Pearl Place

30th and Pearl Street, Boulder CO

Site Review

Final 11/21/2014
LUR2014-00035

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Section I:
Site Review Criteria

Pearl Place (Written Statement – Section 9-2-14 (d) (15))

Pearl Place Associates (the Owner), Forum Real Estate Group *(the Developer) and* ***Tryba Architects*** *(the Applicant) are pleased to present* ***Pearl Place,*** *a new, urban commercial office campus intended to positively contribute to the energy, activity, and aspirations of this evolving mixed-use neighborhood. The following written statement is intended to communicate the context of the proposed project, our goals, and how the design presented for approval represents the values of the community and addresses the design requirements of the Boulder Comprehensive Plan.*

The project is also subject to the requirements of the Boulder Valley Regional Center Design Guidelines and the Site Review criteria of Section 9-2-14 of the Boulder Revised Code. A compliance summary of each is included immediately following this written statement as well as a record of the comments from City staff and the Boulder Design Advisory Board (BDAB). Through several rounds of Site Review our team has successfully addressed these comments.

A legal description of the various parcels that make up the entirety of the site known as Pearl Place is included on a separate page. For a full legal description of the various parcels please refer to the drawings and survey attached.

Regional Context

Pearl Place *occupies a prominent site within the Crossroads neighborhood at the northeast corner of the Boulder Valley Regional Center (BVRC). Encompassing a large geographic area of the City including the Crossroads Mall, the intersection of 30th and Pearl and the various retailers and businesses along 28th and 29th Streets, the BVRC has become the de-facto "front door" of downtown for a number of communities to the north, south and east of Boulder.*

Originally conceived as an urban renewal zone, the BVRC has experienced significant new growth and reinvestment along the lines of ***transit-oriented, mixed-use development****. Central to this vision of a more connected and diverse City is the development of a major transit hub and transit village immediately to the northeast known as Boulder Junction. This transit hub will serve a number of significant local public bus routes as well as connect to a growing urban multi-use path system. In addition, the extension of rail to this area will position the Crossroads and BVRC as the significant point of arrival for an increasing number of regional visitors and commuters.*

*Pearl Place is located in **Planning Area 1** within a designated **Activity Center.** The site is zoned **BR-1**. This designation is designed to encourage a number of complementary commercial, retail and residential uses serving a broader geographic area and is an ideal site for the proposed development.*

Project Objectives and Description

PROGRAM and USE:

*At nearly 4.3 acres in size, the site for the proposed development provides an opportunity to balance the area's large-scale retail and residential character with the **high-quality Class-A office space that is in growing demand within the Boulder city limits.** In other areas of the City, in particular downtown and the adjacent residential neighborhoods, the larger continuous office floor plates required to attract and retain major tenants is very disruptive to the character of these neighborhoods. At this site however, the needs of these employers can be met in a way that adds to the architectural character, diversity of uses and economic activity of the neighborhood.*

SITE PLANNING:

*The project proposes three connected 4-story office buildings totaling 300,000 rentable SF constructed in two phases that **work together to create a sensibility similar to a university campus**. Rather than physically separate structures, the office buildings are configured and connected to create a defined central open space – **a "commons" or quadrangle similar to a college campus setting**. Connection strategies include alignments of key building faces to create well-defined interior spaces and physical "bridge" connections between buildings above the ground floor. In this manner the office buildings will have direct and meaningful relationships with each other across this commons as well as strong connections between building entries, indoor spaces and the outdoors. In support of this campus concept, **all parking is located below-grade.***

EXISTING FEATURES and SITE ACCESS:

*Central to the campus concept is the **thoughtful integration of the site's prominent natural feature – a tree lined waterway.** This waterway forms part of the Boulder Slough that runs from west to east and bisects the site roughly at its midpoint. Combining agricultural and storm management flows, this waterway becomes a focal point for the site, flanked by natural and designed landscaped areas. In addition, a **multi-use path** bisects the site from the underpass at 30th Street, runs parallel to the waterway and provides an enhanced multi-modal connection between the development and adjacent sites.*

*The improved and integrated waterway is designed to **enhance the naturalized setting** while incorporating the required **flood management systems**. Mindful that water may not always be present, the flood walls and floor are given architectural and landscape treatments.*

To preserve the greatest amount of contiguous open space at the center of the proposed development site, vehicular access points are restricted to ***existing curb cuts and access easements.*** *This includes a single entrance at the north from Pearl Street and two entrances from 30th street. Traffic analysis indicates that these access points, restricted to the perimeter of the development, are suitable to serve the property without placing undue burden on the level of service of adjacent streets and intersections. To further improve access, a number of minor curb and island improvements are shown.*

Fire and service access as well as the entrance to the below-grade parking garage also depends on these existing curb cuts. In concert with the Fire Department we have determined that this perimeter access is suitable for all emergency and rescue operations. No large vehicles need to drive into the common space.

HEIGHT MODIFICATIONS:

The careful integration of existing natural features (including a substantial portion of the existing mature trees along the slough), the extension of planned and current multi-use paths, the use of existing site access points, and the emphasis on the creation of high-quality positive outdoor spaces, form the basis of our ***request for building height modification****. Shadow studies prove that the impact of this additional height on adjacent properties is negligible. Ample top level setbacks and building articulation further contribute to breaking down the mass of the campus into complementary elements that address human scale.*

BUILDING CHARACTER:

Building articulation, character and materials are proposed that balance a modern palette of metal, concrete and glass with a masonry, stone and wood expression representative of the climate and region. The basic concept for exterior building articulation is ***inspired by the geology of the geode****: a familiar geologic structure with a rocky exterior concealing a crystalline interior. As translated to an urban office campus this metaphor creates* ***a dual façade treatment*** *– masonry with punched windows on the exterior addressing the street edges and a faceted glass and metal interior addressing the commons. This contrasting character affords a* ***higher degree of transparency within the campus*** *to take advantage of views into and from the landscaped areas. This concept also* ***facilitates visual connections between people*** *working in different wings of the building.*

The massing of the building is articulated both horizontally and vertically. *Major building entries and circulation elements are expressed through setbacks and material changes to provide horizontal definition. Vertically the use of stepbacks at the ground and top floors create a defined base, middle and top. This organization is further enhanced through changes from masonry to glass at these levels, creating a higher degree of transparency, particularly at the ground floor.*

Mindful that the building must respond to varying scales and speeds, large glass window bays are set within the masonry volumes, further breaking down the visual mass of the building and ***providing a secondary scaling element.*** *Acting as windows into the building interior these elements will encourage visual connections between the pedestrian and specific clusters of activity on the interior.*

And finally, all ***volumes are enlivened by a heightened sense of module and texture****. Two colors and modules of brick with offsets create patterns and banding on the brick surfaces, anchored by a local sandstone base and trimmed with architectural precast. The glass facades are enlivened by the application of ceramic frit and extensive use of projecting mullion caps. Finally, the roof line is articulated with a change in material, the expression of eyebrows and trellises, and the punctuation of volumes by the vertical stair towers.*

Anticipated Schedule

Pearl Place is intended to start construction with the demolition of the current non-historic, existing buildings and other site mobilization in the ***middle of 2015.*** *Construction duration of Phase 1 is anticipated to be 18-20 months with an* ***early 2017 opening.*** *Construction of Phase 2 has not yet been determined.*

Copies of Easements, agreements, etc.

Every effort has been made to secure cooperation from adjacent land owners, secure agreements with utility providers related to the continued maintenance and use of public facilities on site, and provide/protect open space and existing natural features where feasible. Please refer to the remainder of the Site Review submittal for copies of relevant agreements, conveyances, restrictions, etc. proposed, including ***letters from adjacent property owners and the ditch companies indicating support for the project.***

Purpose of Site Review (Section 9-2-14 (a))

Pearl Place *seeks approval under the criteria outlined in the Site Review section of the Boulder Revised Code. The following narrative summarizes the specific project approach applicable to each design review criteria. Please refer to the drawings for additional detail.*

(a) Purpose: The purpose of site review is to allow flexibility and encourage innovation in land use development. Review criteria are established to **promote the most appropriate use of land**, **improve the character and quality of new development**, to **facilitate the adequate and economical provision of streets and utilities**, to **preserve the natural and scenic features of open space**, to **assure consistency with the purposes and policies of the Boulder Valley Comprehensive Plan and other adopted plans of the community**, **to ensure compatibility with existing structures and established districts**, to **assure that the height of new buildings is in**

general proportion to the height of existing, approved, and known to be planned or projected buildings in the immediate area, to assure that the project incorporates, through site design, elements which **provide for the safety and convenience of the pedestrian**, to assure that the **project is designed in an environmentally sensitive manner**, and to assure that the **building is of a bulk appropriate to the area** and the amenities provided **and of a scale appropriate to pedestrians.**

Modifications to Standards (Section 9-2-14 (c))

(c) The project proposes the modification of the following development standards:

a. 9-7-3 Setback Encroachments – *modification requested to allow a 5-foot encroachment into the Front Lot Line along Pearl Street for the Phase 2 Building, thereby improving how it fronts the street.*

b. 9-7-5 Building Height – *modification to allow 4 stories and 55 feet in height.*

c. 9-9-6 Parking Standards – *request for a 13% parking reduction from the zoning required minimum (supported by the attached Transportation Demand Management Plan and Traffic Impact Study).*

Requirements for Height Mod. (Section 9-2-14 (e))

(e) The following additional requirements apply … to request a modification of the permitted height:

(1) Preliminary building plans including sketches and elevations illustrating the proposed building height and indicating how the height was calculated. *All applicable building elements are at or under the 55 foot height limit. Please refer to the architectural site plan and building elevation drawings for contours, notes and dimensions indicating how the height was calculated.*

(2) *Not applicable – for developments in the DT district*

(3) *Not applicable – for developments in the DT district*

(4) A shadow analysis that shows the shadow cast by a 35 foot building located at the required setback and the shadow cast by the proposed building. *Please refer to the attached shadow analysis drawings.*

(5) A list of the height of each principal building located or known to be approved or proposed within 100 feet of the proposed development. *The requested information is included on the context map in the drawings.*

(6) A written statement and drawings which describe the way in which the proposal accommodates pedestrians, including, without limitation, uses proposed for the ground level, percent of transparent material at the ground level, and signage and graphics. *The plan and elevation drawings and sketches illustrate the proposed enhancements and accommodations for the pedestrian at the ground floor. These include:*

- *Ground floor uses located to generate pedestrian activity and interest along the north portion of the 30th Street façade and the entire length of the Pearl Street façade. While not strictly facing the public streets, other pedestrian active uses of the anticipated tenant program and major building lobbies activate the interior open spaces and frontages, contributing to the campus environment.*
- *Location of building entrances facing both Pearl and 30th Streets, and the articulation of these entrances with a high degree of transparent glazing, building canopies, signage, breaks in the building massing, landscape treatments and site and building lighting. Please refer to the architectural site plan and building elevation drawings.*
- *High degree of glazing and transparency at the ground floor (greater than 60% on average) and along all facades facing public rights of way. Glazing specified to have lower reflectivity and higher visible light transmission, with some use of patterning and frit. Please refer to the architectural site plan and building elevation drawings.*
- *Enhanced streetscape and landscape treatments along primary street fronts including planted tree lawns, decorative paving near entrances, bicycle racks, and site walls and features providing definition and seating. Please refer to the architectural site plan drawings.*
- *Signage and graphics located at key corners and public building faces providing color, graphics, and building identity. Please refer to the landscape site plan for monument sign locations.*

(7) A detailed plan showing the useable open space and a written statement of how it serves the public interest. *Please refer to the site and landscape drawings showing proposed useable open spaces and the following narrative describing their design character and amenities in detail.*

Response to Review Criteria (section 9-2-14 (h))

(h) Criteria for Review: No site review application shall be approved unless the approving agency finds that:

(1) Boulder Valley Comprehensive Plan:

(A) The proposed site plan is consistent with the land use map and the service area map and, on balance, the policies of the Boulder Valley Comprehensive Plan.

The Boulder Valley comprehensive plan, 2010 major update, outlines a set of core community values that are embodied in the proposed development for Pearl Place. The most relevant and applicable to the proposed development are summarized below:

1. *Sustainability*
    a. *Pearl Place represents a thoughtful integration of commercial office, exterior landscape and open space intended to establish a high standard for design and site sustainability for future, similar developments.*
    b. *Connections to emerging transit furthers the goals of providing the multi-modal options demanded by a sustainable community.*
    c. *The building and site design will steward valuable resources, including energy, water, daylight, and views. The buildings will be designed to a minimum LEED-Gold level under the current rating system (version 4) and achieve a minimum 31% energy savings over the ASHRAE standard. Strategies include:*
        i. *A complete thermal building envelope supported by energy modeling*
        ii. *High performance glazing systems with external and internal shading and light control*
        iii. *A high efficiency mechanical system tied to a robust building automation and metering system*
        iv. *150 Kw of rooftop photovoltaic*
        v. *High ceilings, exposed structure, and large windows providing thermal mass and access to daylight and views*
        vi. *Superior indoor air quality through material selections and ventilation rates that far exceed current industry standards*
        vii. *Provision of facilities on site and within the buildings to encourage multi-modal transit, including bike storage, tune-up and repair, showers and lockers, preferred parking and car charging stations.*
    d. *The buildings and site features will be constructed from durable, timeless materials.*
2. *Culture of Creativity and Innovation*

a. *Pearl Place proposes the creation of a flexible, open office environment inspired by urban campus planning. Tenants will be inspired by the ability to customize their spaces, work flexibly, and be connected to each other and the immediate environment both visually and physically.*

3. *Identity and Sense of Place*
    a. *Located near a prominent intersection and spanning from Pearl to 30th Streets, the project size and visibility provides an opportunity to create a strong identity that addresses the public realm while providing a unique set of interior outdoor and rooftop spaces of distinct character and quality.*
    b. *A focus on pedestrian and cyclist comfort and safety by relegating service and vehicular traffic to the perimeter to the greatest extent possible will contribute to a sense of place.*
    c. *The significant investments to improve and enhance the Boulder Slough and Left Hand Ditch will allow these existing features to become signature, place-defining elements of the campus.*
    d. *The common central open space with its articulation as a series of outdoor rooms of varying character, encourage flexible programming attractive to the larger community.*
4. *Compact, Contiguous Development and Sustainable Urban Form*
    a. *The request for additional floors and height in compact, flexible office forms maximizes density on the site without sacrificing open space. A critical mass of office space in this area contributes to long term economic diversity and stability.*
    b. *Buildings are designed to front adjacent streets, creating a strong and defined urban street edge.*
    c. *Buildings are designed to create defined, positive outdoor spaces in the best tradition of campus planning.*
5. *Open Space Preservation*
    a. *Pearl Place restores and reinvigorates the existing landscaped waterway, a portion of the Boulder Slough. This natural feature becomes the central, orienting experience of the campus.*
    b. *In addition, the vast majority of existing surface asphalt paving is removed for the creation of open spaces and the building footprints.*
6. *Great Neighborhoods and Public Spaces*
    a. *The open space conceived for Pearl Place is the area around the multi-use path that crosses the site from east to west. This space has three distinct characters:*

i. *The naturalistic setting of grass, trees, and understory plantings north of the waterway.*
ii. *The hardscaped plaza near the visitor drop-off with its two connecting pedestrian bridges*
iii. *The landscaped/buffered building edges.*

b. *Public and private open space is designed to appear physically and visually continuous, eliminating real or implied barriers. This is balanced by the security needs of the tenant – their individual entrances, support and service spaces.*
c. *Landscaped setbacks and public sidewalks, a vital part of the public realm, are improved and incorporated into the broader open space design.*

7. *Environmental Stewardship and Climate Action*
    a. *As described above, enhanced response to current flood modeling will allow the site to weather anticipated increases in storm frequency and severity.*
    b. *Building and site design is proposed with respect to current thinking on energy and water consumption.*
    c. *Multi-modal access helps reduce reliance on the automobile for personal transport.*
    d. *The campus plan, integration of building and site, and provision of open interiors with substantial access to light and view, can foster greater appreciation for the natural environment.*
8. *A Vibrant Economy*
    a. *Pearl Place injects a much-needed commercial component of vibrant cities into an area currently defined by large scale retail and residential and a proliferation of surface parking lots.*
    b. *The design of the office buildings balances the flexibility afforded by larger planning plates with an articulated massing and scale, providing an asset with long-term viability and economic value.*
9. *An all-mode Transportation System*
    a. *The proposal accommodates most major modes of transport, including parking for vehicles, bus access, pedestrians and cyclists.*
    b. *The multi-use path is incorporated into the landscape and open space design.*
    c. *Multiple bike racks are provided for the public and the tenants around the site. Covered and secure bike parking for tenants is provided within the building wings..*
    d. *The on-site bus drop off has been improved to include a shelter.*
10. *Physical Health and Well-being*

a. *Physical health and well-being are encouraged through the provision of a multi-modal system to and through the project site as described above.*
b. *The physical campus setting provides numerous opportunities for visual and physical connection, chance contact, structured and informal meetings and events, and other types of social contact that humans depend upon for their psychological well-being.*
c. *Access to daylight, the outdoors, and the spectacular views from the upper levels of the building provide numerous physical, psychological and spiritual benefits for the building's occupants.*
d. *The tenant's program includes aspects of fitness, emotional well-being, and lifestyle conveniences.*

In addition, the proposed development addresses the key trends identified in the 2010 major update to the comprehensive plan:

1. *Economic challenges – Boulder's competitive position with regard to attracting and retaining creative talent seeking unique, flexible, and functional office space in a dynamic and growing regional center will be met by the proposed development.*
2. *Ramped up climate action – The proposed design seeks to balance development needs with the creation of quality open spaces served by ample bike and pedestrian connections to the larger community. Together these demonstrate that economic development, sustainable design, and a respect for the environment with emphasis on other modes of transportation are not mutually exclusive. In addition, the improvements and enhancements to the flood control aspects of the waterway anticipate increased storm events.*
3. *Demographic challenges – With the challenges of an aging population comes the need for services and functions that address broader community needs. While the proposed office is intended to serve private tenants, the activity and economic diversity it brings to the Boulder Valley Regional Center encourages future development that can serve a broader and more diverse market.*

(B) The proposed development shall not exceed the maximum density associated with the Boulder Valley Comprehensive Plan residential land use designation. Additionally, if the density of existing residential development within a three-hundred-foot area surrounding the site is at or exceeds the density permitted in the Boulder Valley Comprehensive Plan, then the maximum density permitted on the site shall not exceed the lesser of:

(i) The density permitted in the Boulder Valley Comprehensive Plan, or *(not applicable)*

(ii) The maximum number of units that could be placed on the site without waiving or varying any of the requirements of chapter 9-8, "Intensity Standards," B.R.C. 1981.

