concrete, trace clay, topsoil, slag and wood - dark brown - medium dense to loose (SM)	230
		PA		
	2	SS	Solvent odor noted.	150
5.0		PA	Driller's observation: Rough drilling in fill.	
	3	SS		100
		PA		
	4	SS		60
		PA	Silty clay, trace gravel, sand and shale - gray - very stiff (CL)	
10.0	5	SS		
		PA	Offset boring location 10' E after sampling to 11.5' and blind drilled to 12.5'.	
	6	ST		
15.0		PA		
	7	ST		
		PA		
20.0	8	SS		
		PA		
25.0	9	SS		
		PA		
	10	SS		
29.5			End of Boring Borehole backfilled upon completion. Automatic-Mobile Hammer used for Standard Penetration Tests.	

Column headings also include: ELEVATION(FT), SAMPLE DISTANCE, RECOVERY, UNIT DRY WT. LBS./FT.³



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 9.0 ft. WS	BORING STARTED 9/17/99	STS OFFICE	Chicago Area - 01
WL 9.0 ft. AB	BORING COMPLETED 9/17/99	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN CME-45/DeRubeis	APP'D BY AJP	STS JOB NO. 30642

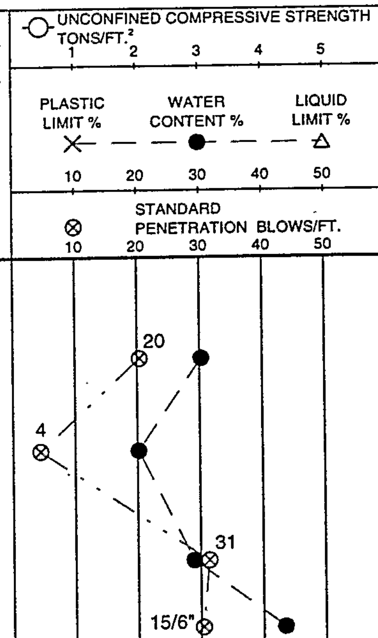
BORING_LOG 30642.GPJ STS.GDT 9/28/99

STS Consultants Ltd.

OWNER	Central City Studios
PROJECT NAME	Central City Studios
LOG OF BORING NUMBER	B-9
ARCHITECT-ENGINEER	d'Escoto, Inc.
SITE LOCATION	NEC Kostner Ave. & Roosevelt Rd.; Chicago, IL

SURFACE ELEVATION +26.0 +/-

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}	PHOTO-IONIZATION DETECTOR READING (PPM)
			PA			Miscellaneous fill: Cinders, concrete chunks, sand, gravel and brick - medium dense to dense - moist to wet		
		1	SS					50
5.0			PA					
		2	SS					10
			PA			Strong solvent odor noted in Sample 3.		
		3	SS			Driller's observation: Auger refusal on steel (possible underground tank).		480
10.0			PA			Note: Boring originally drilled 9-17 with CME-45 drill rig. Rig could not penetrate thru fill; four attempts made.		
10.5		4	SS*					



End of Boring
Borehole backfilled upon completion.
Automatic-Mobile Hammer used for Standard Penetration Tests.

SS* = SPT value based on first 6 in. of driving.

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 7.5 ft.	BORING STARTED 9/21/99	STS OFFICE	Chicago Area - 01
WL Dry AB	BORING COMPLETED 9/21/99	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN Mobile B-61/Baker	APP'D BY AJP	STS JOB NO. 30642

BORING_LOG 30642.GPJ STS.GDT 10/4/99

STS Consultants Ltd.

OWNER
Central City Studios

PROJECT NAME
Central City Studios

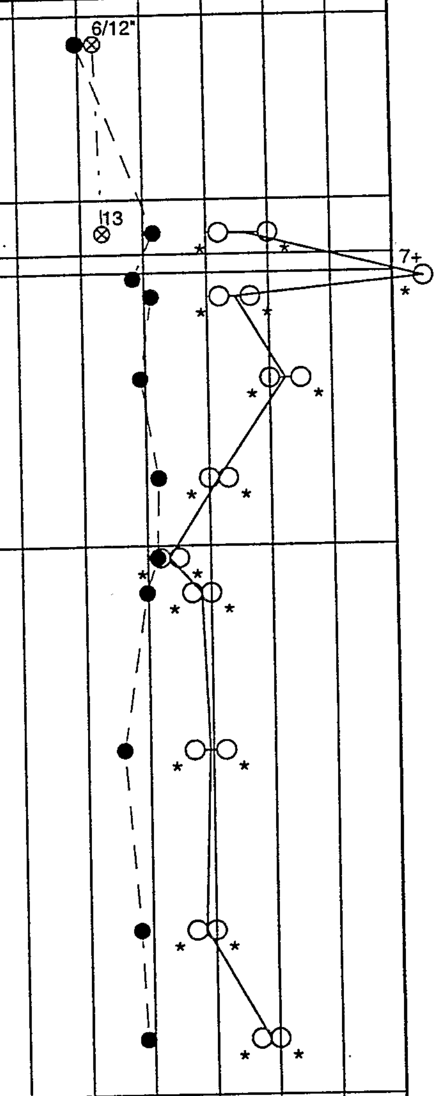
LOG OF BORING NUMBER B-10

ARCHITECT-ENGINEER
d'Escoto, Inc.

SITE LOCATION
NEC Kostner Ave. & Roosevelt Rd.; Chicago, IL

SURFACE ELEVATION +28.0 +/-

DEPTH(FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL
		PA	Concrete
	1	SS*	Miscellaneous fill: Sand, gravel, cinders, concrete and brick, trace slag - medium dense - moist
		PA	
5.0			Fill: Silty clay, trace gravel, sand and topsoil - dark gray - very stiff (CL)
	2	SS	Driller's observation: Buried topsoil layer.
	3	ST	Silty clay, trace gravel and sand - brownish gray - hard to very stiff (CL)
	3A	ST	
10.0		PA	
	4	ST	
		PA	
	5	ST	
15.0		PA	
	6	ST	Silty clay to clayey silt, trace gravel, sand and shale - gray - very stiff (CL to CL-ML)
	6A	ST	2 in. wet sand layer noted in Sample 6.
		PA	
20.0			
	7	ST	
		PA	
25.0			
	8	ST	
		PA	
	9	ST	
30.0			End of Boring Borehole backfilled upon completion. Automatic-Mobile Hammer used for Standard Penetration Tests. SS* = SPT value based on first 6 in. of driving.



UNIT DRY WT. LBS./FT.³

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 17.0 ft. WS	BORING STARTED 9/22/99	STS OFFICE	Chicago Area - 01
WL 17.0 ft. AB	BORING COMPLETED 9/22/99	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN CME-55/Baker	APP'D BY AJP	STS JOB NO. 30642

BORING_LOG 30642.GPJ STS.GDT 9/30/99

STS Consultants Ltd.	OWNER Central City Studios	LOG OF BORING NUMBER B-11
	PROJECT NAME Central City Studios	ARCHITECT-ENGINEER d'Escoto, Inc.

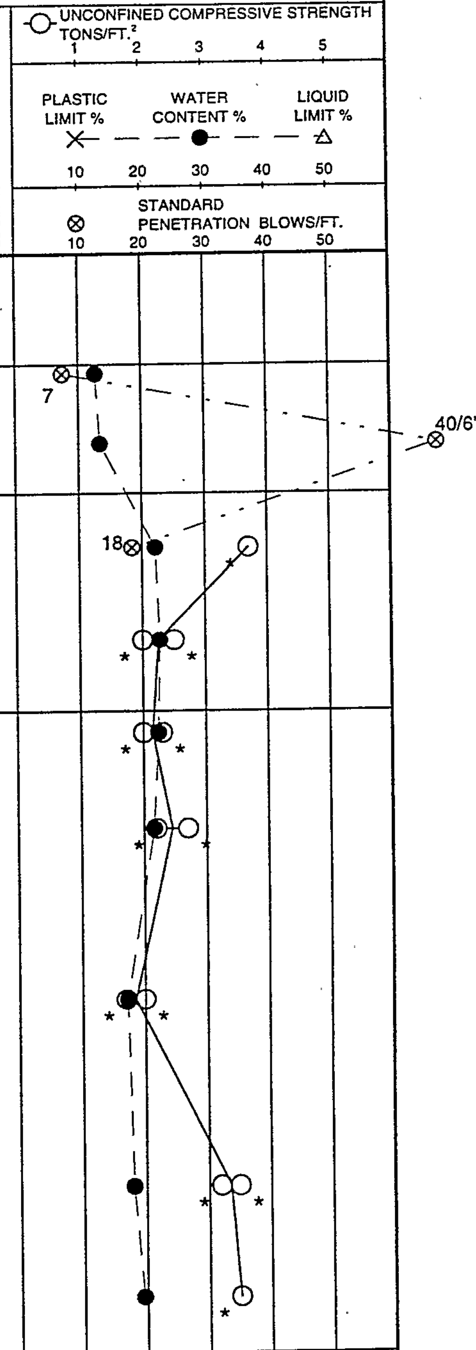
SITE LOCATION
NEC Kostner Ave. & Roosevelt Rd.; Chicago, IL

SURFACE ELEVATION +26.2 +/-

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL
		PA	Broken concrete
	1	SS	Miscellaneous urban fill: Sand, gravel, concrete, brick and topsoil
5.0		PA	
	2	SS(	Driller's observation: Concrete from 5.5-6.2 ft.
		PA	Silty clay, trace gravel and sand - brownish gray - very stiff (CL)
	3	SS	
10.0		PA	
	4	ST	
		PA	Silty clay, trace gravel, sand and shale - gray - stiff to very stiff (CL) Thin silty sand seams noted in Sample 5.
	5	ST	
15.0		PA	
	6	ST	
		PA	
20.0	7	ST	
		PA	
25.0	8	ST	
		PA	
30.0	9	ST	

End of Boring
Borehole backfilled upon completion.
Automatic-Mobile Hammer used for Standard Penetration Tests.