As a commercial development the comparable density is the 2.0:1 to 4.0:1 FAR allowed by the BR-1 zoning. The proposed development is a use-by-right project within the base allowable 2.0:1 FAR. An increase in stories and height, appropriate for the area and requested by the applicant, is necessary to achieve the desired density, create flexible open office floor plates, and retain the extensive open space on the site.

(C) The proposed development's success in meeting the broad range of BVCP policies considers the economic feasibility of implementation techniques required to meet other site review criteria.

The proposal as designed balances the provision of public and private site design amenities with the design elements necessary for a Class A office building.

(2) Site Design: Projects should preserve and enhance the community's unique sense of place through creative design that respects historic character, relationship to the natural environment, multi-modal transportation connectivity and its physical setting. Projects should utilize site design techniques which are consistent with the purpose of site review in subsection (a) of this section and enhance the quality of the project. In determining whether this subsection is met, the approving agency will consider the following factors:

(A) Open Space: Open space, including, without limitation, parks, recreation areas, and playgrounds:

(i) Useable open space is arranged to be accessible and functional and incorporates quality landscaping, a mixture of sun and shade and places to gather;

As demonstrated in the attached landscape and site plans, Pearl Place will provide a number of public and private open spaces greatly exceeding the minimum 20% requirement (35% proposed). These spaces are designed to be conveniently accessed by the pedestrian and of complementary character and function. These usable open spaces include:

1. ***An entry plaza and visitor drop off*** *connected visually and physically to Pearl Street via a private drive. This plaza is designed for high visibility and to provide a welcoming, well lit pedestrian-friendly space at the main entrance to the campus. The design incorporates*

monumental scale graphic signage, seating, and landscaping, and is also easily accessed from/is contiguous with the multi-use path. In addition, this space is the landing point for two pedestrian bridges that provide connection to the main campus and act as important scale defining elements.

2. ***A restored and naturalized waterway preserving existing mature trees**, adding new trees, naturalized understory plantings and shrub beds and providing bank stabilization at the waterway's edge. This open space provides a natural setting for smaller groups near the creek edge enjoying ample shade while providing for enhanced flood control.*
3. ***A multi-use path** running east-west through the site providing connection to and from the existing city pathway network. The path fulfills both the promise of a connection to the underpass and continues south so that future adjacent development can complete the connection to Walnut.*
4. ***A central common space (the Commons)** between wings A and B that provides functional and attractive open space at the heart of the campus. This Commons is sized to accommodate several outdoor "rooms" of varying character, configuration and material. These "rooms" work together or independently to accommodate small private gatherings or larger tenant events, even potential events involving the community. Landscape and hardscape features are best defined on the site and landscape plans but include a mix of paving, trees and shrubs, turf grass, adapted and native plantings, water quality features, seating, bike racks, planters, and lighting.*
5. ***A shaded dog-run** to the north of wing B and adjacent to the ditch, provides a tenant amenity and landscaped buffer from the drainage way structures and multi-use path.*
6. ***A hardscaped plaza south** of the connection between wings A and B to be used for tenant gathering and socializing, including an outdoor kitchen.*
7. ***Landscaped setbacks** on all sides of the buildings with a mix of plantings and hardscape treatments that differ depending on the street frontage.*
8. ***Rooftop decks** for the use of the office tenants that will provide additional private outdoor space, help reduce the urban heat island effect, and contribute to a reduction in the building mass.*

(ii) Private open space is provided for each detached residential unit; (not applicable)

(iii) The project provides for the preservation of or mitigation of adverse impacts to natural features, including, without limitation, healthy long-lived trees, significant plant communities, ground and surface water, wetlands, riparian areas, drainage areas and species on the federal Endangered

Species List, "Species of Special Concern in Boulder County" designated by Boulder County, or prairie dogs (Cynomys ludiovicianus), which is a species of local concern, and their habitat;

Pearl Place demonstrates good stewardship of the site's prominent natural feature – a portion of the Boulder Slough (the "waterway") surrounded by mature trees. As indicated in the landscape plan, a great number of the healthiest trees will remain to be incorporated into the new public and private open spaces described above.

Outside of this waterway, which combines storm drainage, flood management, and agricultural flows, the majority of the site is currently surface parking. The site does not contain a significant plant community, wetlands or riparian areas, habitat for endangered species, or prairie dog colonies.

Two local ditch companies maintain on-site access and maintenance easements for portions of the waterway. This waterway is currently a combination of below-grade box culverts and an above-grade drainage way that connects roughly at the center of the site. As indicated in the site and civil plans, these flows will be combined in a new, structured and open waterway that will provide for the excess flow anticipated by current flood modeling, provide better access for maintenance, and be designed as a significant site amenity through the use of plantings and stepped seat walls. ***The ditch companies have indicated their support for the proposed design.***

(iv) The open space provides a relief to the density, both within the project and from surrounding development;

In total the open spaces conceived provide areas for numerous activities: passive recreation, seating/conversation, people-watching, cycling/walking, small-format play, meditation, meetings, small-scale events, etc. These spaces provide visual and physical relief for the tenants and for the public traversing the site via the new multi-use path.

(v) Open space designed for active recreational purposes is of a size that it will be functionally useable and located in a safe and convenient proximity to the uses to which it is meant to serve;

No open spaces are proposed for large-scale activity or recreation but small format recreation is possible in certain areas. The outdoor "rooms" that characterize the commons are conducive to social gatherings and "spill out" from the adjacent tenant fitness center located on the ground floor of wing A as well as the ground floor auditorium space known as "Tech Talk.". Throughout the site,

numerous bike racks are provided convenient to building entries and to encourage physical activity on the part of the tenants.

Other than these open spaces, the primary space designed for recreational activity is the multi-use path that extends through the site, connecting many of these spaces. A number of smaller "breakout" spaces off the path offer moments for rest and rejuvenation.

(vi) The open space provides a buffer to protect sensitive environmental features and natural areas; and

Landscaped buffers are provided where possible on either side of the ditch. These provide separation between travel paths and activity areas. The route of the multi-use path considers stands of mature existing trees.

(vii) If possible, open space is linked to an area- or city-wide system.

The open space and the multi-use path is directly linked to the 30th Street underpass and path system to the east. The path extends along the west property line south to the adjacent residential property and sidewalk, anticipating expansion of the path system in the future.

(B) Open Space in Mixed Use Developments (Developments That Contain a Mix of Residential and Nonresidential Uses):

(i) The open space provides for a balance of private and shared areas for the residential uses and common open space that is available for use by both the residential and nonresidential uses that will meet the needs of the anticipated residents, occupants, tenants, and visitors of the property; and

Not applicable

(ii) The open space provides active areas and passive areas that will meet the needs of the anticipated residents, occupants, tenants, and visitors of the property and are compatible with the surrounding area or an adopted plan for the area.

Not applicable

(C) Landscaping:

(i) The project provides for aesthetic enhancement and a variety of plant and hard surface materials, and the selection of materials provides for a variety of colors and contrasts and the preservation or use of local native vegetation where appropriate;

As indicated in the landscape plan (Sheet L1.0), plant and material selections are proposed with regard to four-season interest, ease of maintenance, low to medium water use, and climate suitability.

(ii) Landscape design attempts to avoid, minimize or mitigate impacts on and off site to important native species, healthy, long lived trees, plant communities of special concern, threatened and endangered species and habitat by integrating the existing natural environment into the project;

The core of the landscape concept is the preservation and maintenance of a number of existing mature trees surrounding the eastern half of the waterway, and their integration into a larger open space concept.

(iii) The project provides significant amounts of plant material sized in excess of the landscaping requirements of sections 9-9-12, "Landscaping and Screening Standards," and 9-9-13, "Streetscape Design Standards," B.R.C. 1981; and

Significantly more plant material is proposed in the landscape plans. Please refer to sheet L1.0.

(iv) The setbacks, yards and useable open space along public rights of way are landscaped to provide attractive streetscapes, to enhance architectural features and to contribute to the development of an attractive site plan.

The plan proposes fully landscaped and hardscaped setbacks along public rights or way, rear lot lines, and the two cross-access easement/private drives to the north and south of the property. Please refer to sheets L1.0 through L5.0.

(D) Circulation: Circulation, including, without limitation, the transportation system that serves the property, whether public or private and whether constructed by the developer or not:

(i) High speeds are discouraged or a physical separation between streets and the project is provided;

No through-streets are provided in the proposed development, eliminating the potential for high speeds disruptive to the pedestrian feel of the campus concept. Adjacent 30th and Pearl Streets are recognized as high-capacity Class C Streets. Physical separation between the pedestrian and vehicular traffic is provided by landscaped tree lawns and a regular pattern of street trees. Together these provide the physical and visual separation required to allow pedestrians to feel comfortable and safe.

(ii) Potential conflicts with vehicles are minimized;

Automobile and service traffic is located at the south perimeter of the campus, greatly minimizing potential conflicts between vehicles, pedestrians and cyclists. Automobile traffic serving visitors and Phase 2 arrives from the north. The location of the drop off plaza and visitor parking north of the multi-use path and central commons minimizes potential conflicts. Access to and from the Chase bank property is largely unaffected.

In addition, a number of turning movement simulations and traffic models (report enclosed) demonstrate minimal overlap of service and tenant traffic, provision of adequate stacking, and accommodation of truck turning motions that minimize conflict with traffic serving adjacent sites.

(iii) Safe and convenient connections are provided that support multi-modal mobility through and between properties, accessible to the public within the project and between the project and the existing and proposed transportation systems, including, without limitation, streets, bikeways, pedestrian ways and trails;

A system of sidewalks, interior walkways, pedestrian bridges, and the multi-use path running east to west through the site provide safe and convenient multi-modal connections. Direct connection from the private drive to the south to secure bike facilities located in each wing provide convenience for the majority of the tenants who chose this modality.

(iv) Alternatives to the automobile are promoted by incorporating site design techniques, land use patterns, and supporting infrastructure that supports and encourages walking, biking, and other alternatives to the single-occupant vehicle;

The concentration and connection of open spaces at the center of the site, flanked by the wings of the Phase 1 office building, create a strongly attractive campus presence that draws activity to itself. The system of pedestrian paths connects to and reinforces the importance of this space. Locating

major building entries off this space further enhances interest and encourages a high level of activity and engagement throughout the day. The concentration of activity, entries, and aesthetic treatments is intended to make this common space the preferred entrance over and above access via the below-grade parking garage.

(v) Where practical and beneficial, a significant shift away from single-occupant vehicle use to alternate modes is promoted through the use of travel demand management techniques;

825 parking spaces are the minimum required by code. The parking plan and supporting TDM study call for a 13.6% reduction in the minimum for a total of 716 spaces. The recommended number of spaces when compared to the anticipated population of the buildings (1100 in Phase 1) represents a balance that recognizes the investment in transit in the area without sacrificing what is both practical and necessary to serve the needs of the office campus and tenant.

In addition, great investment is proposed in multi-modal connections to and through the site, affording opportunities for further reduced reliance on SOV's as the campus is "broken in" over time and TDM strategies come to fruition.

The full TDM report and TIS is included providing a basis for our parking reduction request.

(vi) On-site facilities for external linkage are provided with other modes of transportation, where applicable;

On site facilities intended to facilitate other modes of transportation include:

- *The multi-use path*
- *Custom bus shelter*
- *Excess on-site bike parking (more than double the required amount)*
- *Dedicated bike storage on the ground floor to encourage tenant use of this mode of transit*

(vii) The amount of land devoted to the street system is minimized; and

Internal private drives are relegated to those that serve existing curb cuts. No new curb cuts or internal streets are proposed. Suggested improvements to turning movements and barrier islands are designed to take up minimal additional area.

(viii) The project is designed for the types of traffic expected, including, without limitation, automobiles, bicycles, and pedestrians, and provides safety, separation from living areas, and control of noise and exhaust.

The transportation impact study and parking study indicate that the project is designed to accommodate the anticipated type and intensity of traffic and supports a reasonable and balanced parking reduction. Location of parking entrances to the south perimeter of the site provides for safety, separation, and control of noise and exhaust. Separate on-grade visitor parking and drop off is providing to the north. It is anticipated that, over time, bicycle use will increase. Excess and dedicated bicycle parking for tenants and visitors has been provided to meet this expected increase in demand over time.

(E) Parking:

(i) The project incorporates into the design of parking areas measures to provide safety, convenience, and separation of pedestrian movements from vehicular movements;

Parking is relegated entirely below grade to minimize the impact on ground floor uses and the quality of the open spaces. Parking access is concentrated at the southwest corner to minimize impact on adjacent streets. A minimal intersection with the multi-use path in this area takes advantage of enhanced site signage and sight triangles to minimize conflicts.

(ii) The design of parking areas makes efficient use of the land and uses the minimum amount of land necessary to meet the parking needs of the project;

Parking is relegated entirely below grade to allow for the land to be dedicated to tenant and pedestrian uses. The below-grade garage footprint is set back from adjacent landscaped areas at grade to minimize the impact on the health of new street trees and existing mature trees. A small amount of necessary visitor parking is integrated into the overall streetscape design along the private drive from Pearl Street to provide convenient visitor access with minimal visual impact.

(iii) Parking areas and lighting are designed to reduce the visual impact on the project, adjacent properties, and adjacent streets; and

As mentioned above, the provision of below-grade parking eliminates the visual impact of parking structures on the site.

(iv) Parking areas utilize landscaping materials to provide shade in excess of the requirements in subsection 9-9-6(d), and section 9-9-14, "Parking Lot Landscaping Standards," B.R.C. 1981.

The small amount of visitor parking at grade is provided shade through the preservation of existing healthy, mature trees as well as the provision of a new street trees.

(F) Building Design, Livability, and Relationship to the Existing or Proposed Surrounding Area:

(i) The building height, mass, scale, orientation, architecture and configuration are compatible with the existing character of the area or the character established by adopted design guidelines or plans for the area;

The Boulder Valley regional center is currently characterized by large and medium scale one and two story retail development with a high-degree of surface parking. Current development trends and area plans support greater density and height as well as a more diverse mix of uses district-wide. ***The proposed development is compatible with this direction****. The request for four floors and 55 feet in height is compatible with new and planned adjacent residential development of four stories and 45-55 feet. In addition, the large floor plates required for office are compatible with the medium and large-scale retail development, in particular the Target store immediately to the west.*

The project also complies with the core principles and goals of the Boulder Valley Regional Center Design Guidelines, summarized at the end of this written statement.

(ii) The height of buildings is in general proportion to the height of existing buildings and the proposed or projected heights of approved buildings or approved plans or design guidelines for the immediate area;

At four stories and 55 feet, with notable setbacks at the fourth floor, the proposed developed is visually compatible with the 29 North residential development immediately south and the high-bay Target store immediately to the west. More importantly, the project is appropriate in scale when considering the new mixed-use developments currently being planned along the east side of 30th Street. Should the Chase Bank property be developed in the future it is anticipated that proposed structures would replace the current pad site with a higher density mid use development.

(iii) The orientation of buildings minimizes shadows on and blocking of views from adjacent properties;

As indicated in the attached shadow analysis, the buildings are located and oriented to maximize access to sunlight and open space, in particular along the mixed-use path, while minimizing shadows on the adjacent properties. The residential properties to the south are not shaded at any time of the year by the proposed office buildings (and nor are their views to the west impacted). Limited shading on the Target loading area and the Chase parking lot occur but do not impact the enjoyment or use of those properties. Views from the Chase Bank property to the west will be slightly impacted, but the impact on views from the corner of 30th and Pearl is negligible.

(iv) If the character of the area is identifiable, the project is made compatible by the appropriate use of color, materials, landscaping, signs, and lighting;

The character of the area is relatively diverse and driven in great measure by the needs of the individual retailers. While masonry veneer predominates, buildings in the area exhibit the use of concrete block, architectural metals, curtain wall and storefronts, stucco, and large scale tenant signage, logos and graphics.

Pearl Place is conceived to be a modern interpretation and evolution of the masonry and glass facades that make up a great part of the existing and planned developments. This includes the use of brick veneer and glazed curtain wall in different proportions than a traditional "punched" window configuration, the use of metal panel as an alternate to masonry, and signage and lighting that provides day and night interest compatible with a vibrant commercial district.

The color and palette of materials is conceived to appear "natural" and identifiable with the region and climate of the Rocky Mountain West.

As the attached lighting plans demonstrate.

(v) Projects are designed to a human scale and promote a safe and vibrant pedestrian experience through the location of building frontages along public streets, plazas, sidewalks and paths, and through the use of building elements, design details and landscape materials that include, without limitation, the location of entrances and windows, and the creation of transparency and activity at the pedestrian level;

Building design emphasizes locations of entrances directly off the interior office commons and/or the adjacent public sidewalks. Entrances are highly visible and convenient. The building facades express smaller material modules and articulated glazing to provide a sense of human scale. In addition, a number of larger scale building steps in plan and elevation break the buildings into a number of masses that further reduce the apparent bulk and mass without compromising the needs for larger, more flexible open office floor plates. These exterior features include a number of glazed, projecting window bays designed to focus one's perception on aspects of the building's interior and the activity of smaller work groups, creating a visual connection between those on the street and those in the building. Other scale defining building elements at grade include projecting canopies, seat walls and planters.

(vi) To the extent practical, the project provides public amenities and planned public facilities;

The proposed design provides for the east-west multi-use path served by ample bike parking dispersed throughout the site. The landscape and hardscape treatment immediately north of the waterway and adjacent to this path provides attractive, linear public open space suitable for rest and rejuvenation. Ditch improvements and bank stabilization, while utilitarian in nature, are designed to be aesthetically pleasing as well as functional. Minor public improvements include intersection improvements, including improved turning movements and barrier islands, improved streetscapes over what exists currently, and an improved bus stop.

(vii) For residential projects, the project assists the community in producing a variety of housing types, such as multifamily, townhouses and detached single family units, as well as mixed lot sizes, number of bedrooms and sizes of units;

Not applicable

(viii) For residential projects, noise is minimized between units, between buildings, and from either on-site or off-site external sources through spacing, landscaping, and building materials;

Not applicable

(ix) A lighting plan is provided which augments security, energy conservation, safety, and aesthetics;

The attached lighting and photometric plan provides a comprehensive system of pole mounted, bollard, step and other site lighting designed to provide more than adequate nighttime illumination of the pathways and open spaces, highlight focal points in the landscape and hardscape design intended to provide moments of orientation and enhance way finding, and provide a balance in contrast ratios between light areas and dark for comfort and safety.

(x) The project incorporates the natural environment into the design and avoids, minimizes, or mitigates impacts to natural systems;

The design integrates a number of the mature, healthy trees and retains/augments the waterway.

(xi) Buildings minimize or mitigate energy use; support on-site renewable energy generation and/or energy management systems; construction wastes are minimized; the project mitigates urban heat island effects; and the project reasonably mitigates or minimizes water use and impacts on water quality.

- *The building is designed to meet the Boulder energy code requirements through an integrated design approach that incorporates passive and active strategies. The energy target is at least 30% below the ASHRAE Standards, achievable through a combination of the following building design strategies:*
    - *Enhanced wall and roof insulation (R21+)*
    - *Enhanced glass performance (low-u values)*
    - *Fixed exterior sunshades (glare and heat control)*
    - *Interior light and glare control (blinds and controls by tenant)*
    - *High-efficiency fan-coil HVAC system with economizers, variable speed drives, and energy monitoring systems*
    - *Rooftop PV system (capacity to be determined)*
    - *LEED-Gold minimum certification level under the LEED BD+C V4 system*
    - *Full building commissioning by an independent commissioning agent (CxA)*
- *The design supports a modular and unitized method of construction designed to eliminate waste in the field. The general contractor will employ all reasonable methods for minimizing construction waste, separating waste streams, and diverting recyclable materials away from the landfill. This will be documented during construction as part of the LEED submittal process.*

- *The selection of light colored roofing materials, preservation of mature landscaping, landscaped open spaces, and selection of lighter colored hardscape materials contribute to the reduction of the urban heat island effect.*
- *Plant species have been selected and located with regard to sunlight and water needs, and several native or adapted species are incorporated to minimize potable water needs. Active storage and reuse of grey water is not allowed.*
- *The landscaped central commons serves a water quality purpose, allowing a high degree of infiltration and filtration. Discharged flows from below-grade water systems are treated prior to reinjection in a number of injection wells located along the south edge of the property. By excluding surface parking from the campus contamination of surface flows is greatly mitigated. Selection of complimentary plantings with native and adapted species limits the need for chemical fertilizers and pest control. Last of all, drainage is better controlled through the proposed realignment and reconstruction of the ditch, and stabilization of the banks through new landscaped berms and terraced features contributes to erosion control.*

(xii) Exteriors or buildings present a sense of permanence through the use of authentic materials such as stone, brick, wood, metal or similar products and building material detailing;

- *The concept for the exterior is based on the metaphor and geology of the geode – an exterior of predominantly masonry covering an interior that is "crystalline" through the ample use of transparent glass.*
- *Authentic and regional materials are the basis of the exterior material palette (please refer to the elevations and sample board). These materials include:*
    - *Brick masonry of varying module and coursing in horizontal striations reminiscent of geologic forms,*
    - *Some exposed architectural and site-formed concrete,*
    - *Stone accents of local sandstone/granite,*
    - *High degree of glass curtain wall and storefront at the ground floor, top floor, and the interior, campus-facing elevations providing views to and from the interior spaces,*
    - *Some exposed wood, particularly in exterior building soffits where it can provide a warmth and grain complementary to the masonry and glass but remain relatively protected from the elements,*
    - *Minimal exterior metal treatments are proposed for mechanical screens, articulating reveals and projections, and in other areas to provide visual interest and definition of the massing,*

- *A modern architectural treatment that refrains from stylistic or historical mimicry, or the implementation of "trendy" concepts, materials and details.*

(xiii) Cut and fill are minimized on the site, the design of buildings conforms to the natural contours of the land, and the site design minimizes erosion, slope instability, landslide, mudflow or subsidence, and minimizes the potential threat to property caused by geological hazards;

- *As the site is currently flat and paved south of the ditch, a large amount of cut is required for the below grade parking. The general contractor and our technical specifications will require re-use or diversion of suitable material as appropriate. General drainage from the south toward the ditch will remain as current but will be better controlled and integrated with bank stabilization to mitigate the effects of erosion.*
- *The site north of the ditch indicated for wing C (Phase 2) is designed so that the parking "podium" nestles into the natural contours, which run from a high point along Pearl Street to a low point south long the ditch, approximately 6 feet below the street elevation. Cut in this area to hide parking structures will be treated in a similar manner to Phase 1.*
- *Prior to Phase 2 construction, the site will be seeded and stabilized (after demolition of existing buildings) so that current drainage patterns are largely unaffected and erosion limited. The included Phase 1 site, civil and landscape drawings indicate in detail the proposed treatment of the north site. When construction of Phase 1 begins, it is likely that the site will be required for construction staging. Our technical specifications will require all normal construction measures for control of erosion and sedimentation during this phase, including implementation and maintenance of a complete tree protection plan as required during Technical Documents.*

(xiv) In the urbanizing areas along the Boulder Valley Comprehensive Plan boundaries between Area II and Area III, the building and site design provide for a well-defined urban edge; and

(xv) In the urbanizing areas located on the major streets shown on the map in Appendix A of this title near the Boulder Valley Comprehensive Plan boundaries between Area II and Area III, the buildings and site design establish a sense of entry and arrival to the City by creating a defined urban edge and a transition between rural and urban areas.

- *The site design locates all building frontages on all sides within a few feet of or directly on the required setback. To the east along 30th Street the building massing and location of secondary entrances contribute to a consistent street experience. Alignment of building faces is in close proximity to the east face of 29 North, the residential building to the south.*

- *Along Pearl, a 5 foot setback encroachment along this front lot line is proposed to provide an improved street experience and establish a strong building edge in anticipation of the redevelopment of the Chase site in the future. A building entrance is located facing this street, serving a two-story space intended to provide interest, activity, and a welcoming presence.*
- *The west and south faces front adjacent private properties. The north façade of 29 North and south façade of the campus create a defined streetscape.*
- *To the west the building fronts the entire length of the property line with the exception of a notable gap at the midpoint for access to the multi-use path. As the Target area is developed in the future this building edge would contribute to a complete streetscape experience.*

(G) Solar Siting and Construction: For the purpose of ensuring the maximum potential for utilization of solar energy in the City, all applicants for residential site reviews shall place streets, lots, open spaces, and buildings so as to maximize the potential for the use of solar energy in accordance with the following solar siting criteria:

(i) Placement of Open Space and Streets: Open space areas are located wherever practical to protect buildings from shading by other buildings within the development or from buildings on adjacent properties. Topography and other natural features and constraints may justify deviations from this criterion.

Primary open spaces are located at the center of the site to take advantage of the waterway. Landscape and hardscape within these areas is designed with an understanding of solar exposure and solar shading effects throughout the year. Building setbacks at grade are located and landscaped to provide attractive buffers between the buildings and adjacent streets and properties.

(ii) Lot Layout and Building Siting: Lots are oriented and buildings are sited in a way which maximizes the solar potential of each principal building. Lots are designed to facilitate siting a structure which is unshaded by other nearby structures. Wherever practical, buildings are sited close to the north lot line to increase yard space to the south for better owner control of shading.

The U-shaped form of the wings optimizes and equalizes solar exposure and minimizes shading while providing for the large, flexible office floor plates required by the tenant.

(iii) Building Form: The shapes of buildings are designed to maximize utilization of solar energy. Buildings shall meet the solar access protection and solar siting requirements of section 9-9-17, "Solar Access," B.R.C. 1981.

(iv) Landscaping: The shading effects of proposed landscaping on adjacent buildings are minimized.

The landscape plan has been conceived with regard to solar exposure and shading throughout the year.

(H) Additional Criteria for Poles Above the Permitted Height: No site review application for a pole above the permitted height will be approved unless the approving agency finds all of the following:

(i) The light pole is required for nighttime recreation activities which are compatible with the surrounding neighborhood, light or traffic signal pole is required for safety, or the electrical utility pole is required to serve the needs of the City; and

(ii) The pole is at the minimum height appropriate to accomplish the purposes for which the pole was erected and is designed and constructed so as to minimize light and electromagnetic pollution.

(I) Land Use Intensity Modifications:

A land use intensity modification is not requested by the applicant.

(K) Additional Criteria for Parking Reductions: The off-street parking requirements of section 9-9-6, "Parking Standards," B.R.C. 1981, may be modified as follows:

A parking reduction of 13.6% is requested by the applicant and is in alignment with the TDM plan recommendations.

(i) Process: The city manager may grant a parking reduction not to exceed fifty percent of the required parking. The planning board or city council may grant a reduction exceeding fifty percent.

(ii) Criteria: Upon submission of documentation by the applicant of how the project meets the following criteria, the approving agency may approve proposed modifications to the parking requirements of section 9-9-6, "Parking Standards," B.R.C. 1981 (see tables 9-1, 9-2, 9-3 and 9-4), if it finds that:

a. For residential uses, the probable number of motor vehicles to be owned by occupants of and visitors to dwellings in the project will be adequately accommodated;

b. The parking needs of any nonresidential uses will be adequately accommodated through on-street parking or off-street parking;

c. A mix of residential with either office or retail uses is proposed, and the parking needs of all uses will be accommodated through shared parking;

d. If joint use of common parking areas is proposed, varying time periods of use will accommodate proposed parking needs; and

e. If the number of off-street parking spaces is reduced because of the nature of the occupancy, the applicant provides assurances that the nature of the occupancy will not change.

(L) Additional Criteria for Off-Site Parking: The parking required under section 9-9-6, "Parking Standards," B.R.C. 1981, may be located on a separate lot if the following conditions are met:

(i) The lots are held in common ownership;

(ii) The separate lot is in the same zoning district and located within three hundred feet of the lot that it serves; and

(iii) The property used for off-site parking under this subparagraph continues under common ownership or control.

Section II:

Boulder Valley Regional Center Design Guidelines

Boulder Valley Regional Center Design Guidelines

The proposed office campus concept satisfies all the applicable design standards and guidelines of the BVRCDG. Specific areas of compliance are indicated by keynote on the drawings and illustrations. The following narrative describes how the project meets the broader design intent.

SECTION 3 - ***Site Design***

- *Site Layout: The site and building layout emphasizes the placement of buildings and entries such that they address both the primary street frontages of Pearl and 30th as well as natural features. This includes placing buildings in a manner that emphasizes corners and intersections and reduces parking exposure.*

- *Vehicular Circulation: Vehicular access and circulation is distributed around the perimeter to provide access to and from all major streets, including a potential connection to Walnut Avenue at the southwest corner in the future. The internal drive that enters from Pearl Street provides access to internal spaces, building entrances, visitor parking and facilitates fire access. To avoid undue congestion at the center of the site, tenant traffic/parking entrances are not provided for on this road with the exception of a short span serving the Phase 2 office building and limited visitor surface parking. Service traffic is generally segregated from tenant traffic, enhancing safety and vehicular flow.*

- *Pedestrian and Bicycle Circulation: Both pedestrian and bicycle traffic are accommodated by extensions of the multi-use path through the site. In addition, public sidewalk improvements provide connections to adjacent properties and connect to the internal sidewalk system. This system threads its way through the site, connecting all building entries with usable open spaces.*

- *Bicycle Parking: Secure bicycle parking is proposed in both wings. While no on-site public bicycle facility is proposed, a number of outdoor bike racks are associated with the major open spaces, sidewalks, paths and building entrances.*

- *Automobile Parking: The vast majority of parking will be structured and below-grade. A small amount of visitor surface parking is accommodated along the private entry drive from Pearl Street.*

- *Useable Open Space: A number of usable open spaces are proposed serving as small scale and medium scale gathering places, places for informal relaxation, and circulation. These spaces include a landscaped and tree-lined area north of the waterway, an office common space flanked by the Phase 1 office building wings, a landscaped buffer and multi-use path along the west edge of the site, and a number of*

landscaped setbacks. In addition, occupied private rooftop terraces are proposed at the fourth floor. Total usable open space on grade will greatly exceed 20%.

• Site Landscaping: The site landscape concept supports the open space concept, beginning with an assessment and inventory of the mature trees along the ditch (included in this submittal). Landscape and hardscape concepts have been developed along the lines of creating seasonal interest, reducing water consumption, providing for ease of maintenance, and reflecting Boulder's natural environment.

• Outdoor Furnishings: Outdoor furnishings will reflect the character of the various useable open spaces.

• Art: Public art may be considered through the technical document process.