SS* = SPT value based on first 6 in. of driving.



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 17.0 f t.	BORING STARTED 9/21/99	STS OFFICE Chicago Area - 01	
WL Dry AB	BORING COMPLETED 9/21/99	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN Mobile B-61/Baker	APP'D BY AJP	STS JOB NO. 30642

BORING_LOG 30642.GPJ STS.GDT 9/30/99

STS Consultants Ltd.	OWNER: Central City Studios
LOG OF BORING NUMBER	B-13
PROJECT NAME	Central City Studios
ARCHITECT-ENGINEER	d'Escoto, Inc.
SITE LOCATION	NEC Kostner Ave. & Roosevelt Rd.; Chicago, IL

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² 1 2 3 4 5

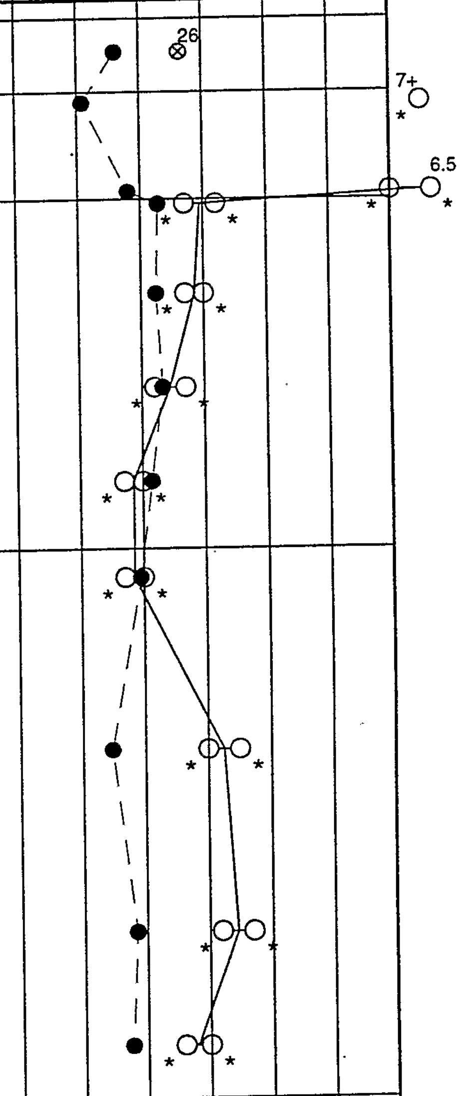
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/FT. 10 20 30 40 50

UNIT DRY WT. LBS./FT.³

SURFACE ELEVATION +25.3 +/-

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL
		PA	Concrete
	1	SS	Miscellaneous urban fill: Sand, gravel, concrete, cinders, clay, slag and topsoil - medium dense - moist
	2	ST	Fill: Silty clay, trace gravel, sand and topsoil - dark brown and black - hard (CL)
5.0		PA	
	3	ST	
	3A	ST	Silty clay - mottled brownish gray - very stiff to stiff (CL)
		PA	
	4	ST	
10.0		PA	
	5	ST	
		PA	
	6	ST	
15.0		PA	
	7	ST	Silty clay, trace gravel, sand and shale - gray - stiff to very stiff (CL)
		PA	
20.0	8	ST	
		PA	
25.0	9	ST	
		PA	
	10	ST	
30.0			End of Boring Borehole backfilled upon completion. Automatic-Mobile Hammer used for Standard Penetration Tests.



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL Dry	BORING STARTED 9/21/99	STS OFFICE	Chicago Area - 01
WL Dry AB	BORING COMPLETED 9/21/99	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN CME-55/DeRubeis	APP'D BY AJP	STS JOB NO. 30642

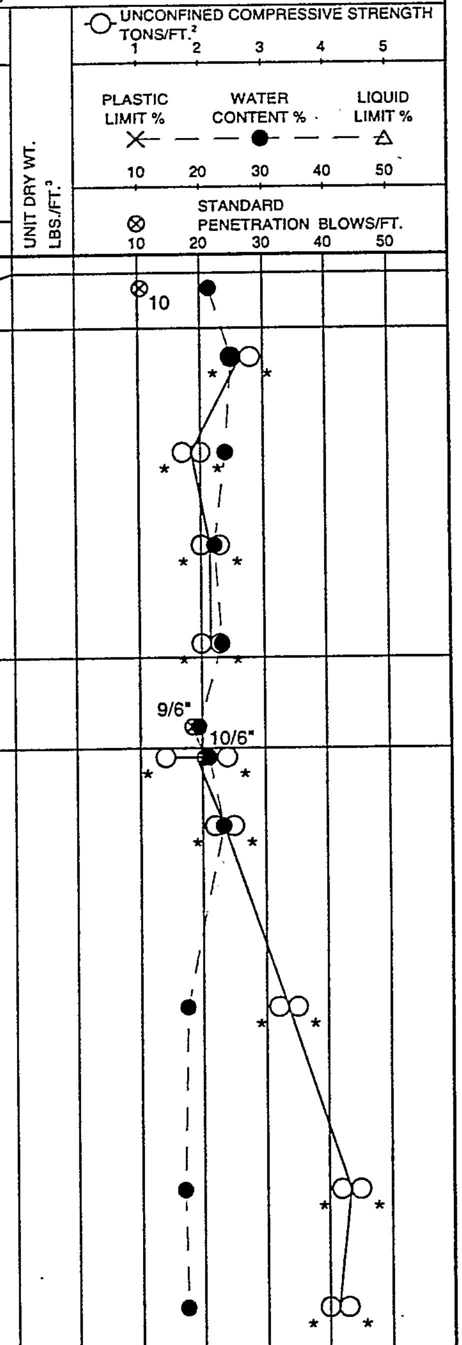
BORING_LOG 30642.GPJ STS.GDT 9/30/99

STS Consultants Ltd.

OWNER	Central City Studios
PROJECT NAME	Central City Studios
LOG OF BORING NUMBER	B-14
ARCHITECT-ENGINEER	d'Escoto, Inc.
SITE LOCATION	NEC Kostner Ave. & Roosevelt Rd.; Chicago, IL

SURFACE ELEVATION +24.5 +/-

DEPTH(FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL
		PA	Concrete
	1	SS	Miscellaneous urban fill: Sand, gravel, cinders, clay and topsoil
		PA	Silty clay, trace gravel, sand and topsoil - brown to brownish gray - very stiff to stiff (CL)
	2	ST	
5.0		PA	
	3	ST	
		PA	
	4	ST	
10.0		PA	
	5	ST	
			Silty fine to coarse sand - brown - medium dense - wet (SM)
		PA	
	6	SS	
	6A	SS	Silty clay, trace gravel, sand and shale - gray - stiff to hard (CL)
15.0		PA	Thin sand seams noted in Sample 6A.
	7	ST	
		PA	
20.0	8	ST	
		PA	
25.0	9	ST	
		PA	
	10	ST	
30.0			End of Boring Borehole backfilled upon completion. Automatic-Mobile Hammer used for Standard Penetration Tests.



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 12.0 ft. WS	BORING STARTED 9/21/99	STS OFFICE	Chicago Area - 01
WL 18.0 ft. AB	BORING COMPLETED 9/21/99	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN CME-55/DeRubeis	APP'D BY AJP	STS JOB NO. 30642

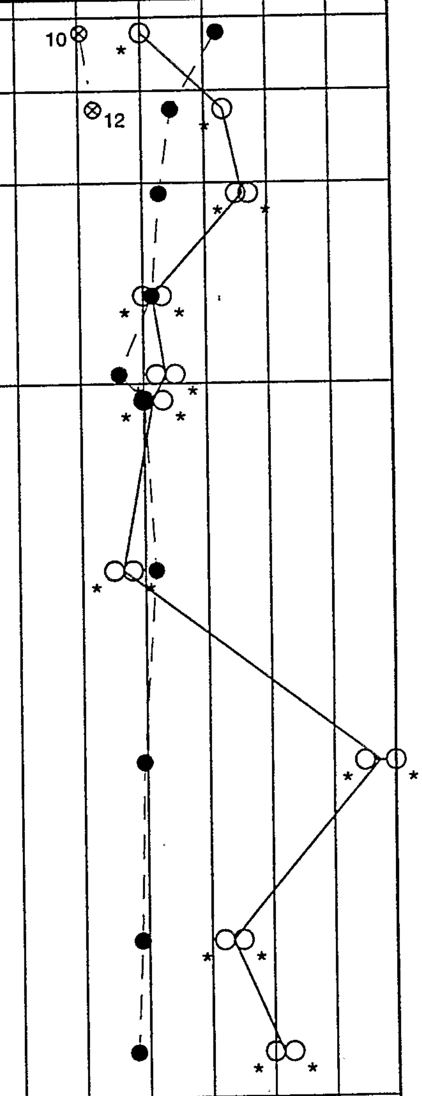
BORING_LOG 30642.GPJ STS.GDT 9/30/99

STS Consultants Ltd.

OWNER	Central City Studios
PROJECT NAME	Central City Studios
LOG OF BORING NUMBER	B-15
ARCHITECT-ENGINEER	d'Escoto, Inc.
SITE LOCATION	NEC Kostner Ave. & Roosevelt Rd.; Chicago, IL

SURFACE ELEVATION +24.9 +/-

DEPTH(FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL
		PA	Concrete
	1	SS	Miscellaneous urban fill: Sand, gravel, cinders, concrete, slag and clay - medium dense - moist
		PA	
	2	SS	Fill: Silty clay, trace gravel, sand, shale and roots - black and gray - very stiff (CL)
5.0		PA	
	3	ST	Silty clay, trace gravel and sand - brownish gray - very stiff (CL)
		PA	
	4	ST	
10.0		PA	
	5	ST	
	5A	ST	Silty clay, trace gravel, sand and shale - gray - stiff to hard (CL)
		PA	
15.0	6	ST	
		PA	
20.0	7	ST	
		PA	
25.0	8	ST	
		PA	
	9	ST	
30.0			End of Boring Borehole backfilled upon completion. Automatic-Mobile Hammer used for Standard Penetration Tests.



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 27.0 ft. WD	BORING STARTED 9/21/99	STS OFFICE Chicago Area - 01	
WL 27.0 ft. AB	BORING COMPLETED 9/21/99	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN CME-55/DeRubeis	APP'D BY AJP	STS JOB NO. 30642

BORING_LOG 30642.GPJ STS.GDT 9/30/99

STS Consultants Ltd.

OWNER: Central City Studios	LOG OF BORING NUMBER: B-16	
PROJECT NAME: Central City Studios	ARCHITECT-ENGINEER: d'Escoto, Inc.	
SITE LOCATION: NEC Kostner Ave. & Roosevelt Rd.; Chicago, IL		

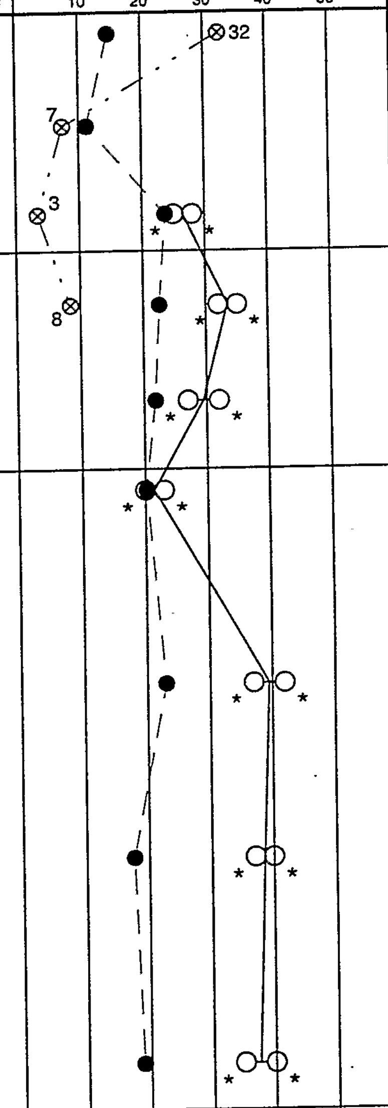
UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² — 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % — 10 20 30 40 50

STANDARD PENETRATION BLOWS/FT. — 10 20 30 40 50

SURFACE ELEVATION +26.6 +/-

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³
		1	SS			Miscellaneous urban fill: Sand, gravel, brick, concrete, wood and slag - dense to loose	
			PA				
		2	SS				
5.0			PA				
		3	SS				
			PA			Silty clay, trace sand and shale - brownish gray - very stiff (CL)	
		4	SS				
10.0			PA				
		5	ST				
			PA				
		6	ST			Silty clay to clayey silt, trace gravel, sand and shale - gray - very stiff (CL to CL-ML)	
15.0			PA				
		7	ST				
20.0			PA				
		8	ST				
25.0			PA				
		9	ST				
30.0						End of Boring Borehole backfilled upon completion. Automatic-Mobile Hammer used for Standard Penetration Tests.	



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

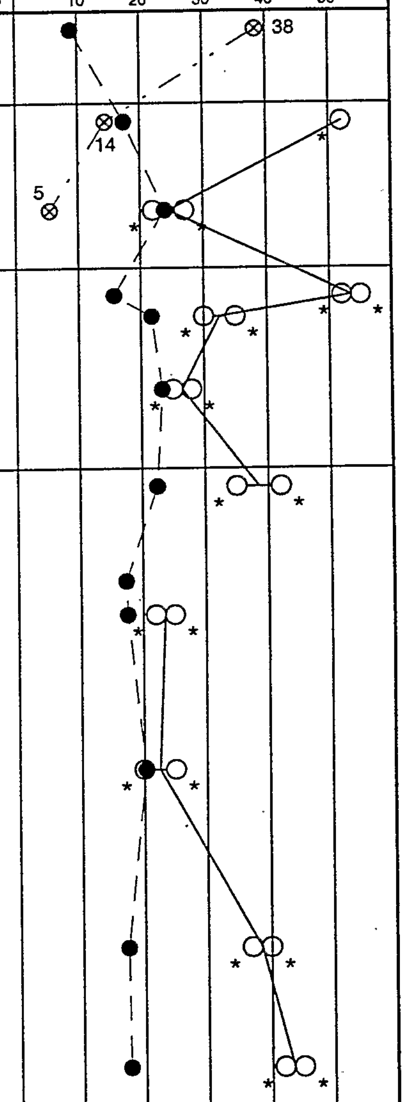
WL Dry	BORING STARTED 9/17/99	STS OFFICE	Chicago Area - 01
WL Dry AB	BORING COMPLETED 9/17/99	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN CME-55/DeRubeis	APP'D BY AJP	STS JOB NO. 30642

STS Consultants Ltd.

OWNER	Central City Studios
PROJECT NAME	Central City Studios
LOG OF BORING NUMBER	B-17
ARCHITECT-ENGINEER	d'Escoto, Inc.
SITE LOCATION	NEC Kostner Ave. & Roosevelt Rd.; Chicago, IL

SURFACE ELEVATION +27.5 +/-

DEPTH(FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL
	1	SS	Miscellaneous urban fill: Sand, gravel, brick, concrete and topsoil - dense - moist
		PA	
	2	SS	Fill: Silty clay, trace slag, brick, concrete and topsoil - gray - hard to very stiff (CL)
5.0		PA	
	3	SS	
		PA	
	4	ST	Silty clay, trace gravel and sand - brown to brownish gray - hard to very stiff (CL)
	4A	ST	
10.0		PA	
	5	ST	
		PA	
	6	ST	Silty clay to clayey silt, trace gravel and sand - gray - very stiff to hard (CL to CL-ML)
15.0		PA	Thin sand seams noted in Sample 7.
	7	ST	
	7A	ST	
		PA	
20.0	8	ST	
		PA	
25.0	9	ST	
		PA	
	10	ST	
30.0			End of Boring Borehole backfilled upon completion. Automatic-Mobile Hammer used for Standard Penetration Tests.



UNIT DRY WT. LBS./FT.³

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 20.0 ft. WD	BORING STARTED 9/17/99	STS OFFICE	Chicago Area - 01
WL 28.0 ft. AB	BORING COMPLETED 9/17/99	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN CME-55/DeRubeis	APP'D BY AJP	STS JOB NO. 30642

BORING_LOG 30642.GPJ STS.GDT 9/30/99

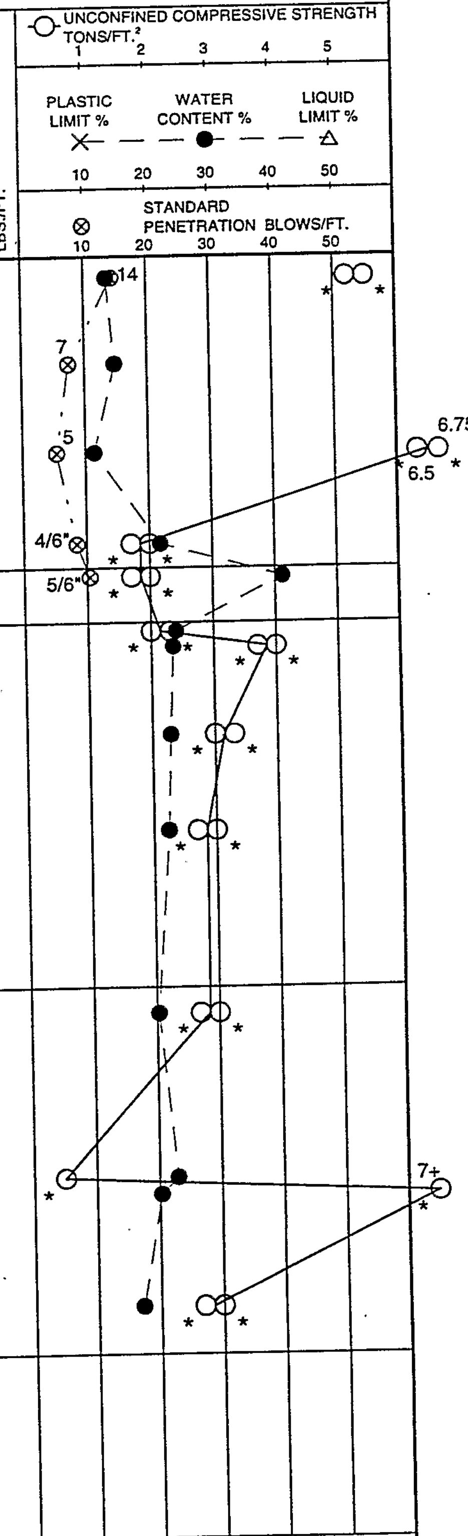
STS Consultants Ltd.

OWNER	LOG OF BORING NUMBER
Central City Studios	B-18
PROJECT NAME	ARCHITECT-ENGINEER
Central City Studios	d'Escoto, Inc.

SITE LOCATION
NEC Kostner Ave. & Roosevelt Rd.; Chicago, IL

SURFACE ELEVATION +31.5 +/-

DEPTH(FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL
	1	SS	Miscellaneous urban fill: Sand, gravel, clay, cinders, brick and concrete - medium dense to loose - moist
		PA	
	2	SS	
5.0		PA	
	3	SS	
		PA	
	4	SS	
	4A	SS	Buried topsoil (OL)
10.0		PA	
	5	ST	Silty clay, trace gravel and sand - brownish gray - very stiff (CL)
	5A	ST	
		PA	
	6	ST	
15.0		PA	
	7	ST	
		PA	
20.0	8	ST	Silty clay, trace gravel, sand and shale - gray - very stiff to hard (CL)
		PA	
25.0	9	ST	
	9A	ST	
		PA	
	10	ST	
30.0			End of Boring Borehole backfilled upon completion. Automatic-Mobile Hammer used for Standard Penetration Tests.