SECTION 4 - ***Streetscape Design***

• Components by Street Type: The site is flanked by Pearl and 30th, both Type C streets. Streetscape components include a landscaped buffer along the curb with plantings and turf grass and trees no more than 30 feet on center, a sidewalk of at least 12' in width, and landscaped buffers between the sidewalk and buildings. These buffers will be shaped and sculpted by the building fronts and may include variable setbacks as allowed by the Guidelines. In addition, paving at building entrances will be enhanced, providing color, articulation, and visual distinction.

• North Driveway from Pearl: The north-south access drive from Pearl will include a minimum 5' attached walkway on both sides. The access drive landscaping and street components will have a similar feel to those elements on the Type C streets to provide visual consistency.

• Transit Stops: The single bus stop on 30th will be rebuilt to include a shelter with materials that are consistent with and complement the building.

SECTION 5 - ***Building Design***

• Massing: The building massing is reflective of the types of uses and functions accommodated, oriented towards the views to the Flatirons, and accommodates steps in volume along the primary natural amenity (the Slough) and associated open spaces.

Specifically, the office building volumes work together to hold adjacent street edges while defining a central common open space. Building separation allows both light and view to penetrate into this commons. The upper floors of both office phases are set back to create rooftop terraces with mountain and City views. Upper floor setbacks and breaks in the façade along the waterfront and office common space provide these spaces with greater access to sunlight and view as well as scale and visual interest.

- *Façade: The concept for the building facades:*

  i. Provides texture, interest and scale on all sides, but especially those facing public streets and at building entrances.

  ii. Provides contrast between transparency and opacity and reserves the most transparency at the ground floor adjacent to the public walk and outdoor spaces.

  iii. Uses a modern, sophisticated palette that is also familiar and approachable.

  iv. Emphasizes high-quality and durable materials.

  v. Is unique and appropriate to the building and the functions it serves without resorting to stylistic mimicry.

- *Service and Utility: The office buildings have on-grade service and utility areas that are generally segregated from the vehicular and pedestrian circulation, minimizing conflict and mitigating negative views. Service spaces are internal to the buildings and screened from public view.*

SECTION 6 - ***Sign Design***

A comprehensive site sign program for the tenant is proposed on the drawings. The program includes appropriately sized and located building (wall) and monument signs. Please refer to the drawings for additional information. A complete, technical sign plan shall be provided at Technical Documents.

Summary of the Most Important BVRC Design Guidelines

Overall Site Layout

- ☑ Context Plan
- ☑ Buildings close to street, or street corner
- ☑ Parking behind or beside building
- ☑ Preserve/capitalize on views; photographs of views from site and adjacent sidewalks
- ☑ No walls, fences or berms separating abutting properties

Circulation

- ☑ Internal access joins together public streets or adjacent private drives
- ☑ Conceptual vehicular connection shown on BVRC Vehicular Connections Plan considered
- ☑ Direct vehicular links to abutting properties
- ☑ Minimize/reduce number of curb cuts
- ☑ Complete pedestrian network (between parking, building entrances, sidewalk, transit stop, etc.), including path for key route through or along parking lot
- ☑ Pedestrian facility shown on BVRC Pedestrian Connections Plan
- ☑ Direct pedestrian links to abutting properties
- ☑ Bike facility shown on BVRC Bicycle Connections Plan
- ☑ Direct bicycle links to abutting properties
- ☑ Circulation problems shown on BVRC Trouble Spots Map corrected

Parking

- ☑ Two bike parking spaces per ten car spaces
- ☑ Structured parking considered by applicant
- ☑ Large lot (over about 160 spaces) broken into smaller lots and separated by buildings or major landscape areas
- ☑ Parking lot screening along street
- ☑ City interior and perimeter landscaping requirements for parking lots
- ☑ Parking structure wrapped by active uses
- ☑ Parking structure facade articulation
- ☑ Ground-level screening of exposed part of parking structure

Useable Open Space

- ☑ Useable outdoor open space

Landscaping

☑ City site landscaping requirements

Streetscape

☑ Min. 8-foot or 10-foot wide landscape strip, depending on street type

☑ Min. 6-foot, 8-foot or 10-foot wide sidewalk or 12-foot wide multi-use path, depending on street type

☑ Landscape strip: Large street trees 30 feet on center

☑ Landscape setback along parking lot or open space on "C" streets: Large street trees 30 feet on center

☑ Crossroads Mall "block" perimeter streets and west side of 28th Street: Ash trees in landscape strip and Linden trees in landscape setback, 30 feet on center

☑ Internal Through-Street: 6-foot wide sidewalks and pedestrian enhancements

☑ Transit stop: path to building entrance, wheelchair loading area, shelter, bench, trash receptacle

Building Design

☑ Breakdown mass of building
☑ Pedestrian break where needed
☑ Orient building to street, entrance on streetside
☑ Address street corner
☑ Minimize large blank walls
☑ Pedestrian interest along ground level
☑ Inconspicuously located and well-screened service areas
☑ Inconspicuously located and well-screened utility and HVAC equipment

Signs

☑ Sign program if multi-tenant building
☑ One wall sign per storefront
☑ Wall sign located in sign band or designated sign area
☑ Max. sign area, length, and height and max. symbol height
☑ Individual letters, no light cabinets

Section III:
Land Use Review Results and Comments

CITY OF BOULDER
COMMUNITY PLANNING & SUSTAINABILITY

1739 Broadway, Third Floor
P.O. Box 791
Boulder, CO 80306-0791
Phone: 303.441.1880
Fax: 303.441.3241
Web: www.bouldercolorado.gov

LAND USE REVIEW RESULTS AND COMMENTS

DATE OF COMMENTS:	August 8, 2014
CASE MANAGER:	Elaine McLaughlin
PROJECT NAME:	PEARL PLACE
LOCATION:	2930 PEARL ST
COORDINATES:	N04W04
REVIEW TYPE:	Site Review
REVIEW NUMBER:	LUR2014-00035
APPLICANT:	COLLIN KEMBERLIN
DESCRIPTION:	SITE REVIEW for the proposed removal of existing structures and a two-phased redevelopment with three, four-story buildings of Class A office in a campus format with below grade parking. Design includes enhanced building architecture, high quality landscaped open spaces, and provision of the east-west running multi-use path as desired by the connections plan. In addition, the existing waterway bisecting site will be modified and improved. A total of 330,000 gross s.f. in two phases (200,000 square feet in intial phase) with maximum 55' building height and 4-stories requested.

REQUESTED VARIATIONS FROM THE LAND USE REGULATIONS:

Section 9-7, "Form and Bulk Standards," B.R.C. 1981;

- permitted height from 35 feet to 55 feet
- maximum number of stories from three to four.

I. REVIEW FINDINGS

The proposed project provides interesting building form and integration of outdoor spaces to indoor spaces on the interior of the site. Staff acknowledges the applicant for responding to the provision and alignment of the multi-use path. There are several remaining design issues related to the street facing sides of the building that must be addressed. With the recent change in plans to create two separate phases, staff is concerned about the appearance of phase II in the interim.

Comments under "Plan Documents" address this concern. Staff is also concerned about the small parking reduction being proposed and the lack of TDM strategies to reduce the need for parking, as detailed in the access and circulation comments. Then, there are a number of reviewer comments critical to the success of the project that weren't addressed in the July 21, 2014 resubmittal, as detailed herein. These are required elements that must be completed prior to an application being found consistent with the review criteria. A revision is necessary within 60 days to ensure the application remains in an "Active" status. Please refer to the section "Next Steps" at the end of this comment letter for the number of plan sets required. Staff is happy to meet at your convenience to discuss the comments found herein.

II. CITY REQUIREMENTS

This section addresses issues that must be resolved prior to a project decision or items that will be required conditions of a project approval. Requirements are organized by topic area so that each department's comments of a similar topic are grouped together. Each reviewer's comment will be followed by the reviewer's department or agency and

telephone number. Reviewers are asked to submit comments by section and topic area (e.g."City Requirements - Parking" or "City Requirements - Site Design") so that the comments can be more efficiently organized into one document. Topics are listed here alphabetically for reference.

Access/Circulation David Thompson, 303-441-4417

1. The site plans do not include several public improvements which were previously discussed between staff and the applicant that are required to be constructed in conjunction with the site improvements. These improvements include the barrier island for the right-in / right-out access off Pearl Street, the barrier island for the ¾ access for the south access off 30th Street and the northbound left-turn lane on 30th Street for the southern access. In order to keep the project on schedule and identify critical design and traffic operational issues staff is agreeable to working with the design and traffic engineer to review these design elements prior to the next submittal. Please notify the Case manager if there's an interest to forward these design elements for staff's review.

   The public improvements requested are provided. The Pearl Street access is designed to restrict turning movements and includes a right-in / right-out barrier island. The 30th Street access is designed to restrict left turns out of the site and includes a barrier island. The 30th Street restriping and widening is proposed at the 30th Street access to accomodate a left-turn lane. The proposed street geometry and lane striping is provided with this resubmittal package. At each access, the lanes are 12-ft wide inside turning radii of 30-ft to accommodate an SU-30 vehicle. The multi-use path crossings at each access are raised using a "Table-Top" design.

2. Please revise the design of the barrier island for the north access off 30th Street to: (1) provide a minimum width of 30- feet where the island is adjacent to 30th Street; (2) demonstrate the width of the right-in / right-out lanes can accommodate emergency vehicles; and (3) remove the skew in the proposed crosswalk across the north access drive.

   The barrier island for the Chase Bank access from 30th Street is redesigned as requested. The barrier island is lengthened parallel to 30th Street to provide a minimum of 30-ft in length. The access lane width provided are 12-ft wide. The southern "right-out" curb return is designed with a 30-ft magnum inside radii to accommodate an SU-30 vehicle entering the site contra-flow from 30th Street. The widening of the Chase Access will require some modification to the 30th Street bridge approach including removal of railing and raised concrete. The skewed crosswalk remains unchanged and is skewed to accommodate the transition from a detached path to an attached path through the intersection. Bicycle turning movements were analyzed with this design to verify the skew did not adversely affect access to and from the proposed multi-use path proposed across the site.

3. Please have the traffic engineer contact David Thompson to discuss review comments regarding the site's Traffic Study and TDM Plan. The review comments for the traffic study are minor corrections. However, the TDM Plan requires revisions to include the implementation of additional TDM strategies to reduce the parking requirement of the project and in support of a larger parking reduction.

   Fehr & Peers has provided a list of TDM strategies that exceeds the requirements set forth by the City of Boulder. During discussions with City staff, it was determined that the cash-out program and/or paid parking will not be required or recommended since there will be only one tenant and the other TDM strategies meet the goals. Fehr & Peers has updated the TDM report to further define the calculations between TDM trip reduction and parking reduction.

4. In support of the project's TDM Plan, long term bike parking needs to be provided in Wing "C" building to be constructed with Phase 2.

   This has been provided. The plans have been updated to indicate the required number of bike parking stalls in both Phase 1 and Phase 2.

5. Please clarify the discrepancy between the response to comments letter and the landscape plans regarding the area of the concrete pad for the B-Cycle station. The letters states the concrete pad will be 6' x 31' but the landscape plan shows a concrete pad of 6' x 21'.

   The B-Cycle station concrete pad provided is 21' by 6' and exceeds the minimum dimensions required for a 4 based installation providing 7 bike slots. The TDM has been revised to be consistent with the B-Cycle station shown on the landscape plans.

6. On the Preliminary Easement Layout Plan, please revise the plan sheet to show the width of the proposed easements to be dedicated to the City.

   Easement labels are revised to reflect the width of the easements to be dedicated to the City. In some areas of the site, the easement width may vary.

7. Per previous comment, please revise the width of the concrete pad to seven-feet where the bike parking is located perpendicular to a wall as required in technical drawing 2.52.B of the City's Design and Construction Standards.

Easement labels are revised to reflect the width of the easements to be dedicated to the City. In some areas of the site, the easement width may vary.

8. Please revise the preliminary grading plan to: (1) label the street light to be relocated; (2) show the installation of a RTD bus shelter for the 30th Street transit stop as shown in the project TDM Plan and (3) provide a 15'x15' sight triangle for the parking garage exist in order to increase the sight distance between vehicles existing the garage and bicyclists entering the crosswalk.

   The "Preliminary Grading Plan" was revised as requested to provide: a label for both the relocated street light for the transit stop, a custom cantilevered bus shelter is noted per the TDM, and the 15x15 site triangle is added for the parking garage exit.

Building Design Elaine McLaughlin, 303-441-4130

1. The building elevations appear to have not changed substantially from the BDAB review. In the written response with your resubmittal, indicate how each BDAB concern was addressed.

   Substantial changes not required. The BDAB Meeting 2 Minutes and written responses are indicated in the third round site submittal packet.

2. Both Staff and BDAB articulated concerns about the Phase II building along Pearl Street not meeting the BVRC Design Guidelines. Refer to the staff analysis of consistency with the guidelines provided as Attachment A.

   Following further review with City Staff, the Design Team met with BDAB for an additional review of design development and revisions on the 10th September 2014. The Design Team minutes of this meeting and written responses to BDAB's comments are included in the third round site submittal packet.

   The BVRC Guidelines have been outlined in a checklist in the third round site submittal packet. In addition individual BVRC points are indicated throughout the drawing set.

3. Note that neither of the street facing elevations along 30th and Pearl streets currently meet the BVRC Design Guidelines. Page 6 of the guidelines articulates the vision for the BVRC being more pedestrian oriented,

   The design of the building facades facing 30th Street and Pearl Street have been revised to improve the pedestrian experience and create a more pedestrian-oriented experience along these primary frontages. The elevation drawings, sections and perspective renderings best illustrate these changes. Specifically:

   - *Pearl Street - Incorporation of a two-story glazed volume fronting Pearl Street articulated by mullions, street-front entries and a building canopy. This design revision provides much greater transparency into interior spaces, breaks up and eliminates large expanses of blank wall, and allows this important corner at the entrance of the campus to better address the streetfront. As the rendering of this corner indicates this two-story space is intended to become a special part of the tenant program enjoying direct access to Pearl Street through a new, articulated building entrances and glazed walls level with the sidewalk. Complementing and completing this composition is the system of building and site signage and landscape treatments delineated in the plan drawings.*
   - *30th Street - Development and articulation of the ground floor facade fronting the north half of the 30th Street frontage. Design revisions include the "grounding" of a portion of the floating volume adjacent to*

the recessed entrance to provide for a monumental entry sign an "art wall," and the bringing of a portion of the glass out to meet the street thereby reducing the extent of the concrete column colonnade. As the renderings indicate additional texture and patterning of the glass and masonry complement the new composition. A high degree of transparency is retained affording glimpses of the interior campus commons from the 30th Street sidewalk.

The BVRC should become a place where people want to stroll and linger, not just do their errands and drive away. To achieve this, development must be less dominated by the automobile; it should be human-scale and offer ample pedestrian interest.

Page 7 of the guidelines articulates the vision for 30th Street, currently redeveloping along the corridor:

A lively, more urban streetscape should be developed along 30th Street through the BVRC, to both accommodate and stimulate pedestrian activity.

Page 9 of the guidelines state,

Pearl Street will be a key link between the BVRC and Downtown, and should be strengthened through streetscape and pedestrian-oriented development.

Specific guidelines also state:

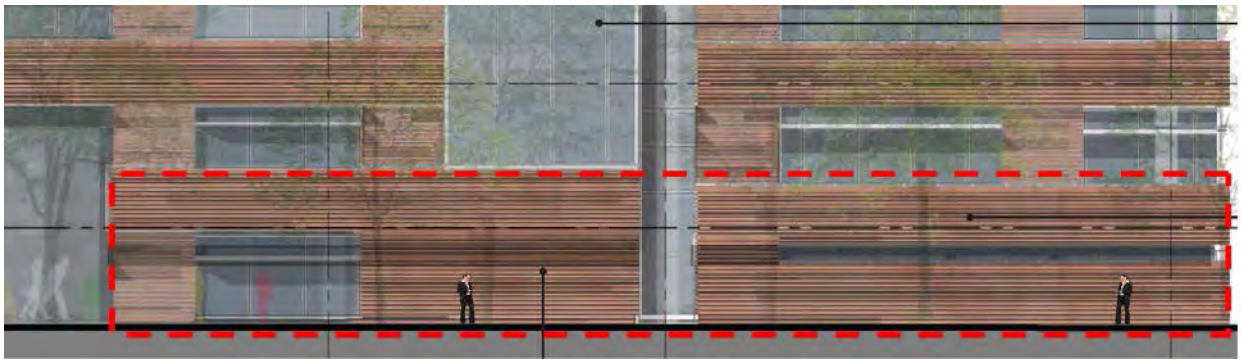
- *3.1.B. Locate buildings close to the street:*
- *5.2.D. Avoid large blank walls;*
- *5.2.E. Provide pedestrian interest on the ground level: The ground level of the building must offer pedestrian interest along sidewalks and paths. This includes windows, entrances, and architectural details. Storefront windows should be transparent.*

As shown below, the street elevation for Pearl Street, especially within the critical first floor has 100 linear feet with just one street level window. This elevation must be revised to illustrate window openings on the ground level. Illustrate this elevation with a perspective sketch as well.