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 25.0 ft. WS	BORING STARTED 9/17/99	STS OFFICE	Chicago Area - 01
WL 28.0 ft. AB	BORING COMPLETED 9/17/99	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN CME-55/DeRubeis	APP'D BY AJP	STS JOB NO. 30642

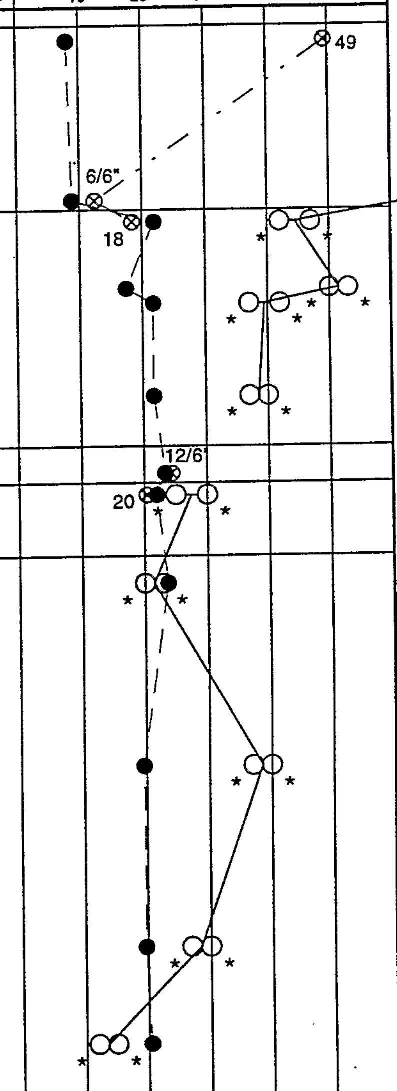
BORING_LOG 30642.GPJ STS.GDT 9/30/99

STS Consultants Ltd.

OWNER	Central City Studios
PROJECT NAME	Central City Studios
LOG OF BORING NUMBER	B-19
ARCHITECT-ENGINEER	d'Escoto, Inc.
SITE LOCATION	NEC Kostner Ave. & Roosevelt Rd.; Chicago, IL

SURFACE ELEVATION +27.0 +/-

DEPTH(FT)	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL
		PA	Concrete
	1	SS	Miscellaneous urban fill: Sand, gravel, cinders, concrete, slag, wood and clay
		PA	
5.0	2	SS*	
	2A	SS	Silty clay, trace gravel and sand - brownish gray - hard to very stiff (CL)
		PA	
	3	ST	
	3A	ST	
10.0		PA	
	4	ST	
		PA	Silty sand - brownish gray - medium dense - wet (SM)
	5	SS*	Silty clay, trace gravel and sand - brownish gray - very stiff (CL)
	5A	SS	
15.0		PA	
	6	ST	Silty clay, trace gravel, sand and shale - gray - very stiff to stiff (CL)
		PA	
20.0	7	ST	
		PA	
25.0	8	ST	
		PA	
	9	ST	
30.0			End of Boring Borehole backfilled upon completion. Automatic-Mobile Hammer used for Standard Penetration Tests. SS* = SPT value based on first 6 in. of driving.



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 12.0 ft.	BORING STARTED 9/22/99	STS OFFICE	Chicago Area - 01
WL Dry AB	BORING COMPLETED 9/22/99	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN CME-55/DeRubeis	APP'D BY AJP	STS JOB NO. 30642

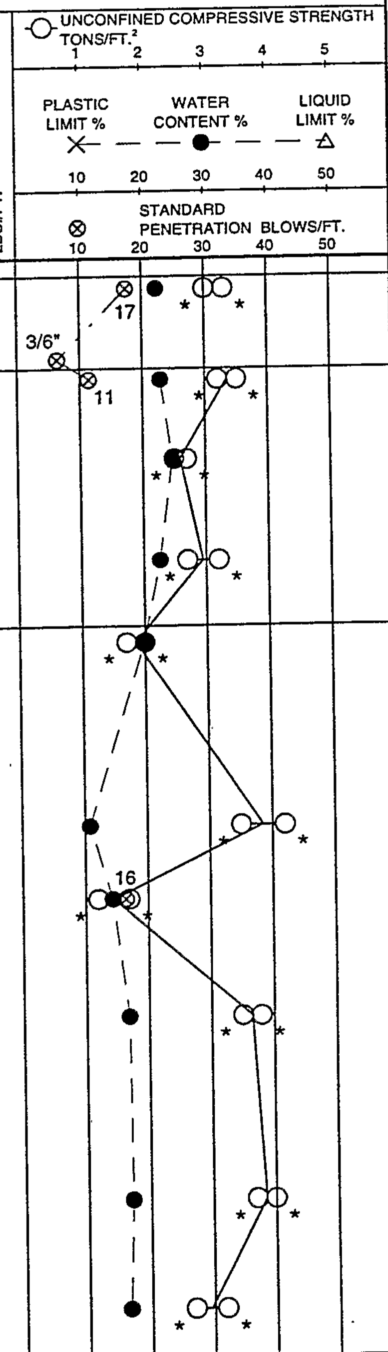
BORING_LOG 30642.GPJ STS.GDT 9/30/99

STS Consultants Ltd.

OWNER: Central City Studios	LOG OF BORING NUMBER: B-20
PROJECT NAME: Central City Studios	ARCHITECT-ENGINEER: d'Escoto, Inc.

SITE LOCATION
NEC Kostner Ave. & Roosevelt Rd.; Chicago, IL

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +23.6 +/-	UNIT DRY WT. LBS./FT.^{3}
			PA			Concrete	
		1	SS			Silty clay, little cinders, trace topsoil - black - very stiff (CL-OL)	
			PA				
		2	SS*				
		2A	SS			Silty clay, trace gravel, sand and shale - brown to brownish gray - very stiff (CL)	
5.0			PA				
		3	ST				
			PA				
		4	ST				
10.0			PA				
		5	ST			Silty clay, trace gravel, sand and shale - gray - stiff to very stiff (CL)	
			PA				
15.0							
		6	ST			Thin wet sand seams noted in Sample 6.	
		7	SS				
			PA				
20.0							
		8	ST				
			PA				
25.0							
		9	ST				
			PA				
		10	ST				
30.0						End of Boring Borehole backfilled upon completion. Automatic-Mobile Hammer used for Standard Penetration Tests. SS* = SPT value based on first 6 in. of driving.	



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL 15.0 ft. WS	BORING STARTED 9/22/99	STS OFFICE Chicago Area - 01	
WL 28.0 ft. AB	BORING COMPLETED 9/22/99	ENTERED BY KKB	SHEET NO. 1 OF 1
WL	RIG/FOREMAN CME-55/DeRubeis	APP'D BY AJP	STS JOB NO. 30642

BORING_LOG 30642.GPJ STS.GDT 9/30/99

STS General Notes

STS CONSULTANTS, LTD.

DRILLING & SAMPLING SYMBOLS:

SS : Split Spoon-1 3/8" I.D., 2" O.D. Unless otherwise noted
ST : Shelby Tube-2" O.D., Unless otherwise noted
PA : Power Auger
DB : Diamond Bit-NX, BX, AX
AS : Auger Sample
JS : Jar Sample
VS : Vane Shear
OS : Osterberg Sampler-3" Shelby Tube
HS : Hollow Stem Auger
WS : Wash Sample
FT : Fish Tail
RB : Rock Bit
BS : Bulk Sample
PM : Pressuremeter Test, In-Situ
GS : Giddings Sampler

Standard "N" Penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch O.D. split spoon sampler, except where otherwise noted.

WATER LEVEL MEASUREMENT SYMBOLS:

WL : Water Level
WS : While Sampling
WD : While Drilling
AB : After Boring
WCI : Wet Cave In
DCI : Dry Cave In
BCR : Before Casing Removal
ACR : After Casing Removal

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable groundwater levels. In impervious soils, the accurate determination of groundwater elevations may not be possible, even after several days of observations; additional evidence of groundwater elevations must be sought.

GRADATION DESCRIPTION & TERMINOLOGY:

Coarse Grained or Granular Soils have more than 50% of their dry weight retained on a #200 sieve; they are described as: boulders, cobbles, gravel or sand. Fine Grained soils have less than 50% of their dry weight retained on a #200 sieve; they are described as: clays or clayey silts if they are cohesive and silts if they are non-cohesive. In addition to gradation, granular soils are defined on the basis of their relative in-place density and fine grained soils on the basis of their strength or consistency and their plasticity.