The Pearl Street elevation has been redesigned to fully comply with all BVRC guidelines. A double height space has been extended across the full width of the north façade, and the ground floor has been raised by 4' to provide street level glazed frontage in all locations. A two story glazed volume at the entrance to the campus provides increased transparency and enlivens the streetscape by exposing interior activity. A masonry skin is maintained over the western volume with low level and clerestory glazing to the double height space within. The glazed joint between the primary volumes has been widened and articulated with a canopy to provide a clear and welcoming entry.

A rendered view of this façade has been included within this submission.

July 21, 2014 site Submittal

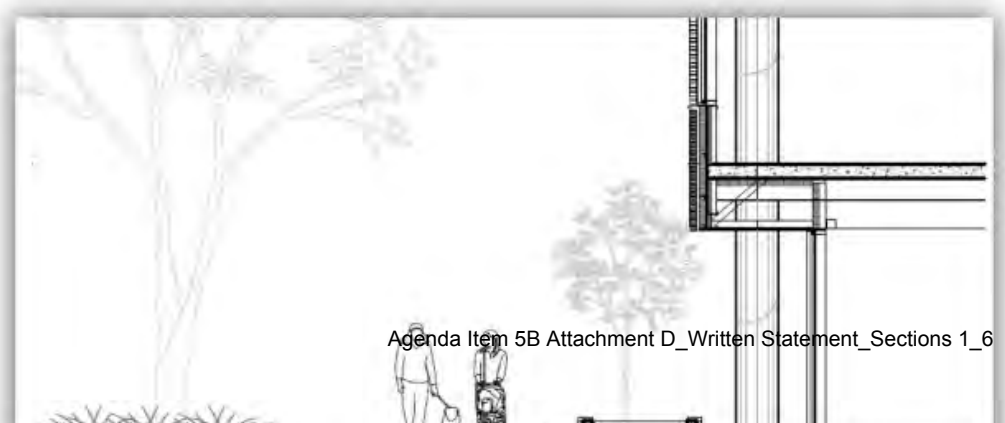


September 15, 2014 site Submittal

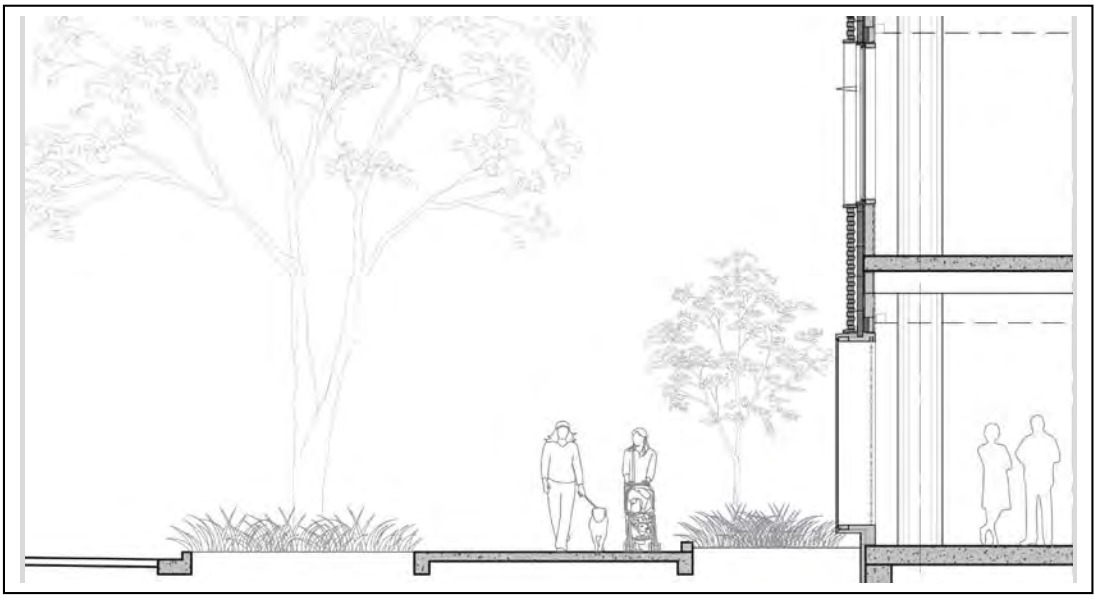
4. The north portion of the 30th street frontage, while providing windows, is partially detached from the pedestrian. The north portion of the first floor is inset into the building, with a raised planter in the landscape setback, and with large columns planned. With this configuration, the pedestrian is not only removed from the street wall, there is little in the way of detailing or pedestrian interest with the concrete columns and building setback of 20 feet. Staff notes that two-foot diameter concrete columns spaced at 30 feet create a cold and stark pedestrian environment both in material, scale and rhythm. While the by-right standard setback in this location is 20-feet, the expectation from the BVRC design guidelines is that the building will be located close to the street and a setback modification is acceptable through Site Review in this context.

As described above, the section addressing 30th Street has been revised such that a substantial portion of the ground floor has been brought forward to meet the street. In addition, the planter element has been removed entirely, eliminating barriers between the sidewalk and building face. A portion of the volume still "floats" at the corner adjacent to the newly landscaped ditch, provides special tenant areas sheltered by the building mass and enjoys direct views into the creek and stands of mature trees.

July 21, 2014 site Submittal

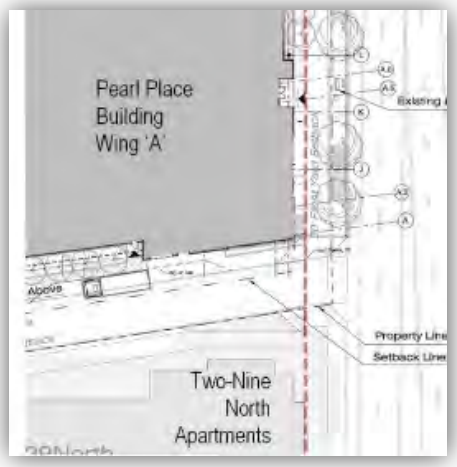


September 15, 2014 site Submittal

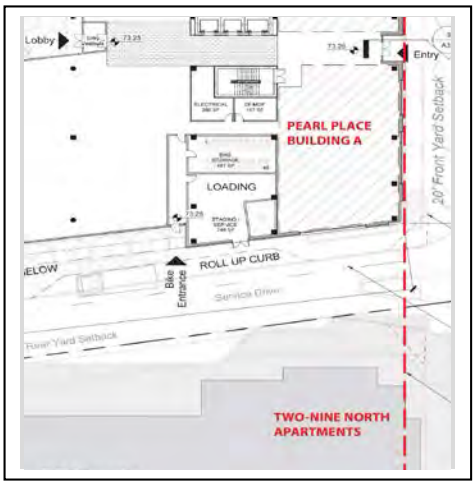


5. As shown to the right, the Two-Nine North Apartments to the south of the site are moved closer to the property line. The proposed buildings should at least be similar in proximity, or provide detailed information on how the project addresses the pedestrian experience along 30th Street.

The building edge adjacent to 29 North is in proximity to the second step in the corner volume (nor the first). This second step represents the taller set of volumes at the corner of this building and is of a more appropriate scale when considering the volume of the office. We believe this alignment better creates the sense of a "gateway" intended by the comment.



July 21, site



2014 Submittal

September 15, 2014 site Submittal

6. Staff concurs with the discussion that BDAB had with the applicant about how their current facades were designed to be driven by, like facades in an office park, and that the facades were detailed and proportioned accordingly, and not for pedestrian interest. In the discussion, BDAB conveyed the changing nature of 30th Street, and the applicant seemed to understand that with 30th Street ultimately slowing down and becoming more urban and pedestrian in nature, that there was openness to adjusting the street facing facades to respond to the pace and focus of pedestrians. The current elevations don't appear to address BDAB's comments in this regard. See comparison of the July 9th submittal to BDAB and the July 21 resubmittal below.

6 and 7: It is important to note that there is a difference of opinion regarding the ultimate desired character of the BVRC compared to other activity centers such as downtown and University Hill. While both the design standard and BDAB comments reference these areas for inspiration they are also quick to note that the BVRC must develop a character that is different from those centers and uniquely responsive to its own conditions. Taking into consideration the full intent of the document and variety of BDAB opinions we have incorporated design revisions to window articulation and the ground floor to better represent the pedestrian scale and balance that scale with the continued development of the area with regard to all modes of transportation. We strongly believe that both senses of scale can be represented together and do not have to be considered in opposition. Specific design revisions include:

- *Bringing significant portions of the floating volume to the 30th Street frontage with changes in material and articulation. This includes an articulated masonry wall adjacent to the building entrance intended to "ground" the composition as well as an articulated ground floor glass volume directly fronting the street. A portion of the floating volume remains, but with the removal of the linear planter these become partially sheltered outdoor "rooms" enjoying views to the landscape around the waterway and without physical or visual barriers to the street.*

- *The front entrance along 30th Street is articulated by a building canopy and building and wall signage, adding color, texture and interest.*
- *Window proportions above the ground floor are predominantly horizontal, but we have added vertical metal fin articulation and vertical jointing in the masonry to balance the vertical and horizontal rhythms, providing additional levels of texture and detail, and highlighting certain individual window units with a decidedly vertical proportion.*
- *The glass and metal window bays have also been strengthened compositionally. These elements help to focus and frame activities within the building, providing a direct visual connection between building uses and pedestrians at street level.*
- *The wall surfaces are completed with a textured brick coursing shown in greater detail in the drawing and sections.*

Following further review with City Staff, the Design Team met with BDAB for an additional review of design development and revisions on the 10th September 2014. The Design Team minutes of this meeting and written responses to BDAB's comments are included in the third round site submittal packet.

BDAB submittal July 9, 2014 (30th Elevation)

July 21, 2014 site Submittal (30th Elevation)

September 15, 2014 site Submittal

7. BDAB discussed of the large scale proportions of the window openings which are shown to be horizontally proportioned, and scaled for fast car traffic. It was suggested that the large openings might be more vertically proportioned, and scaled for the slower pace and pedestrian orientation. This would also strengthen the (abstract) association of these street facades with the traditional masonry proportions seen at CU and on western Pearl Street, both mentioned as relevant context by the applicant. The applicant should consider these recommendations and respond to how the proposed building addresses the guidelines specifically. Refer to Attachment A for the guidelines.

   See item 6.

8. Provide a typical of the brick layup pattern proposed. Because of the small scale of the elevations, there is no clear identification of the type of brick pattern proposed.

   An enlarged brick layup pattern has been illustrated within the drawing set.

9. Please provide a materials sample board. The expectation is to have the materials mounted on a board and keyed to the elevations for the Planning Board review.

   A materials sample board has been provided.

10. As was noted in the previous review, please illustrate the low point from which the building height is measured on both the ground floor plan and the grading plan.

    The site contours, site low point & height are indicated on the arch site plans and elevations.

Engineering, Jessica Stevens, 303-441-3121

1. The applicant has revised the proposal to include three levels of underground parking directly adjacent to a major drainageway and irrigation ditches. A soils report indicating the site groundwater conditions must be submitted for review. The applicant will be required to address any potential groundwater issues related to the underground parking structures prior to Site Review approval.

   Please refer to the report provided by Pickering,Cole and Hivner dated 9/2/14 in the appendices.

2. As previously indicated historic occurrences of low level concentrations of contaminants have been known to occur within the groundwater in the vicinity of the project site. Due to the proposed below grade construction and potential necessity to discharge groundwater to the City's stormsewer system, the applicant must obtain groundwater quality samples for review by the City of Boulder Water Quality Office prior to Site Review approval. The applicant is advised to contact the City of Boulder Storm Water Quality Office at 303-413-7350 regarding permit requirements.

   Please refer to the report provided by Pickering,Cole and Hivner dated 6/30/2014 in the appendices.

3. The proposed drainageway modifications appear to require construction within the property to the west. The applicant will be required to obtain consent from the adjacent property owner prior to Site Review approval.

   The applicant has been in negotiations with the adjacent owner to the west and will obtain consent from the adjacent property owner prior to site review approval.

4. The application will be required to provide written approval from the Boulder and Left Hand Ditch and North Boulder Farmers Ditch prior to Site Review approval.

   We received comments on the design from Deere & Ault on 8/21/14 (see attached). We have engaged the respective ditch companies attorney in order to draft an agreement as suggested in the letter. We are currently in the process of addressing the remaining comments and providing the materials requested. We will provide these materials to the Ditch companies during the Technical Document phase.

5. Portions of the proposed 66 inch and 60 inch culverts on the 2800 Pearl Street property are located outside of the existing storm drainage easement. Additional easement will be required to allow for the proposed construction.

   The additional easement was added and noted on the plans.

6. A portion of the proposed permeable pavement area is located within the approximately 75' x 22' portion of land located between Parcel I and Parcel VI on the ALTA/ACSM Land Title Survey which has been labeled as unplatted,. The ownership of this parcel remains unclear. The Applicant must demonstrate that all of the proposed water quality facilities are located within the owner's property.

   All water quality facilities are on the Owner's property, please refer to the drawings submitted.

7. The survey documents which have provided within the submittal have been labeled "Draft" and have not been signed. Please provide updated survey documents that have been stamped and signed by the Professional Licensed Surveyor responsible for preparation upon resubmittal.

   Updated survey sheets have been stamped and signed.

Flood Control, Jessica Stevens, 303-441-3121

The floodplain modeling data which has been provided only appears to include cross sections through 3662. The floodplain workmap that has been attached to the Preliminary Storm Water and Flood Mitigation Report shows that areas above cross section 3827 are included in the project scope. The upstream area of impact does not appear to have been included.

Modeling data for the entire area of impact will be required at the time of Floodplain Development Permit review.

The proposed piped sections upstream of the project are not included in the flood modeling data because the projected flood flows do not exceed the capacity of the existing and proposed pipe segments. The City's new model of the Boulder Slough floodplain was developed in a similar manner and the flood modelling is truncated at the downstream end of the existing pipes.

Fees, Elaine McLaughlin 303-441-4130

Please note that 2014 development review fees include a $131 hourly rate for reviewer services following the initial city response (these written comments). Please see the P&DS Questions and Answers brochure for more information about the hourly billing system.

Landscaping Elizabeth Lokocz, 303-441-3138

Please address the following remaining comments at the next submittal. Contact staff with any questions or concerns.

1. The extent of the below grade parking structure remains of concern. Please clearly label the extent of the garage and verify that graphically it is illustrated to the outside of all structural elements (secant walls, etc.). Coordinate the sections included in the landscape plans (sheet L3.0), in particular section C-C which is adjacent to existing trees marked for preservation, and the architectural plans (sheet A1.5) illustrating the garage. The group of existing trees just north of Building A appear to be in conflict. Based on the potential impact, the largest tree may become a hazard due to excavation.

   The extent of the below grade parking garage foundation wall and perimeter slurry wall, is indicated on civil and architectural site plans and in section on landscape drawings.

2. Similarly, the parking structure that expanded on the east side of Building (Wing) 'A' to add tandem parking spaces now extends into the Landscape setback along 30th Street and may encroach into the drip line of the proposed street trees as they mature. Refer to "Parking" comments below. Staff recommends moving the limit of the below grade parking out of the drip line limits of a mature street tree and/or demonstrating how a vault could be provided on that side of the parking structure to accommodate expanding tree roots over time.

   The parking garage on the east side has been pulled back to align with the building edge - resulting in no impact to the proposed street trees along 30th Street.

3. Please number the trees to be preserved according to the inventory on sheet L1.0 and add a table on sheet L5.0 with the inventory data. Consider adding comments and replacement columns to address potential construction impacts. Additional protection planning will be needed at the Technical Document review.

   Trees to be preserved are numbered and a table from the tree inventory has been added to sheet L5.0. Additional information about tree protection will be provided at Tech Docs.