Major Component Of Sample	Size Range
Boulders	Over 8 in. (200 mm)
Cobbles	8 inches to 3 inches (200 mm to 75 mm)
Gravel	3 inches to #4 sieve (75 mm to 4.76 mm)
Sand	#4 to #200 sieve (4.76 mm to 0.074 mm)
Silt	Passing #200 sieve (0.074 mm to 0.005 mm)
Clay	Smaller than 0.005 mm

Description Of Components Also Present in Sample	Percent Of Dry Weight
Trace	1-9
Little	10-19
Some	20-34
And	35-50

CONSISTENCY OF COHESIVE SOILS:

Unconfined Compressive Strength, Qu, tsf	Consistency
0.25	Very Soft
0.25-0.49	Soft
0.50-0.99	Medium (Firm)
1.00-1.99	Stiff
2.00-3.99	Very Stiff
4.00-8.00	Hard
>8.00	Very Hard

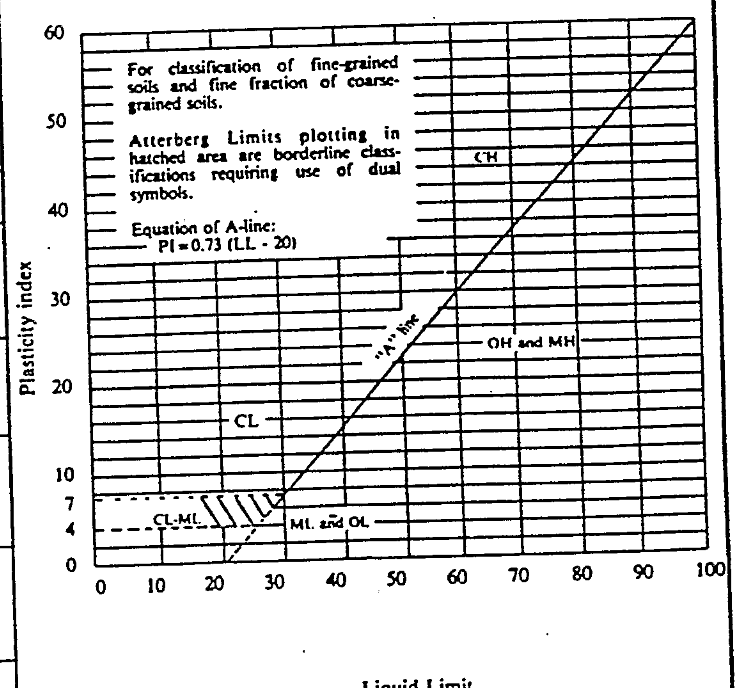
RELATIVE DENSITY OF GRANULAR SOILS:

N-Blows per ft.	Relative Density
0-3	Very Loose
4-9	Loose
10-29	Medium Dense
30-49	Dense
50-80	Very Dense
>80	Extremely Dense

STS Soil Classification System

UNIFIED SOIL CLASSIFICATION

Major Divisions			Group symbols	Typical names	Laboratory classification criteria		
Coarse-grained soils (More than half of material is *larger* than No. 200 sieve size)	Gravels (More than half of coarse fraction larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW	Well-grades gravels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than 5 per cent .... GW, GP, SW, SP; More than 12 per cent .... GM, GC, SM, SC; 5 to 12 per cent .... *Borderline* cases requiring dual symbols	$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines		Not meeting all gradation requirements for GW	
		Gravels with fines (Appreciable amount of fines)	GM d / u	Silty gravels, gravel-sand-silt mixtures		Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are *borderline* cases requiring use of dual symbols
			GC	Clayey gravels, gravel-sand-clay mixtures		Atterberg limits above "A" line with P.I. greater than 7	
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines		$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
			SP	Poorly graded sands, gravelly sands, little or no fines		Not meeting all gradation requirements for SW	
		Sands with fines (Appreciable amount of fines)	SM d / u	Silty sands, sand-silt mixtures		Atterberg limits below "A" line or P.I. less than 4	Limits plotting in hatched zone with P.I. between 4 and 7 are *borderline* cases requiring use of dual symbols
			SC	Clayey sands, sand-clay mixtures		Atterberg limits above "A" line with P.I. greater than 7	
Fine-grained soils (More than half of material is *smaller* than No. 200 sieve)	Silts and clays (Liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity			
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays			
			OL	Organic silts and organic silty clays of low plasticity			
	Silts and clays (Liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts			
			CH	Inorganic clays of high plasticity, fat clays			
			OH	Organic clays of medium to high plasticity, organic silts			
	Highly organic soils		Pt	Peat and other highly organic soils			



Plasticity Chart

SUBSURFACE EXPLORATION PROCEDURES

Hand-Auger Drilling (HA)

In this procedure, a sampling device is driven into the soil by repeated blows of a sledge hammer. When the sampler is driven to the desired sample depth, the soil sample is retrieved. The hole is then advanced by manually turning the hand auger until the next sampling depth increment is reached. The hand auger drilling between sampling intervals also helps to clean and enlarge the bore hole in preparation for obtaining the next sample.

Power Auger Drilling (PA)

In this type of drilling procedure, continuous flight augers are used to advance the bore holes. They are turned and hydraulically advanced by a truck or track-mounted unit as site accessibility dictates. In auger drilling, casing and drilling mud are not required to maintain open bore holes.

Hollow Stem Auger Drilling (HS)

In this drilling procedure, continuous flight augers having open stems are used to advance the bore holes. The open stem allows the sampling tool to be used without removing the augers from the bore hole. Hollow stem augers thus provide support to the sides of the bore hole during the sampling operations.

Rotary Drilling (RB)

In employing rotary drilling methods, various cutting bits are used to advance the bore holes. In this process, surface casing and/or drilling fluids are used to maintain open bore holes.

Diamond Core Drilling (DB)

Diamond core drilling is used to sample cemented formations. In this procedure, a double tube (triple tube) core barrel with a diamond bit cuts an annular space around a cylindrical prism of the material sampled. The sample is retrieved by a catcher just above the bit. Samples recovered by this procedure are placed in sturdy containers in sequential order.

SAMPLING PROCEDURES

Auger Sampling (AS)

In this procedure, soil samples are collected from cuttings off of the auger flights as they are removed from the ground. Such samples provide a general indication of subsurface conditions; however, they do not provide undisturbed samples, nor do they provide samples from discrete depths.

Split-Barrel Sampling (SS) — (ASTM Standard D-1586-84)

In the split-barrel sampling procedure, a 2 inch O.D., split barrel sampler is driven into the soil a distance of 18 inches by means of a 140 pound hammer falling 30 inches. The value of the Standard Penetration Resistance is obtained by counting the number of blows of the hammer over the final 12 inches of driving. This value provides a qualitative indication of the in-place relative density of cohesionless soils. The indication is qualitative only, however, since many factors can significantly affect the Standard Penetration Resistance Value, and direct correlation of results obtained by drill crews using different rigs, drilling procedures, and hammer-rod-spoon assemblies should not be made. A portion of the recovered sample is placed in a sample jar and returned to the laboratory for further analysis and testing.

Shelby Tube Sampling Procedure (ST) — (ASTM Standard D-1587-83)

In the shelby tube sampling procedure, a thin-walled steel seamless tube with a sharp cutting edge is pushed hydraulically into the soil and a relatively undisturbed sample is obtained. This procedure is generally employed in cohesive soils. The tubes are carefully handled in the field to avoid excessive disturbance and are returned to the laboratory for extrusion and further analysis and testing.

Giddings Sampler (GS)

This type of sampling device consists of 5-ft. sections of thin-wall tubing which are capable of retrieving continuous columns of soil in 5-ft. maximum increments. Because of a continuous slot in the sampling tubes, the sampler allows field determination of stratification boundaries and containerization of soil samples from any sampling depth within the 5-ft. interval.

LABORATORY PROCEDURES

Water Content (Wc)

The water content of a soil is the ratio of the weight of water in a given soil mass to the weight of the dry soil. Water content is generally expressed as a percentage.

Hand Penetrometer (Qp)

In the hand penetrometer test, the unconfined compressive strength of a soil is determined, to a maximum value of 4.5 tons per square foot (tsf), by measuring the resistance of the soil sample to penetration by a small, spring-calibrated cylinder. The hand penetrometer test has been carefully correlated with unconfined compressive strength tests, and thereby provides a useful and a relatively simple testing procedure in which soil strength can be quickly and easily estimated.

Unconfined Compression Tests (Qu)

In the unconfined compression strength test, an undisturbed prism of soil is loaded axially until failure or until 20% strain has been reached, whichever occurs first.

Dry Density (γ_D)

The dry density is the quantity used as a measure of the amount of solids in a unit volume of soil aggregate. Use of this value is often made when measuring the degree of compaction of a soil.

Classification of Samples

In conjunction with the sample testing program, all soil samples are examined in our laboratory and classified on the basis of their texture and plasticity in accordance with United Soil Classification System (USCS). The soil descriptions on the boring logs are in conformance with this system and the estimated group symbols according to this system are included in parentheses following the soil descriptions on the boring logs. Included on a separate sheet entitled "General Notes" is a brief explanation of this system of soil classification.

STS Standard Boring Log Procedures

STS CONSULTANTS, LTD.

In the process of obtaining and testing samples and preparing this report, standard procedures are followed regarding field logs, laboratory data sheets and samples.

Field logs are prepared during performance of the drilling and sampling operations and are intended to essentially portray field occurrences, sampling locations and procedures.

Samples obtained in the field are frequently subjected to additional testing and reclassification in the laboratory by more experienced soil engineers, and differences between the field logs and the final logs may exist.

The engineer preparing the report reviews the field and laboratory logs, classifications and test data, and using judgment and experience in interpreting this data, may make further changes.

Samples taken in the field, some of which are later subjected to laboratory tests, are retained in our laboratory for sixty days and are then destroyed unless special disposition is requested by our client. Samples retained over a long period of time, even in sealed jars, are subject to moisture loss which changes the apparent strength of cohesive soil, generally increasing the strength from what was originally encountered in the field. Since they are then no longer representative of the moisture conditions initially encountered, observers of these samples should recognize this factor.

It is common practice in the geotechnical engineering profession that field logs and laboratory data sheets not included in engineering reports, because they do not represent the engineer's final opinions as to appropriate descriptions for conditions encountered in the exploration and testing work. On the other hand, we are aware that perhaps certain contractors and subcontractors submitting bids or proposals on work might have an interest in studying these documents before submitting a bid or proposal. For this reason, the field logs are retained in our office for review by all contractors submitting a bid or proposal. We would welcome the opportunity to explain any changes that have been and typically are made in the preparation of our final reports, to the contractor or subcontractors, before the firm submits its bid or proposal, and to describe how the information was obtained to the extent the contractor or subcontractor wishes. Results of laboratory tests are generally shown on the boring logs or are described in the text of the report, as appropriate.

The descriptive terms and symbols used on the logs are described on the attached sheet, entitled: "General Notes".

AMERICAN SOCIETY FOR TESTING AND MATERIALS

Standard Method for PENETRATION TEST AND SPLIT-BARREL SAMPLING OF SOILS[1]

This standard is issued under the fixed designation D 1586; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of the last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This method has been approved for use by agencies of the Department of Defense and for listing in the DOD Index of Specifications and Standards.

1. Scope

1.1 This method describes the procedure, generally known as the Standard Penetration Test (SPT), for driving a split-barrel sampler to obtain a representative soil sample and a measure of the resistance of the soil to penetration of the sampler.