Legal Documents Julia Chase, City Attorney's Office, 303- 441-3020

1. The Applicant will be required to sign a Development Agreement if the project is approved. When staff requests, the Applicant will be required to provide staff with the following:

   a. An updated title commitment current within 30 days; and

   b. Proof of authorization to sign on behalf of the owner.

   The applicant will sign a development agreement as the project is approved.

2. Vested Rights – The Applicant has submitted a Vested Rights form which references 2 phases, but needs to be specific about the length of time for each phase. The Applicant should resubmit the vested rights form and specify the elements of the plan in which the applicant seeks to create vested rights, including, without limitation, type of use, density, building height, building footprint location and architecture, and specifics on the phases requested.

   The vested rights form is being resubmitted and provides more information.

3. Subdivision - Prior to a building permit application, the Applicant shall submit applications for both a Preliminary and Final Plat which provide for the elimination of the interior lot lines, subject to the review and approval of the City Manager and execute a subdivision agreement meeting the requirements of chapter 9-12, "Subdivision," B.R.C., 1981 unless an equivalent arrangement is approved by the city manager.

   This will be completed prior to a building permit application.

4. Elevated Walkway (Phase 2) – In Phase 2, the Applicant has proposed an elevated walkway connecting the Phase I – Wing B structure with the Phase 2 – Wing C structure. Prior to a building permit application for Phase 2, the Applicant will be required to obtain an air rights lease from the City for said elevated walkway (see draft condition #6 below).

   The applicant will obtain an air rights lease for the elevated walkway prior to a building permit application.

5. Upon resubmittal, the Applicant must provide details regarding how it will be able to demonstrate that all of the proposed use is located on its own property. There is a portion of land owned by JP Morgan Chase Bank (2950 Pearl) which is approximately 75' x 22' that is located between Parcel I and Parcel VI on the ALTA/ACSM Land Title Survey. Will the Applicant be purchasing this portion of land? If so, it should be included in the subdivision referenced in Paragraph 3 above.

   The applicant has been in negotiations with Chase Bank and will submit proof of ownership prior to a building permit application.

Parking Elaine McLaughlin, 303-441-4130

1. The previous review comments echoed the strong recommendation by the Planning Board that the project reduce parking spaces given the proximity to mix of uses, major bus routes, the regional bus transit facility, multi use paths, etc. The applicant indicated in the response to comments that the project is providing 716 parking spaces where 825 spaces are per code which results in an approximately 13 percent parking reduction. Note however, that sheet A1.5 must be revised to remove

the tandem parking spaces from the overall tally as tandem spaces are not considered per city standard and, therefore, don't count. While the provision of tandem spaces can be included in the analysis for a parking reduction, they can't be included in the number of parking spaces provided per city standards. Therefore, revise the parking table tally to exclude the tandem spaces from the total, and provide a note regarding the parking reduction that tandem spaces of up to 'x' will be provided.

The tandem spaces have been removed from the parking table.

2. The proposal to utilize tandem spaces within the parking structure may be perceived as beneficial in supporting the parking needs of the tenant. However, staff highly recommends reducing the tandem spaces to, in-turn reduce the number of single occupancy vehicle (SOV) trips to- and from- the site. The applicant indicated that, "*reduction much beyond the current design will lead to an overflow scenario that could result in employees parking in adjacent lots which we do not support*." However, staff and the Planning Board both have commented on reducing parking to reduce SOV trips to the site by encouraging transit use.

   The recommended TDM strategies will reduce the number of SOV trips. Removing the tandem spaces will not significantly reduce SOV trips.

3. Note in Landscape comment #2 above, that the parking garage is shown to extend well into the landscape setback along 30th Street, primarily to accommodate a new row of tandem parking spaces. However, staff is concerned that this new row of parking spaces extending into this area could affect the growth opportunities for the street trees as it encroaches into the drip line of a mature tree. The applicant should remove the parking structure from within the landscape setback and eliminate that row of tandem parking spaces.

   The row of tandem spaces that were within the 30th street landscape setback have been removed.

4. As noted previously, on sheet A1.2, Parking Plan, in the parking table please revise the table to read as follows (including eliminating the tandem spaces from the tally):

	Required per Land Use Code Section 9-9-6, B.R.C. 1981		**Proposed**	
	Compact	**Standard**	**Compact**	**Standard**
Phase 1				
Phase 2				
Total				

The parking table has been updated to match the City requested table.

5. The calculation of required parking must be based on Net Floor Area rather than Gross Floor Area. The intent is to not over-calculate parking required when gross floor area includes non-habitable spaces such as mechanical rooms. Reassess the required parking based on an assumed net floor area.

The Floor Area has been recalculated per the Boulder Revised Code chapter 9-16 definition of "floor area" and new sheets have been included to indicate the extents of the calculated area.

Plan Documents Elaine McLaughlin, 303-441-4130

1. Provide plans for Phase I that shows intended Phase I use for the northern portion of the site. Note that in conversations with the applicant, there is interest in creating surface parking lot for the northern side of the site for Phase I. However, staff does not support a surface parking lot for Phase I. Because there is concern about the timing of implementation of Phase II, staff notes that the parking lot wouldn't meet the guidelines or the Site Review criteria. Staff recommends either retaining the existing buildings on the northern portion of the site until such time as Phase II is implemented or (potentially) seeding the northern portion of the site for Phase I if buildings are demolished. However, currently, there are no clearly detailed plans for Phase I for the northern portion of the site. Both staff and the Planning Board will want to understand what the appearance is of this portion of the site in the interim.

   A Phase 1 Preliminary Grading Plan is added to the submittal set to show the conditions of the Phase 2 portion of the project during Phase 1. The existing site improvements with the Phase 2 limits will be demolished with the exception of the multi-use path adjacent to Pearl Street. The Phase 2 area will be overlot graded and seeded for site stabilization.

2. Remove the text from the title block that states, "Not for Construction Progress Set Only" and instead replace with the Site Review Case No. LUR2014-00035 in smaller font text.

   This has been changed on the sheets.

3. Correct the scale on all of the floor plan drawings they do not scale to 1'=3/32" as they are labeled.

   The drawings are scaled at 1'-0" = 1/32".

4. Correct the labels on all of the floor plan drawings, some are too small to be legible, and when reduced to a half sized set (that the Planning Board will receive) the text will not be legible.

   The labels have been updated on the sheets.

5. Within the plan set, some of the plan sets label the separate "wings" of the building as separate buildings for example, as "Building A" while other plans would label the same area as "Wing A." For clarity, please correct the references to be consistent throughout the plan set.

   The labels have been corrected on the sheets.

6. Provide a roof plan that illustrates the proposed location of the mechanical equipment.

   The team has created a new roofplan sheet to illustrate the mechanical equipment.

7. The perspective sketch shown on sheet A2.1 appears to be slightly inaccurate as shown below. Reference the example of a nearby photo in approximately the same perspective angle from the Two-Nine North Apartments shown in the lower image to compare another perspective from a similar vantage point. The applicant should consider a closer vantage point perspective to illustrate the building in greater detail.

The background in the perspective has been modified and montaged onto a photograph taken from the site at eye level.

July 21, 2014 site Submittal

September 15, 2014 site Submittal

July 21, 2014 site Submittal

Perspective sketch provided needs to be adjusted. This is evident in a comparison to an actual photo of the adjacent property from similar angle.

Note, that the perspective should be closer to the building without a foreground. If showing any of the railing, it must be the actual railing that exists on site.

September 15, 2014 site Submittal

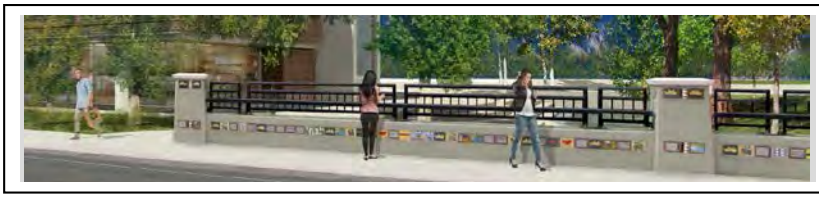
8. Also regarding the perspective, illustrate existing ornamental bridge header and railing.

The ornamental bridge header and railing have been added.

July 21, 2014 site Submittal

the

September 15, 2014 site Submittal



9. The Site Review criterion **(xi)** states,

   Buildings minimize or mitigate energy use; support on-site renewable energy generation and/or energy management systems; construction wastes are minimized; the project mitigates urban heat island effects; and the project reasonably mitigates or minimizes water use and impacts on water quality.

   As requested in the previous review, please provide as definitive information as possible on how the applicant intends to address the energy efficiency standard of IECC 2012 plus 30 percent, which is the adopted standard for the City of Boulder. The specific criterion above requires, among other things, that the building will "*support on-site renewable energy generation and/or energy management systems*." This information is required to be provided at Site Review, to the greatest extent possible, for staff to make a finding of consistency with the Site Review criterion above and to inform the Planning Board of the intended approach.

   The design team has generated a preliminary energy model based on the Schematic Design drawings and narratives in an effort to define required strategies to meet the City of Boulder requirement for IECC 2012 plus 30 percent. The following list includes measures required to exceed the 30 percent threshold:

   1. *R-16 Exterior Walls (minimum)*
   2. *R-31 Roof (minimum)*
   3. *R-26 Exposed Floors (including separation between parking garage and tempered plenum)*
   4. *0.36 SHGC or lower glazing*
   5. *Glazing assembly U-value of 0.4 (maximum) including frame effects*
   6. *2' shading devices as indicated in schematic design drawings*
   7. *40% lighting power density reduction in all areas (including 0.588 W/SF in Office Areas)*
   8. *20% exterior lighting power reduction*
   9. *Fan coil unit HVAC system with direct outside air system and EC motors on all fan coil units*
   10. *11.5 EER evaporative condensing chillers (minimum)*
   11. *Condensing boilers*
   12. *12.8 EER packaged rooftop units serving tech talk, fitness, and cafeteria areas (minimum)*
   13. *RTU static pressure limits of 5.25" TSP for supply and 1.8 TSP for return*
   14. *0.13 W/SF parking garage lighting*
   15. *Variable speed parking garage supply and exhaust fans with CO monitoring and control system*
   16. *175 kW solar photovoltaic array on the roof*

   With the measures above, the project is targeting 31% energy cost savings above the ASHRAE 90.1-2010 Appendix G Baseline. ASHRAE 90.1-2010 is referenced within IECC 2012 and is listed in the City of Boulder Building Code amendments (section C401.1) as the required baseline for showing 30% improvement. The building will require on-site renewable energy in order to meet the energy efficiency requirements, and the design team is currently pursuing the use of a solar photovoltaic array on the roof for on-site electricity generation. The building will also include a building management system (BMS) which will perform all energy management functions.

10. The applicant did not provide a written response to how the revised building design addressed BDAB comments.

    Following further review with City Staff, the Design Team met with BDAB for an additional review of design development and revisions on the 10th September 2014. The Design Team minutes of this meeting and written responses to BDAB's comments are included in the third round site submittal packet.

Review Process Elaine McLaughlin, 303-441-4130

While staff understands the applicant's concern about project timeline and schedule and the desire for a "clean up" review at this time, as stated in an 8-6-2014 email there are substantive changes, revisions, and clarifications required on the 1st revision plans dated 7-21-2014 that will necessitate a review of revisions through a three-week review track.

Therefore, upon resubmittal of the revisions and a finding that the project meets the review criteria, the application will be scheduled with a review before the Planning Board. Once the Planning Board hears the application, they may request additional changes or they may approve the application. The applicant should be aware that the Site Review process moves as efficiently as possible in a three-week review track and that completeness and responsiveness to reviewer comments for resubmittals is the best way to ensure an efficient process.

Note that once the Planning Board has reviewed the application and made a decision for approval or denial, the Planning Board is subject to a 30 day call-up by the City Council. If City Council chooses to hear the application, the hearing will then be scheduled within 60 days of the call-up.

Following conclusion of the Site Review process, including the signing of the development agreement between the city and the property owners, the project will be required to apply for Technical Document Review on the three-week review track; prior to building permit application.

Utilities, Jessica Stevens, 303-441-3121

1. The water main extension connection within 30th Street requires two bends and the dedication of an additional utility easement. The applicant should consider a modified alignment which reduces the number of bends within the extension and the need for additional easement.

   The water main extension from 30th Street was realigned to eliminate the bends and is shown connected to the City's existing 8" main that parallels the transmission main in 30th Street. An additional easement is no longer required.

2. The repurposed irrigation meter along Pearl Street must be located within the right-of-way or a public utility easement. Please revise the Preliminary Utility Plan, Sheet C2.0 to show that the meter location will meet City of Boulder standards.

   The irrigation meter along Pearl Street will be removed because it is conflict with the realigned multi-use path. An existing 3/4" water meter south of the Chase Bank 30th Street access will be repurposed. A public utility easement will be provided for this repurposed meter.

3. Please include the output data from the EPANET model within the report. Staff has been unable to access the velocity data within the EPANET model as provided.

   The output data for the EPANET model is included within the report rather than on the CD insert. New report copies are provided for ease of reference.

4. The new telephone riser and relocated TE appear to be located on the adjacent property, outside of an easement. A utility easement will be required.

   The telephone riser is located on the Pearl Place property but is not currently within a dedicated utility easement. The telephone riser will be relocated east away from the multi-use path and out of conflict with

the proposed water line. The relocated telephone riser will either be within the existing right-of-way or will be within the proposed 25-ft utility easement that parallels the south property line. Final location of the telephone riser or vault will be determined prior to TEC Doc review.

5. The alignment of the existing 8 inch water main in 30th Street is inconsistent with City records. Please verify the location of the water main and revised the Preliminary Utility Plan, Sheet C2.0 as necessary.

   We are currently engaged in exploring the location and types of utilities that run along 30th St. We will document the location of all utilities and if the City requires that this 8" water main be demolished back to the meter at the South we will make that adjustment during construction.

6. Trees proposed to be planted within the right-of-way shall be located at least 10 feet from existing or proposed utilities in accordance with Section 4.04(5) of the DCS. The proposed trees along 30th Street conflict with the existing 8 inch water main location.

   We will locate planted trees at 10' from utilities. Please refer to plans.

I. INFORMATIONAL COMMENTS

This section addresses issues that are for the applicant's reference but are not required to be resolved prior to a project decision or as a condition of approval. Informational Comments are organized by topic area so that each department's comments of a similar topic are grouped together. Each reviewer's comment will be followed by the reviewer's department or agency and telephone number. Reviewers are asked to submit comments by section and topic area (e.g."Informational Comments - Fees" or "Informational Comments - Utilities") so that the comments can be more efficiently organized into one document. Topics are listed here alphabetically for reference.

Drainage, Jessica Stevens, 303-441-3121

1. As indicated within the Preliminary Storm Water and Flood Mitigation Report modifications have been proposed to the recently construction 30th Street underpass project. The applicant should coordinate the proposed design with City of Boulder improvements in this area. The project manager for the modification project, Rod Rindal may be contacted at 303-441-3265.

   The applicants civil engineer will contact the City to coordinate the Proposed improvements to the Boulder Slough channel prior to preparing final construction documents.

2. Prior to Technical Document Review, staff recommends that the applicant review the potential to direct the runoff the multi-use path area to the west of the Phase I structure to provide water quality treatment and avoid impacts to adjacent properties.

   The applicant will review this prior to Technical Documents.

3. At the time of Technical Document Review the Final Storm Water Report should include separate drainage basins or sub-basins to establish the tributary areas for the proposed water quality facilities.

   The applicant will coordinate this at the time of Technical Documents.

Engineering, Jessica Stevens, 303-441-3121

1. Dedication of additional easement for the Boulder and Left Hand Ditch, North Boulder Farmers Ditch and the Boulder Slough will be required prior to Technical Document Review approval in accordance with Section 11-5-6 of the *Boulder Revised Code, 1981 (BRC).*

   We received comments on the design from Deere & Ault on 8/21/14 (see letter attached in appendices). We have engaged the respective ditch companies attorney in order to draft an agreement as suggested in the letter. We are currently in the process of addressing the remaining comments and providing the materials requested. We will provide these materials to the Ditch companies during the Technical Document phase.

2. The applicant has proposed construction of an office bridge between the Phase 1 and Phase II structures within the existing and future Boulder Slough Easement. Section 9-9-10(b) of the *BRC* prohibits the construction of a structure within a public easement without written consent of the easement owner. The construction of a bridge connection may be considered based upon the following minimum criteria;

   - No portion of the structure impacts the City's ability to maintain the Boulder Slough

     The proposed building at grade and below grade is set back away from the Boulder Slough. The proposed structures will not obstruct the City's access to the channel and will not adversely impact the City's ability to maintain the Boulder Slough.