1.2 This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. For a specific precautionary statement, see 5.4.1.

1.3 The values stated in inch-pound units are to be regarded as the standard.

2. Applicable Documents

2.1 ASTM Standards:

D2487 Test Method for Classification of Soils for Engineering Purposes[2]

D2488 Practice for Description and Identification of Soils (Visual-Manual Procedure)[2]

D4220 Practice for Preserving and Transporting Soil Samples[2]

3. Descriptions of Terms Specific to This Standard

3.1 anvil—that portion of the drive-weight assembly which the hammer strikes and through which the hammer energy passes into the drill rods.

3.2 cathead—the rotating drum or windlass in the rope-cathead lift system around which the operator wraps a rope to lift and drop the hammer by successively tightening and loosening the rope turns around the drum.

3.3 drill rods—rods used to transmit downward force and torque to the drill bit while drilling a borehole.

3.4 drive-weight assembly—a device consisting of the hammer, hammer fall guide, the anvil, and any hammer drop system.

3.5 hammer—that portion of the drive-weight assembly consisting of the 140 ± 2 lb (63.5 ± 1 kg) impact weight which is successively lifted and dropped to provide the energy that accomplishes the sampling and penetration.

3.6 hammer drop system—that portion of the drive-weight assembly by which the operator accomplishes the lifting and dropping of the hammer to produce the blow.

3.7 hammer fall guide—that part of the drive-weight assembly used to guide the fall of the hammer.

3.8 N-value—the blowcount representation of the penetration resistance of the soil. The N-value, reported in blows per foot, equals the sum of the number of blows required to drive the sampler over the depth interval of 6 to 18 in. (150 to 450 mm) (see 7.3).

3.9 ΔN—the number of blows obtained from each of the 6-in. (150-mm) intervals of sampler penetration (see 7.3).

3.10 number of rope turns—the total contact angle between the rope and the cathead at the beginning of the operator's rope slackening to drop the hammer, divided by 360° (see Fig. 1).

3.11 sampling rods—rods that connect the drive-weight assembly to the sampler. Drill rods are often used for this purpose.

3.12 SPT—abbreviation for Standard Penetration Test, a term by which engineers commonly refer to this method.

4. Significance and Use

4.1 This method provides a soil sample for identification purposes and for laboratory tests appropriate for soil obtained from a sampler that may produce large shear strain disturbance in the sample.

4.2 This method is used extensively in a great variety of geotechnical exploration projects. Many local correlations and widely published correlations which relate SPT blowcount, or N-value, and the engineering behavior of earthworks and foundation are available.

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[1]This method is under the jurisdiction of ASTM Committee D-18 on Soil and Rock and is the direct responsibility of subcommittee D18.02 on Sampling and Related Field Testing for Soil Investigations.

Current edition approved Sept. 11, 1984. Published November 1984. Originally published as D1586—58T. Last previous edition D1586—67 (1974).

[2]Annual Book of ASTM Standards, Vol 04.08.

5. Apparatus

5.1 Drilling Equipment—Any drilling equipment that provides at the time of sampling a suitably clean open hole before insertion of the sampler and ensures that the penetration test is performed on undisturbed soil shall be acceptable. The following pieces of equipment have proven to be suitable for advancing a borehole in some subsurface conditions.

5.1.1 Drag, Chopping, and Fishtail Bits, less than 6.5 in. (162 mm) and greater than 2.2 in. (56 mm) in diameter may be used in conjunction with open-hole rotary drilling or casing-advancement drilling methods. To avoid disturbance of the underlying soil, bottom discharge bits are not permitted; only side discharging bits are permitted.

5.1.2 Roller-Cone Bits, less than 6.5 in. (162 mm) and greater than 2.2 in. (56 mm) in diameter may be used in conjunction with open-hole rotary drilling or casing-advancement drilling methods if the drilling fluid discharge is deflected.

5.1.3 Hollow-Stem Continuous Flight Augers, with or without a center bit assembly, may be used to drill the boring. The inside diameter of the hollow-stem augers shall be less than 6.5 in. (162 mm) and greater than 2.2 in. (56 mm).

5.1.4 Solid, Continuous Flight, Bucket and Hand Augers, less than 6.5 in. (162 mm) and greater than 2.2 in. (56 mm) in diameter may be used if the soil on the side of the boring does not cave onto the sampler or sampling rods during sampling.

5.2 Sampling Rods—Flush-joint steel drill rods shall be used to connect the split-barrel sampler to the drive-weight assembly. The sampling rod shall have a stiffness (moment of inertia) equal to or greater than that of parallel wall "A" rod (a steel rod which has an outside diameter of 1⅝ in. (41.2 mm) and an inside diameter of 1⅛ in. (28.5 mm).

NOTE 1—Recent research and comparative testing indicates the type rod used, with stiffness ranging from "A" size rod to "N" size rod, will usually have a negligible effect on the N-values to depths of at least 100 ft (30 m).

5.3 Split-Barrel Sampler—The sampler shall be constructed with the dimensions indicated in Fig. 2. The driving shoe shall be of hardened steel and shall be replaced or repaired when it becomes dented or distorted. The use of liners to produce a constant inside diameter of 1⅜ in. (35 mm) is permitted, but shall be noted on the penetration record if used. The use of a sample retainer basket is permitted, and should also be noted on the penetration record if used.

NOTE 2—Both theory and available test data suggest that N-values may increase between 10 to 30% when liners are used.

5.4 Drive-Weight Assembly:

5.4.1 Hammer and Anvil—The hammer shall weigh 140 ± 2 lb (63.5 ± 1 kg) and shall be a solid rigid metallic mass. The hammer shall strike the anvil and make steel on steel contact when it is dropped. A hammer fall guide permitting a free fall shall be used. Hammers used with the cathead and rope method shall have an unimpeded overlift capacity of at least 4 in. (100 mm). For safety reasons, the use of a hammer assembly with an internal anvil is encouraged.

NOTE 3—It is suggested that the hammer fall guide be permanently marked to enable the operator or inspector to judge the hammer drop height.

5.4.2 Hammer Drop System—Rope-cathead, trip, semi-automatic, or automatic hammer drop systems may be used, providing the lifting apparatus will not cause penetration of the sampler while re-engaging and lifting the hammer.

5.5 Accessory Equipment—Accessories such as labels, sample containers, data sheets, and groundwater level measuring devices shall be provided in accordance with the requirements of the project and other ASTM standards.

6. Drilling Procedure

6.1 The boring shall be advanced incrementally to permit intermittent or continuous sampling. Test intervals and locations are normally stipulated by the project engineer or geologist. Typically, the intervals selected are 5 ft (1.5 m) or less in homogeneous strata with test and sampling locations at every change of strata.

6.2 Any drilling procedure that provides a suitably clean and stable hole before insertion of the sampler and assures that the penetration test is performed on essentially undisturbed soil shall be acceptable. Each of the following procedures have proven to be acceptable for some subsurface conditions. The subsurface conditions anticipated should be considered when selecting the drilling method to be used.

6.2.1 Open-hole rotary drilling method.

6.2.2 Continuous flight hollow-stem auger method.

6.2.3 Wash boring method.

6.2.4 Continuous flight solid auger method.

6.3 Several drilling methods produce unacceptable borings. The process of jetting through an open tube sampler and then sampling when the desired depth is reached shall not be permitted. The continuous flight solid auger method shall not be used for advancing the boring below a water table or below the upper confining bed of a confined non-cohesive stratum that is under artesian pressure. Casing may not be advanced below the sampling elevation prior to sampling. Advancing a boring with bottom discharge bits is not permissible. It is not permissible to advance the boring for subsequent insertion of the sampler solely by means of previous sampling with the SPT sampler.

6.4 The drilling fluid level within the boring or hollow-stem augers shall be maintained at or above the in situ groundwater level at all times during drilling, removal of drill rods, and sampling.

7. Sampling and Testing Procedure

7.1 After the boring has been advanced to the desired sampling elevation and excessive cuttings have been removed, prepare for the test with the following sequence of operations.

7.1.1 Attach the split-barrel sampler to the sampling rods and lower into borehole. Do not allow the sampler to drop onto the soil to be sampled.

7.1.2 Position the hammer above and attach the anvil to the top of the sampling rods. This may be done before the sampling rods and sampler are lowered into the borehole.

7.1.3 Rest the dead weight of the sampler, rods, anvil, and drive weight on the bottom of the boring and apply a seating blow. If excessive cuttings are encountered at the bottom of the boring, remove the sampler and sampling rods from the boring and remove the cuttings.

7.1.4 Mark the drill rods in three successive 6-in. (0.15-m) increments so that the advance of the sampler under the impact of the hammer can be easily observed for each 6-in. (0.15-m) increment.

7.2 Drive the sampler with blows from the 140-lb (63.5-kg) hammer and count the number of blows applied in each 6-in. (0.15-m) increment until one of the following occurs:

7.2.1 A total of 50 blows have been applied during any one of the three 6-in. (0.15-m) increments described in 7.1.4.

7.2.2 A total of 100 blows have been applied.

7.2.3 There is no observed advance of the sampler during the application of 10 successive blows of the hammer.

7.2.4 The sampler is advanced the complete 18 in. (0.45 m) without the limiting blow counts occurring as described in 7.2.1, 7.2.2, or 7.2.3.

7.3 Record the number of blows required to effect each 6 in. (0.15m) of penetration or fraction thereof. The first 6 in. is considered to be a seating drive. The sum of the number of blows required for the second and third 6 in. of penetration is termed the "standard penetration resistance", or the "N-value". If the sampler is driven less than 18 in. (0.45 m), as permitted in 7.2.1, 7.2.2, or 7.2.3, the number of blows per each complete 6-in. (0.15-m) increment and per each partial increment shall be recorded on the boring log. For partial increments, the depth of penetration shall be reported to the nearest 1 in. (25 mm), in addition to the number of blows. If the sampler advances below the bottom of the boring under the static weight of the drill rods or the weight of the drill rods plus the static weight of the hammer, this information should be noted on the boring log.