   - The North Boulder Farmer's Ditch and the Boulder and Lefthand Ditch company provide written consent for the location of a structure within the easement

     We received comments on the design from Deere & Ault on 8/21/14 (see letter attached in appendices). We have engaged the respective ditch companies attorney in order to draft an agreement as suggested in the letter. We are currently in the process of addressing the remaining comments and providing the materials requested. We will provide these materials to the Ditch companies during the Technical Document phase.

   - The Boulder Slough easement must be dedicated in accordance with Legal Documents comment #4.

     Please see Legal comment #4 for the response related to easements.

3. The applicant is responsible for obtaining approvals for any relocations or modifications to irrigation ditches or laterals from the impacted ditch companies. This includes the crossing of any irrigation ditch or lateral for vehicular or utility purposes and the release of stormwater runoff into any ditch or lateral. The applicant is advised that revisions to any approved City plans necessary to address ditch company requirements may require reapplication for City review and approval at the applicant's expense.

   We received comments on the design from Deere & Ault on 8/21/14 (see letter attached in appendices). We have engaged the respective ditch companies attorney in order to draft an agreement as suggested in the letter. We are currently in the process of addressing the remaining comments and providing the materials requested. We will provide these materials to the Ditch companies during the Technical Document phase. In addition, the ***applicant understands that ditch company requirements may require reapplication.***

4. Discharge of groundwater to the public storm sewer system is anticipated to accommodate construction and operation of the proposed development. City and/or State permits will be required for this discharge. The applicant is advised to contact the City of Boulder Storm Water Quality Office at 303-413-7350 regarding permit requirements. All applicable permits must be in place prior to building permit application. Additionally, special design considerations for the properties to handle groundwater discharge as part of the development may be necessary.

   The applicant will begin coordination with The City of Boulder Stormwater Quality Office. The Applicant has already begun design for groundwater discharge and has been in coordination with engineering staff regarding proposed design and engineering.

5. In accordance with Section 9-9-10 of the *BRC*, no portion of the proposed monument sign along Pearl Street may encroach into the sidewalk easement.

   Monument signs have been moved within the sidewalk easements.

6. Any portion of the monument sign which is above grade must be located a minimum of eighteen inches behind the sidewalk, in accordance with Section 9-9-15(b)(3) of the *BRC*.

   Monument signs have been moved 18" within the sidewalk easements.

7. The applicant should discuss and confirm the proposed locations of cabinets, transformers and other necessary above ground appurtenances with Xcel Energy, Comcast and Century Link as soon as possible to avoid potential design conflicts due to the underground garage.

   The applicant has begun discussions with power and low voltage carriers to coordinate underground utilities.

Flood Control, Jessica Stevens, 303-441-3121

1. The applicant has proposed to channelize the Boulder Slough, within an open drainageway. The resulting floodplain will be contained within the channel. The structures will be located outside of the floodplain. However, the third and fourth story bridge element connecting the buildings will cross above the floodplain. The bridge element will be considered to be located within the floodplain. If the structures are to be located outside of the floodplain, the applicant will be required to demonstrate that no portion of buildings including the underground parking structure is located within the floodplain boundary. The applicant will also be required to demonstrate that the building construction sites are not hydrologically connected to the Boulder Slough floodplain.

   The proposed piped sections upstream of the project are not included in the flood modeling data because the projected flood flows do not exceed the capacity of the existing and proposed pipe segments. The City's new model of the Boulder Slough floodplain was developed in a similar manner and the flood modelling is truncated at the downstream end of the existing pipes.

2. If the proposed non-residential buildings are to be located within the floodplain, the structures must be floodproofed or elevated at least two feet above the projected 100-year flood event *flood protection elevation (FPE).* New parking areas will need to be in compliance with section 9-3-3(a)(8), *Boulder Revised Code, 1981 (BRC)* which states that no person shall establish an area for automobile parking in any portion of the floodplain where flood depths exceed eighteen inches.

3. The Site Review proposes revisions to the mapped 100-year floodplain. The applicant will be required to receive approval of a Conditional Letter of Map Revision through the *Federal Emergency Management Agency (FEMA)* prior to issuance of permits to complete the drainageway improvements. Upon completion of the drainageway modifications the applicant must receive an approved *Letter of Map Revision (LOMR)* from *FEMA*. Building permits which are dependent upon the mapping change may not be issued until the *LOM*R becomes effective.

4. The City of Boulder is currently in the process of adopting an updated floodplain mapping study for the Boulder Slough. Staff anticipates that the study will be reviewed for adoption by City Council in November.

5. The applicant is advised that the location of the bridge connection within the 100-year floodplain may impact flood insurance requirement. Staff recommends contacting any potential lenders to determine how the proposed bridge connection will impact requirements to carry flood insurance.

6. The property is impacted by the 100-year floodplain of the Boulder Slough. Any development within the 100-year floodplain is subject to the City's floodplain regulations and requires the approval of a floodplain development permit.

Lot Layout Elaine McLaughlin

For purposes of documentation, note that staff interprets the setbacks on the property to be as follows:

- Front (north): Pearl Street
- Side facing a street (east): 30th Street
- Interior Side (west): adjacent to Target
- Rear (south): adjacent to Two Nine North Apartments

Utilities, Jessica Stevens, 303-441-3121

1. A 25 foot wide utility easement will be required to be dedicated through the 2950 Pearl property for the proposed water main extension in accordance with Section 4.04(2) of the DCS.

2. A 25 foot wide utility easement will be required to be dedicated for the water main extension along the southern property boundary in accordance with Section 4.04(2) of the DCS.

3. Utility easements will be required to be dedicated for all water meters located outside of the public right-of-way.

4. The applicant is advised that proposed trees must be located a minimum of ten feet away from existing or proposed utilities, including without limitation: water, wastewater, storm drainage, flood control, gas, electric, telecommunications, drainageways, and irrigation ditches, within and adjacent to the development site. It is the applicant's responsibility to resolve such conflicts with appropriate methods conforming to the *BRC*, the *DCS,* and any private/franchise utility specifications.

5. Per Section 8-5-13 of the *BRC*, no person shall excavate an area in the pavement of a public street for a period of 3 years from completion of resurfacing, except in compliance with said section. The design includes a proposal to water and sewer services from 30th Street. The applicant is advised that the 30th Street was reconstructed in 2011.

II. NEXT STEPS

Provide six full sized sets of revised plans, one set of revised documents, and a written letter response to this comment letter responding in detail to each of the comments, directly to a project specialist at the front counter of P&DS, third floor Park Central building within 60 days of this comment letter to ensure that the application remains in an active status. The resubmittal plans should be accompanied by an electronic version of the same, preferably in a DropBox format. The submittal should be provided *prior* to the first and third Monday of the Month at 10:00 a.m.

III. CITY CODE CRITERIA CHECKLIST

To be provided upon a review of revisions.

IV. Draft Conditions on Case

The following are standard conditions that may be required upon a finding of consistency with the review criteria. These are preliminary and draft only and are subject to change.

1. The Applicant shall ensure that the **development shall be in compliance with all approved plans** dated ____on file in the City of Boulder Planning Department, except to the extent that the development may be modified by the conditions of this approval.

2. Prior to a building permit application, the Applicant shall submit a Technical Document Review application for the following items, subject to the approval of the City Manager:

    a. **Final architectural plans**, including material samples and colors, to ensure compliance with the intent of this approval and compatibility with the surrounding area. The architectural intent shown on the approved plans dated -_____is acceptable. Planning staff will review plans to assure that the architectural intent is performed.

    b. A **final site plan** illustrating the approved site configuration.

    c. A **final utility plan** meeting the City of Boulder Design and Construction Standards.

    d. A **final storm water report and plan** meeting the City of Boulder Design and Construction Standards.

    e. **Final transportation plans** meeting the City of Boulder Design and Construction Standards for all transportation improvements. These plans must include, but are not limited to: street plan and profile drawings, street cross- sectional drawings, signage and striping plans in conformance with

Manual on Uniform Traffic Control Devices (MUTCD) standards, transportation detail drawings, geotechnical soils report, and pavement analysis.

f. A **detailed landscape plan**, including size, quantity, and type of plants existing and proposed; type and quality of non-living landscaping materials; any site grading proposed; and any irrigation system proposed, to ensure compliance with this approval and the City's landscaping requirements. Removal of trees must receive prior approval of the Planning Department. Removal of any tree in City right of way must also receive prior approval of the City Forester.

g. A **detailed outdoor lighting plan** showing location, size, and intensity of illumination units, indicating compliance with section 9-9-16, B.R.C.1981.

3. Prior to a building permit application, the Applicant shall submit a **Final Plat**, subject to the review and approval of the City Manager, and execute a **subdivision agreement** meeting the requirements of Chapter 9-12, "Subdivision," B.R.C. 1981, which provide, without limitation and at no cost to the City, for the following:

   a. The **dedication, to the City**, **of all easements necessary** to serve the development.

   b. The vacation of the existing utility easements recorded in the Office of the Boulder County Clerk and Recorder at Reception Numbers 100295 105650, 2631489, 2631492, 166001 and 10938.

   c. The **construction of all public improvements** necessary to serve the development.

   d. A **financial guarantee**, in a form acceptable to the Director of Public Works, in an amount equal to the cost of constructing all public improvements necessary to serve the development.

4. Prior to a building permit application, the Applicant shall submit a **financial guarantee**, in a form acceptable to the Director of Public Works, in an amount equal to the cost of providing eco-passes to the employees of the development for three years after the issuance of a certificate of occupancy as proposed in the Applicant's Transportation Demand Management (TDM) plan.

5. Pursuant to subsection 9-2-12(a), "Three Year Rule," B.R.C. 1981, the following **development/phasing plan** is approved:

   a. Phase I, to construct a square foot,____-story building, shall commence at the date of this approval and shall be substantially completed within three years.

   b. Phase II, to construct a_____square foot,____story addition, shall commence upon the expiration of Phase 1 and expires three years thereafter.

6. Prior to building permit application for Phase 2, the Applicant shall obtain an air rights lease for the portion of the structure spanning any City easement or right of way. The Applicant assumes the risk that failure to obtain an air rights lease or permit may result in an amendment to this approval.

BVCP and BVSP DESIGN GUIDELINE

Locate buildings close to the street, with parking behind and/or beside the buildings. Streets lined by buildings are more interesting to move along, especially for the pedestrian.

BVRC: 3.1.B Locate Buildings close to the street
BVRC: 3.1.D. Maximize street-frontage of buildings
BPSP: 2.1. Building Placement

Meets Guidelines **- YES**

BVCP: 3.1.C. Locate Buildings at street corners:
BPSP Gateways/Corners/Entries:

Meets Guidelines **– N/A**

BVRC: 3.1.E. Lay out site to support pedestrian circulation

Meets Guidelines **- YES**

3.1.G. Preserve and capitalize on views to the west

Meets Guidelines **- YES**

BVRC: 3.1.F. Useable open space should be integral to the plan;
BVRC: 3.6.A. Provide useable outdoor open space;
BVRC: 3.6.B. Locate and design open space to encourage use;
BVRC: 3.6.E. Provide furnishings and landscaping in open space; and
BVRC: 3.8.A. Provide outdoor furnishings

Meets Guidelines **– YES**

3.1K. Provide vehicular and pedestrian links

Meets Guidelines **- PARTIALLY**

3.2.A. Internal drives should connect public streets; and
3.2.B. Connect with adjacent parking lots or drives

Meets Guidelines **- PARTIALLY**

BVRC: 3.3.A. Provide a complete pedestrian network; and
BVRC: 3.3.B. Provide interior pedestrian links to adjacent properties

Meets Guidelines **– YES**

BVRC: 3.3.C. Distinguish and enhance pedestrian paths;
BVRC: 3.3.D. Use distinctive paving;
BVRC: 3.3.E. Provide crosswalks; and
BVRC: 3.3.E. Ensure adequate path widths

Meets Guidelines **– YES**

BVRC: 3.4.H. Ensure bicycle parking is ample and secure;
BVRC: 3.4.B. Locate bike racks where visible and convenient; and
BVRC: 3.4.C. Provide shelter and lighting for bike parking

Meets Guidelines – **YES**

BVRC: 3.5.A. Try to minimize parking needs;

Meets Guidelines – **YES**

BVRC: 3.5.B. Try to provide structured, rather than surface parking

Meets Guidelines – **YES**

BVRC: 3.7.A. Exceed City landscape standards;
BVRC: 3.7.B. Street corners and site entries should have special landscaping;
BVRC: 3.7.C. Pedestrian areas should have special plantings;
BVRC: 3.7.D. Vehicular areas may have larger- scale plantings; and
BVRC: 3.7.E. Utilize xeriscape techniques

Meets Guidelines – **YES**

BVRC: 4.1.A. Identify which type of street(s) the development site fronts
BVRC: 4.2.A. Internal through-streets should be pedestrian friendly

Meets Guidelines – **YES**

BVRC: 5.1.A Break down the mass of the building; and
BVRC: 5.1.C. Transition to adjacent buildings

Meets Guidelines – **YES**

BVRC: 5.1.E. Intermingle the building interior and exterior

Meets Guidelines – **YES**

BVRC: 5.2.A. Orient the building to the street

Meets Guidelines – **YES**

BVRC: 5.2.C. Emphasize building entrances

Meets Guidelines – **PARTIALLY**

BVRC: 5.2.D. Avoid large blank walls;

Meets Guidelines – **YES**

BVRC: 5.2.E. Provide pedestrian interest on the ground level;

Meets Guidelines – **YES**

BVRC: 5.2.F. Design all sides of the building
BVRC: 5.2.G. Standardized designs and foreign styles are discouraged
BVRC: 5.2.I. Use human-scale materials; and
BVRC: 5.2.J. Select high-quality exterior materials

Meets Guidelines – **YES**

BVRC: 5.3.A. Locate service areas to minimize visibility; 5.3.B. Screen truck areas;
BVRC: 5.3.C. Enclose trash storage;
BVRC: 5.3.D. Utility boxes and meter should be inconspicuous; and
BVRC: 5.3.E. Minimize the visibility of HVAC systems

Meets Guidelines – **YES**

BVRC: 5.2.K. Buildings should be environmentally sound

Meets Guidelines **– YES**

BVRC: 3.1.I. Preserve existing vegetation
BVRC: 3.6.A. Provide useable outdoor open space;

BVRC: 3.6.B. Locate and design open space to encourage use;
BVRC: 3.6.E. Provide furnishings and landscaping in open space; and

BVRC: 3.8.A. Provide outdoor furnishings

Section V:
Boulder Design Advisory Comments
Meeting 2 9/10/2014

Boulder Design Advisory Comments – Design Team Minutes

MEETING DATE: September 10, 2014

ADDRESS: 2930 Pearl St.

PRESENT:

Name	Company
Kevin Foltz	Forum Real Estate
Matt Beecher	Forum Real Estate
Collin Kemberlin	Tryba Architects
John McIntyre	Tryba Architects
Dylan McQuinn	Tryba Architects
Jeff Dawson	Boulder Planning Board
David Biek	BDAB
Fenno Hoffman	BDAB
Jamison Brown	BDAB
Michelle Lee	BDAB
Charles Ferro	Boulder Staff
Sam Useffa	Boulder Staff

Presentation of key design changes since July BDAB Meeting

30th Street Façade

- Location of Bus Shelter along 30th Street moved north to avoid conflict between shelter and building entry.
- Setback between 30th St façade and sidewalk has been reduced to engage pedestrians – previously exposed columns have been enclosed within building envelope.
- Ground floor façade provides a sequence of conditions to animate pedestrian experience.
- Solid stretch of masonry wall along 30th St frames entrance and "grounds" the building – also provides opportunity for signage and bike parking.
- Recessed glass portion at north end of this façade allows the volume to float and defines an outdoor garden space adjacent to trees.
- Facades and masonry spandrel areas developed to provide a counter-rhythm of vertical openings, fins and joints to balance horizontal.

Pearl Street Façade

- Void created at level 2 to allow "at grade" space to extend along full Pearl Street Frontage.
- Vertical glazed joint in the façade widened to provide an articulated entry.
- Double height glazed corner developed as lobby / entrance to the campus.