7.4 The raising and dropping of the 140-lb (63.5-kg) hammer shall be accomplished using either of the following two methods:

7.4.1 By using a trip, automatic, or semi-automatic hammer drop system which lifts the 140-lb (63.5-kg) hammer and allows it to drop 30 ± 1.0 in. (0.76 m ± 25 mm) unimpeded.

7.4.2 By using a cathead to pull a rope attached to the hammer. When the cathead and rope method is used the system and operation shall conform to the following:

7.4.2.1 The cathead shall be essentially free of rust, oil, or grease and have a diameter in the range of 6 to 10 in. (150 to 250 mm).

7.4.2.2 The cathead should be operated at a minimum speed of rotation of 100 RPM, or the approximate speed of rotation shall be reported on the boring log.

7.4.2.3 No more than 2¼ rope turns on the cathead may be used during the performance of the penetration test, as shown in Fig. 1.

NOTE 4—The operator should generally use either 1¾ of 2¼ rope turns, depending upon whether or not the rope comes off the top (1¾ turns) or the bottom (2¼ turns) of the cathead. It is generally known and accepted that 2¾ or more rope turns considerably impedes the fall of the hammer and should not be used to perform the test. The cathead rope should be maintained in a relatively dry, clean, and unfrayed condition.

7.4.2.4 For each hammer blow, a 30-in. (0.76-m) lift and drop shall be employed by the operator. The operation of pulling and throwing the rope shall be performed rhythmically without holding the rope at the top of the stroke.

7.5 Bring the sampler to the surface and open. Record the percent recovery or length of sample recovered. Describe the soil samples recovered as to composition, color, stratification, and condition, then place one or more representative portions of the sample into sealable moisture-proof containers (jars) without ramming or distorting any apparent stratification. Seal each container to prevent evaporation of soil moisture. Affix labels to the containers bearing job designation, boring number, sample depth, and the blow count per 6-in. (0.15-m) increment. Protect the samples against extreme temperature changes. If there is a soil change within the sampler, make a jar for each stratum and note its location in the sampler barrel.

8. Report

8.1 Drilling information shall be recorded in the field and shall include the following:

8.1.1 Name and location of job,

8.1.2 Names of crew,

8.1.3 Type and make of drilling machine,

8.1.4 Weather conditions,

8.1.5 Date and time of start and finish of boring,

8.1.6 Boring number and location (station and coordinates, if available and applicable),

8.1.7 Surface elevation, if available,

8.1.8 Method of advancing and cleaning the boring,

8.1.9 Method of keeping boring open,

8.1.10 Depth of water surface and drilling depth at the time of a noted loss of drilling fluid, and time and date when reading or notation was made,

8.1.11 Location of strata changes,

8.1.12 Size of casing, depth of cased portion of boring,

8.1.13 Equipment and method of driving sampler,

8.1.14 Type of sampler and length and inside diameter of barrel (note use of liners),

8.1.15 Size, type, and section length of the sampling rods, and

8.1.16 Remarks.

8.2 Data obtained for each sample shall be recorded in the field and shall include the following:

8.2.1 Sample depth and, if utilized, the sample number,

8.2.2 Description of soil,

8.2.3 Strata changes within sample,

8.2.4 Sampler penetration and recovery lengths, and

8.2.5 Number of blows per 6-in. (0.15-m) or partial increment.

9. Precision and Bias

9.1 Variations in N-values of 100% or more have been observed when using different standard penetration test apparatus and drillers for adjacent borings in the same soil formation. Current opinion, based on field experience, indicates that when using the same apparatus and driller, N-values in the same soil can be reproduced with a coefficient of variation of about 10%.

9.2 The use of faulty equipment, such as an extremely massive or damaged anvil, a rusty cathead, a low speed cathead, an old, oily rope, or massive or poorly lubricated rope sheaves can significantly contribute to differences in N-values obtained between operator-drill rig systems.

9.3 The variability in N-values produced by different drill rigs and operators may be reduced by measuring that part of the hammer energy delivered into the drill rods from the sampler and adjusting N on the basis of comparative energies. A method for energy measurement and N-value adjustment is currently under development.

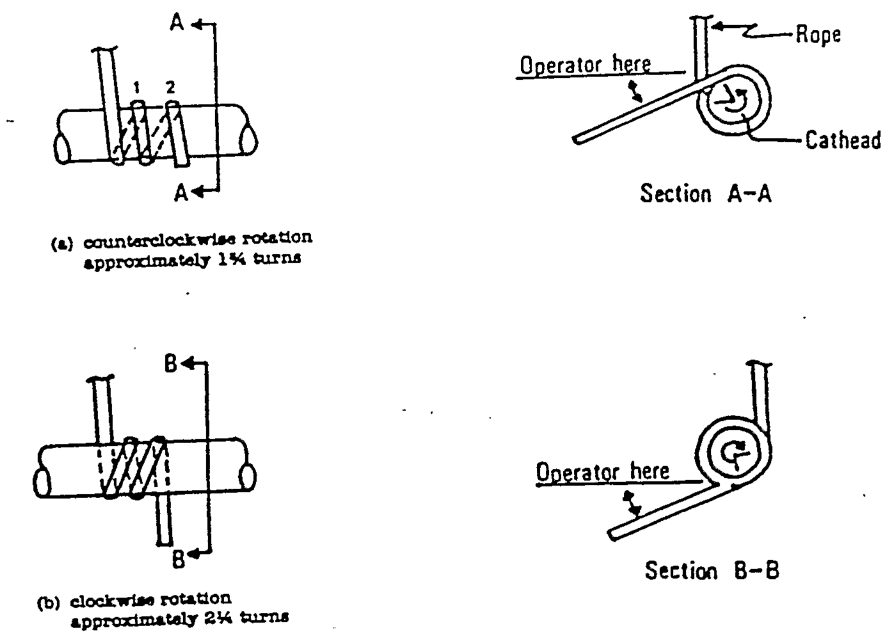
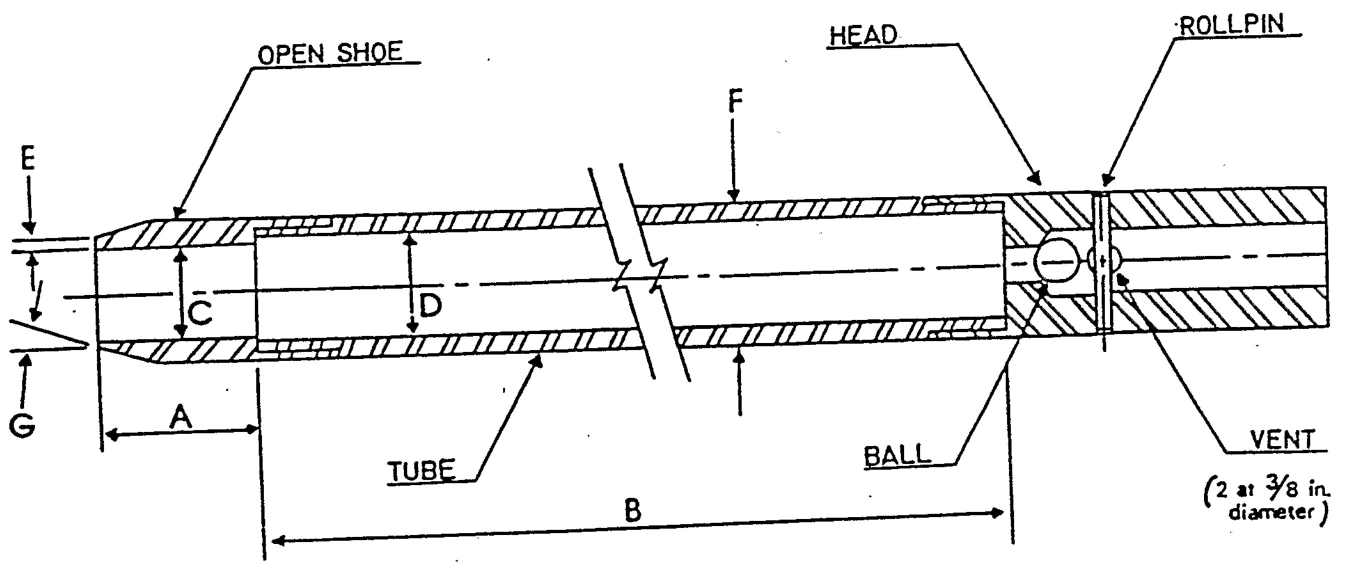


FIG. 1 Definitions of the Number of Rope Turns and the Angle for (a) Counterclockwise Rotation and (b) Clockwise Rotation of the Cathead



A = 1.0 to 2.0 in. (25 to 50 mm)
B = 18.0 to 30.0 in. (0.457 to 0.762 m)
C = 1.375 ± 0.005 in. (34.93 ± 0.13 mm)
D = 1.50 ± 0.05 − 0.00 in. (38.1 ± 1.3 − 0.0 mm)
E = 0.10 ± 0.02 in. (2.54 ± 0.25 mm)
F = 2.00 ± 0.05 − 0.00 in. (50.8 ± 1.3 − 0.0 mm)
G = 16.0° to 23.0°

The 1½ in. (38 mm) inside diameter split barrel may be used with a 16-gage wall thickness split liner. The penetrating end of the drive shoe may be slightly rounded. Metal or plastic retainers may be used to retain soil samples.

FIG. 2 Split-Barrel Sampler

AMERICAN SOCIETY FOR TESTING AND MATERIALS

Standard Practice for

THIN-WALLED TUBE SAMPLING OF SOILS[1]

This standard is issued under the fixed designation D 1587; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of the last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (€) indicates an editorial change since the last revision or reapproval.

This practice has been approved for use by agencies of the Department of Defense and for listing in the DOD Index os Specifications and Standards.

1. Scope

1.1 This practice covers a procedure for using a thin-walled metal tube to recover relatively undisturbed soil samples suitable for laboratory tests of structural properties. Thin-walled tubes used in piston, plug, or rotary-type samplers, such as the Denison or Pitcher, must comply with the portions of this practice which describe the thin-walled tubes (5.3).

NOTE 1—This practice does not apply to liners used within the above samplers.

2. Applicable Documents

2.1 ASTM Standards:

D2488 Practice for Description and Identification of Soils (Visual-Manual Procedure)[2]

D3550 Practice for Ring-Lined Barrel Sampling of Soils[2]

D4220 Practice for Preserving and Transporting Soil Samples[2]

3. Summary of Practice

3.1 A relatively undisturbed sample is obtained by pressing a thin-walled metal tube into the in-situ soil, removing the soil-filled tube, and sealing the ends to prevent the soil from being disturbed or losing moisture.

4. Significance and Use

4.1 This practice, or Practice D3550, is used when it is necessary to obtain a relatively undisturbed specimen suitable for laboratory tests of structural properties or other tests that might be influenced by soil disturbance.

5. Apparatus

5.1 Drilling Equipment—Any drilling equipment may be used that provides a reasonably clean hole; that does not disturb the soil to be sampled; and that does not hinder the penetration of the thin-walled sampler. Open borehole diameter and the inside diameter of driven casing or hollow stem auger shall not exceed 3.5 times the outside diameter of the thin-walled tube.

5.2 Sampler Insertion Equipment, shall be adequate to provide a relatively rapid continuous penetration force. For hard formations it may be necessary, although not recommended, to drive the thin-walled tube sampler.

5.3 Thin-Walled Tubes, should be manufactured as shown in Fig. 1. They should have an outside diameter of 2 to 5 in. and be made of metal having adequate strength for use in the soil and formation intended. Tubes shall be clean and free of all surface irregularities including projecting weld seams.

5.3.1 Length of Tubes—See Table 1 and 6.4.

5.3.2 Tolerances, shall be within the limits shown in Table 2.

5.3.3 Inside Clearance Ratio, should be 1% or as specified by the engineer or geologist for the soil and formation to be sampled. Generally, the inside clearance ratio used should increase with the increase in plasticity of the soil being sampled. See Fig. 1 for definition of inside clearance ratio.

5.3.4 Corrosion Protection—Corrosion, whether from galvanic or chemical reaction, can damage or destroy both the thin-walled tube and the sample. Severity of damage is a function of time as well as interaction between the sample and the tube. Thin-walled tubes should have some form of protective coating. Tubes which will contain samples for more than 72 h shall be coated. The type of coating to be used may vary depending upon the material to be sampled. Coatings may include a light coat of lubricating oil, lacquer, epoxy, Teflon, and others. Type of coating must be specified by the engineer or geologist if storage will exceed 72 h. Plating of the tubes or alternate base metals may be specified by the engineer or geologist.

5.4 Sampler Head, serves to couple the thin-walled tube to the insertion equipment and, together with the thin-walled tube, comprises the thin-walled tube sampler. The sampler head shall contain a suitable check valve and a venting area to the outside equal to or greater than the area through the check valve. Attachment of the head to the tube shall be concentric and coaxial to assure uniform application of force to the tube by the sampler insertion equipment.

6. Procedure

6.1 Clean out the borehole to sampling elevation using whatever method is preferred that will ensure the material to be sampled is not disturbed. If groundwater is encountered, maintain the liquid level in the borehole at or above ground water level during the sampling operation.

6.2 Bottom discharge bits are not permitted. Side discharge bits may be used, with caution. Jetting through an open-tube sampler to clean out the borehole to sampling elevation is not permitted. Remove loose material from the center of a casing or hollow stem auger as carefully as possible to avoid disturbance of the material to be sampled.

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[1]This practice is under the jurisdiction of ASTM Committee D-18 on Soil and Rock and is the direct responsibility of Subcommittee D18.02 on Sampling and Related Field Testing for Soil Investigation.

Current edition approved Aug. 17, 1983. Published October 1983. Originally published as D 1587-58T. Last previous edition D 1587-74.

[2]Annual Book of ASTM Standards, Vol 04.08.

NOTE 2—Roller bits are available in downward-jetting and diffused-jet configurations. Downward-jetting configuration rock bits are not acceptable. Diffuse-jet configurations are generally acceptable.

6.3 Place the sample tube so that its bottom rests on the bottom of the hole. Advance the sampler without rotation by a continuous relatively rapid motion.

6.4 Determine the length of advance by the resistance and condition of the formation, but the length shall never exceed 5 to 10 diameters of the tube in sands and 10 to 15 diameters of the tube in clays.

NOTE 3—Weight of sample, laboratory handling capabilities, transportation problems, and commercial availability of tubes will generally limit maximum practical lengths to those shown in Table 1.

6.5 When the formation is too hard for push-type insertion, the tube may be driven or Practice D3550 may be used. Other methods, as directed by the engineer or geologist, may be used. If driving methods are used, the data regarding weight and fall of the hammer and penetration achieved must be shown in the report. Additionally, that tube must be prominently labeled a "driven sample."

6.6 In no case shall a length of advance be greater than the sample-tube length minus an allowance for the sampler head and a minimum of 3 in. for sludge-end cuttings.

NOTE 4—The tube may be rotated to shear bottom of the sample after pressing is complete.

6.7 Withdraw the sampler from the formation as carefully as possible in order to minimize disturbance of the sample.

7. Preparation for Shipment

7.1 Upon removal of the tube, measure the length of sample in the tube. Remove the disturbed material in the upper end of the tube and measure the length again. Seal the upper end of the tube. Remove at least 1 in. of material from the lower end of the tube. Use this material for soil description in accordance with Practice D2488. Measure the overall sample length. Seal the lower end of the tube. Alternatively, after measurement, the tube may be sealed without removal of soil from the ends of the tube if so directed by the engineer or geologist.

NOTE 5—Field extrusion and packaging of extruded samples under the specific direction of a geotechnical engineer or geologist is permitted.

NOTE 6—Tubes sealed over the ends as opposed to those sealed with expanding packers should contain end padding in end voids in order to prevent drainage or movement of the sample within the tube.

7.2 Prepare and immediately affix labels or apply markings as necessary to identify the sample. Assure that the markings or labels are adequate to survive transportation and storage.

8. Report

8.1 The appropriate information is required as follows:

8.1.1 Name and location of the project,

8.1.2 Boring number and precise location on project,

8.1.3 Surface elevation or reference to a datum,

8.1.4 Date and time of boring—start and finish,

8.1.5 Depth to top of sample and number of samples,

8.1.6 Description of sampler: size, type of metal, type of coating,

8.1.7 Method of sampler insertion: push or drive,

8.1.8 Method of drilling, size of hole, casing, and drilling fluid used,

8.1.9 Depth to groundwater level: date and time measured,

8.1.10 Any possible current or tidal effect on water level,

8.1.11 Soil description in accordance with Practice D2488,

8.1.12 Length of sampler advance, and

8.1.13 Recovery: length of sample obtained.

9. Precision and Bias

9.1 This practice does not produce numerical data; therefore, a precision and bias statement is not applicable.

TABLE 1 Suitable Thin-Walled Steel Sample Tubes[A]

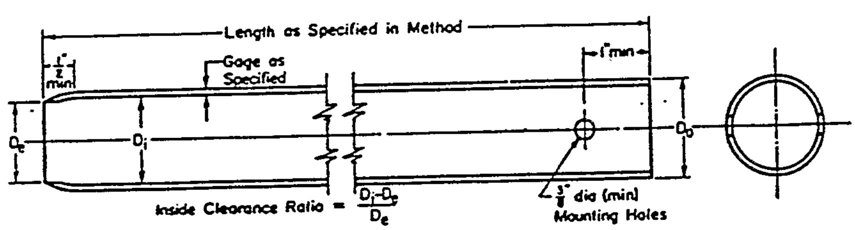
Outside diameter:			
in.	2	3	5
mm	50.8	76.2	127
Wall thickness:			
Bwg	18	16	11
in.	0.049	0.065	0.120
mm	1.24	1.65	3.05
Tube length:			
in.	36	36	54
m	0.91	0.91	1.45
Clearance ratio, %	1	1	1

[A] The three diameters recommended in Table 1 are indicated for purposes of standardization, and are not intended to indicate that sampling tubes of intermediate or larger diameters are not acceptable. Lengths of tubes shown are illustrative. Proper lengths to be determined as suited to field conditions.

TABLE 2 Dimensional Tolerances for Thin-Walled Tubes

Nominal Tube Diameters from Table 1[A] Tolerances, in.			
Size Outside Diameter	2	3	5
Outside diameter	+0.007 −0.000	+0.010 −0.000	+0.015 −0.000
Inside diameter	+0.000 −0.007	+0.000 −0.010	+0.000 −0.015
Wall thickness	±0.007	±0.010	±0.015
Ovality	0.015	0.020	0.030
Straightness	0.030/ft	0.030/ft	0.030/ft

[A] Intermediate or larger diameters should be proportional. Tolerances shown are essentially standard commercial manufacturing tolerances for seamless steel mechanical tubing. Specify only two of the first three tolerances; that is, O.D. and I.D., or O.D. or O.D. and Wall, or I.D. and Wall.



NOTE 1—Minimum of two mounting holes on opposite sides for 2 to 3½ in. sampler.
NOTE 2—Minimum of four mounting holes spaced at 90° for samplers 4 in. and larger.
NOTE 3—Tube held with hardened screws.
NOTE 4—Two-inch outside-diameter tubes are specified with an 18-gage wall thickness to comply with area ratio criteria accepted for "undisturbed samples." Users are advised that such tubing is difficult to locate and can be extremely expensive in small quantities. Sixteen-gage tubes are generally readily available.

Metric Equivalents

in.	mm
3/16	4.77
½	12.7
1	25.4
2	50.8
3½	88.9
4	101.6

FIG. 1 Thin-Walled Tube for Sampling