General Feedback

1. Unanimous agreement amongst all members that the adjustments made since last BDAB meeting were very positive and all critical issues have been adequately addressed. ***All critiques/advice given in this meeting should be taken into consideration through future design phases, and are not requirements.***
2. Members were very complementary of the brick pattern and detailing – "high level of craftsmanship."
3. Although the elevations still show a predominately horizontal façade treatment, enough vertical articulation has been achieved through window proportioning, vertical fins, and joint lines to create an attractive balance.
4. Geode concept has been reinforced through a seamless integration between exterior masonry facades and interior glass facades.

30th Street Façade – Specific Comments

1. Suggestion to relocate proposed bus shelter so that its relationship to the façade does not seem arbitrary – possible integration with bike storage in this area. Buffer zone adjacent to this bus shelter would potentially feel more 'urban' if paved with trees in grates or planters rather than the narrow 'suburban' landscape strip currently shown at that location.

   The design of the custom bus shelter will be developed as part of the next design phase and submitted for review with tech docs. The design team will provide a design solution that integrates successfully with both the building facades and landscape design.

2. The glazed box projections at level one of Buildings A & C seem appropriate given the overall composition along Pearl and 30th Streets. However, Planning Board and city staff have become increasingly weary of large expanses of glass at grade on recent projects.

   Noted.

3. Consider the CRI and quality of lighting fixtures in the exposed stair tower(s). Past examples of this concept have turned out poorly due to low quality lighting.

   Noted. Careful attention will be paid to the specification of the stairwell light fittings.

Pearl Street Façade – Specific Comments

1. Large glazed, double height lobby is a huge improvement over previous scheme. Fenno Hoffman proposed bringing one or both masonry piers *through* the curtainwall at levels 1 & 2 to ground the building and break down its scale. David Biek and several other BDAB members disagreed with Fenno and preferred this façade as it is shown in the renderings.

   The scale of the glazed corner volume at Pearl Street has been maintained as presented to BDAB. As the design is developed the team will review the scale, detailing, and programming of this component to ensure the architectural concept is strengthened wherever possible.

2. The level 4 glass corner with a shadow-box detail instead of a cornice along both Pearl and 30th Streets seems to be a less elegant solution to cap the building than does the projecting metal cornice apparent on the adjacent portion of each façade. Consider continuation of the horizontal cornice along the entire fourth floor, or alternatively introducing a 4-story masonry volume in these areas rather than transitioning to a glass penthouse.

   The design team has reviewed this aspect of the design and proposed an alternate façade solution that incorporates an additional projecting horizontal cap profile that breaks the vertical emphasis of the glass corner

and continues more seamlessly the language of the balance of the upper floors (refer elevations).

Next Steps

- Although consensus at BDAB meetings are ideal, it is not required and rarely achieved. Preferences between members varied on a few items, however all were in agreement that the two critical issues to be discussed in this meeting were successfully resolved.

  1. Activate ground level façade along 30th and Pearl Streets to create pedestrian interest.
  2. Avoid large, blank expanses of wall – particularly along Pearl Street.

- ***Unanimous recommendation by BDAB to move forward to next Site Review submittal (09/15/14)***

Next meeting: *Additional BDAB Meeting not required*

END OF MINUTES

Section VI:
Appendices

APPENDIX A:

Pearl Place Review Letter

August 21, 2014

Mr. Matt Beecher

Forum Real Estate Group
4500 Cherry Creek Drive South, Suite
550 Glendale, Colorado 80246

Re: Pearl Place Office Development (2930 Pearl Place)

Dear Matt:

As requested, Deere & Ault Consultants (D&A), on behalf of the Boulder and Left Hand Irrigation Company and the North Boulder Farmers Ditch Company, has reviewed preliminary construction plans and the "*Preliminary Storm Water and Flood Mitigation Report*," prepared for the Pearl Place Office Development. Specific documents reviewed by D&A regarding the proposed Pearl Place Office Development include:

- "*Ground Level Floor Plan*," Sheet A1.0, prepared by Tryba Architects, dated May 5, 2014

- "*Landscape Plan*," Sheet L1.0, prepared by Studio Terra, dated May 5, 2014

- "*Preliminary Utility Plan*," Sheet C2.0, prepared by The Sanitas Group, dated April 21, 2014

- "*Preliminary Storm Water and Flood Mitigation Report*," prepared for Tryba Architects by The Sanitas Group, dated May 2014

The following are preliminary D&A comments that will need to be addressed by the developer prior to D&A recommending approval of the development to the Ditch Companies:

- As a point of clarification, the northerly 66-inch diameter reinforced concrete pipe (RCP) through the Target parking lot was intended to convey the combined flow of the Boulder and Left Hand Ditch and North Boulder Farmers Ditch, and the southerly 66-inch diameter RCP was intended to convey the Boulder Slough flows. In reality, the irrigation and drainage flows are comingled in both the northerly and southerly 66-inch diameter pipes.

- The relocation of the combined open ditch through the Pearl Place property into a 66-inch diameter RCP on the Target property and an open channel on the Pearl Place property within the Boulder Slough will require the developer to provide a new easement to the Ditch Companies on the Target property and on the Pearl Place Development property. The Ditch Companies will forego their current easement on the Pearl Place property once a new easement is provided for the relocated ditch.

- By putting the combined ditch in a 66-inch diameter RCP and an open channel, the developer will assume responsibility for all future maintenance, repair and replacement of the ditch improvements. The developer will need to acquire an easement to access the ditch to perform all maintenance, repair and replacement duties on land not owned or controlled by the developer.

- The proposed development shows underground parking structures at each of the three proposed office buildings. To the extent any drainage water from the underground parking lots is released into the Boulder Slough or combined ditch, it must first be run through an oil-sand separator or other equivalent structure that removes sand and oil from the storm water prior to being discharged into the Boulder Slough or combined ditch. Plans for the oil-sand separator shall be submitted to the Ditch Companies for review and approval prior to drainage from the underground parking lots being discharged into the Boulder Slough/combined ditch.

- The Ditch Companies do not have a water right to beneficially put to use groundwater that is discharged to the ditch. Should the developer's plan include any collection and discharge of groundwater into the ditch, the Ditch Companies could be in conflict with the Colorado Division Engineer's Office. Should the State Engineer require the Ditch Companies to measure the amount of groundwater discharged from the development to the ditch and require the Ditch Companies to discharge that amount of water to Goose Creek just downstream of the development, the developer should be responsible for the Ditch Companies' costs. The developer should enter into an agreement with the Ditch Companies accepting this responsibility.

- The Ditch Companies will assess a ditch relocation fee for moving their ditch.

- The Ditch Companies will need to obtain and review construction plans for the proposed concrete bridge and wood bridge crossings of the ditch. The Ditch Companies require 1.5 feet of freeboard between the low chord of any new bridge and the water surface elevation associated with the decreed flow rate of the two ditches (approximately 140 cfs). This should not be a problem for these proposed crossings, as the Boulder Slough bridge crossings likely will be designed to convey substantially more flood flow than the Ditch Companies decreed flow rate.
- The Ditch Companies will need to obtain and review the final construction plans for the proposed corridor to be constructed over the Boulder Slough/combined ditch to ensure enough room is available to get Ditch Company equipment under the proposed corridor.
- The proposed relocation of the Boulder Slough and the combined ditch downstream of the Target parking lot in two 66-inch diameter pipes involves several sharp bends, a steep section of pipe, and confining the flow in a smaller flow area than now exists. This may result in a greater head loss and subsequent higher water surface at the downstream end of the two 66-inch diameter pipes at the Target parking lot, which may result in a potential loss of flow capacity in the two 66-inch diameter RCPs through the Target parking lot. This is not a major concern to the Ditch Companies, as these two 66-inch diameter RCP pipes can convey the decreed flow of the Ditch Companies. However, the City of Boulder may be interested in comparing the conveyance capacity of the two 66-inch diameter RCPs through the Target parking lot before and after the proposed modifications are made downstream of

the Target parking lot to ensure no significant loss of flow conveyance results.

- The question of access to the Boulder Slough/combined ditch for maintenance through the developer's property needs to be addressed and who is going to be responsible for the future channel maintenance (i.e., the City of Boulder, the Ditch Companies, or the developer).

- Any utilities that cross under the pipe/open channel will need to be cased and constructed a minimum of 2 feet below the pipe/channel invert.

  Given the increased exposure of people to the Boulder Slough/combined ditch through the development, the Ditch Companies may require that they be named as additionally insured by the developer from accidents occurring in the Boulder Slough/combined ditch. We suggest the developer initiate discussions with the Ditch Company attorney to develop an agreement with the Ditch Companies to relocate the ditch and include in the agreement the items that are discussed herein.

  These comments are based on information that we have to date. Additional comments on behalf of the Ditch Companies may occur as more information becomes available and after the Ditch Companies discuss the proposed project with representatives from the City of Boulder.

If you have any questions regarding this review, please do not hesitate to call. Sincerely,

DEERE & AULT CONSULTANTS, INC.

Michael J. Ballantine, P.E.
Principal, Project Manager

MJB:sp

cc: Scott
Holwick
John
Brunner
Dan Lisco
Bob Juhl

P:\0110 BLH\0110.031.00 Pearl Place\Pearl Place Review1.Lt

APPENDIX B:

Geotechnical Engineering Report

Geotechnical Engineering Report

Pearl Place Professional Office Development
Pearl Street and 30th Street
Boulder, Colorado

Prepared for:

Forum Real Estate Group
4500 Cherry Creek Drive South, Suite 550
Glendale, Colorado 80246

Prepared by:

Pickering, Cole & Hivner, LLC
PCH Project No. 12.070.14

October 17, 2014

October 17, 2014

Forum Real Estate Group
4500 Cherry Creek Drive South, Suite 550
Glendale, Colorado 80246

Attn: Mr. Kevin Foltz

Re: Geotechnical Engineering Report
Pearl Place Professional Office Development
Pearl Street and 30th Street
Boulder, Colorado
PCH Project No. 12.070.14

Pickering Cole & Hivner, LLC (PCH) has completed a geotechnical engineering investigation for the proposed professional office development to be located at the southwest corner of the referenced intersection in Boulder, Colorado. This study was performed in general accordance with our revised proposal (Number P12.054.14, executed February 14, 2014).

EXECUTIVE SUMMARY

This geotechnical executive summary should be used in conjunction with the entire report for design and/or construction purposes. It should be recognized that specific details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. The section titled General Comments should be read for an understanding of the report limitations.

- **Soil and Bedrock Conditions:** Based on the borings drilled for this study, the subsurface conditions at the site varying from the north side to the south side of the Boulder and Left Hand Ditch that bisects the site. The soils encountered (below approximately 5 inches of existing asphalt pavement) in the borings include sand and gravel soils with varying amounts of silt. Significant lenses of cobbles were also encountered. Sedimentary claystone bedrock was encountered beneath these sands at depths ranging from about 18 to 21 feet below existing site grade on the south side of the ditch and at depths ranging from about 7 to 14 feet below existing site grade in the borings located on the north side of the ditch. The bedrock extended to the full depth of exploration.

- **Groundwater and Below-grade Construction:** Groundwater was measured at depths ranging from about 5 to 13 feet below current site grades during drilling, However, water was measured at a

depth of about 1.2 feet when checked several days after drilling in a monitoring well located near the south bank of the ditch.

Based on the planned site configuration, temporary dewatering will be required to complete the planned two levels of basement excavation at the site. Construction dewatering would likely consist of well points installed into the bedrock below the base of basement excavations where pumps can be used to drawdown the existing aquifer level.

Either constructing a water-tight foundation or installation of a permanent dewatering system will also be required to maintain dry conditions in these below-grade areas. Waterproofing consultants should be contacted for recommendations regarding the design and construction of below-grade foundations. A permanent dewatering system would include a perimeter drain pipe installed in the bedrock at the base of the excavation and pipe network embedded within a subfloor gravel layer. Environmental testing and monitoring may be required to obtain/maintain temporary or permanent dewatering permits to discharge collected water into City storm drainage systems.

- **Caving Soils and Excavation Shoring:** In addition to dewatering, temporary shoring and will likely be required to complete the excavations for planned below-grade parking areas. The need for shoring will depend on the distance from the base of excavations to existing underground utility easements, right-of-way and property lines. Shoring systems are generally contracted as a design-build system. Typical shoring systems used in the area include soldier piers installed on relatively close centers along the extents of the excavation or piles and lagging. Other methods could also be considered, but require easements from adjacent property owners. Permanent shoring may also be used as formwork for the exterior side of foundation walls. Design-build shoring contractors should be contacted to review this report and provide recommendations to complete the planned excavations.

- **Expansive Bedrock Materials:** The bedrock materials exhibited low to moderate expansion when subjected to wetting in our laboratory. Excavations that penetrate the bedrock will potentially expose these materials. Post-construction wetting of these exposed materials can cause heave and potentially excessive movement of foundations and floor slabs. If excavation depths are limited and the bedrock materials are not exposed in excavations, we believe the risk of movement is low given that groundwater is present above the bedrock.

  Alternatives to mitigate this hazard include:

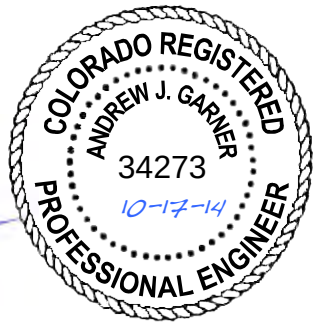
  - limiting excavation depths to avoid exposing bedrock,
  - use of deep foundations and structurally supported, suspended floors, and/or
  - subexcavation and recompaction or replacement of the expansive bedrock.

- **Foundation Systems:** Deep foundations should be considered to limit the impacts of expansive bedrock and transmit structural loads into the underlying bedrock materials. Drilled piers are common in the area, however, considering the presence of caving soils and groundwater, we anticipate that conventional drilled pier construction would require casing or drilling slurry. The use of a spread footing foundations or a mat foundation (particularly a water-tight mat) could also be considered for support of the structure, however, some mitigation of the expansive bedrock materials could be required below these shallow foundations.

- **Interior Floor Slabs:** We assume that some movement of unfinished parking garage floor slabs can be tolerated, however, we estimate that movement of floor slabs bearing within the bedrock may be variable and potentially excessive. Alternatives to reduce the risk of floor slab movement include the use of a structurally supported, suspended floor or subexcavation and recompaction or replacement of the expansive bedrock.

We appreciate being of service to you in the geotechnical engineering phase of this project, and are prepared to assist you during the construction phases as well. Please do not hesitate to contact us if you have any questions concerning this report or any of our testing, inspection, design and consulting services.

Sincerely,
Pickering, Cole & Hivner



Andrew J. Garner, P.E.
Senior Project Manager

Thomas C. Cole, P.E.
Principal

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GEOTECHNICAL ENGINEERING REPORT

PEARL PLACE PROFESSIONAL OFFICE DEVELOPMENT
PEARL STREET AND 30th STREET
BOULDER, COLORADO

PCH Project No. 12.070.14
September 10, 2014

INTRODUCTION

This report contains the results of our geotechnical engineering exploration for the Pearl Place Professional Office Development to be located at the southwest corner of Pearl Street and 30th Street in Boulder, Colorado.

The purpose of these services is to provide initial subsurface information and geotechnical engineering recommendations relative to:

- Subsurface soil and bedrock conditions
- Groundwater conditions
- Below-grade construction
- Foundation alternatives
- Floor slab design and construction
- Pavement structural sections
- Earthwork
- Drainage

The recommendations contained in this report are based upon the results of field and laboratory testing, engineering analyses, our experience with similar soil conditions and structures, and our understanding of the proposed project.

PROJECT INFORMATION

We understand that the project will ultimately include the construction of three four-story office buildings on an approximately 3.5-acre site located to the southwest of the referenced intersection. Phase I will include two office buildings (Buildings A & B), each of about 100,000 square feet in total floor area, that will be connected by sky-bridges at levels two and three. Phase I buildings will be situated within the southern site extents. Phase II construction will include another four-story office building (Building C) of approximately 100,000 square feet in floor area and will be located in the northwest site extents. Three levels of subterranean parking will be provided beneath a portion of

Building A and then entirety of Buildings B and C. The office buildings will be developed with Type B steel framed construction with elevated concrete decks constructed over conventionally reinforced columns and foundation walls. Exterior surfaces will vary from glazed aluminum curtain wall systems to masonry veneer.

Site improvements will include new asphalt/PCC automobile drives including a roundabout, an amphitheater type terraced seating along the existing creek north of Building A, PCC flatwork, underground utilities and site landscaping.

We assume that the existing improvements will be completely razed to facilitate the proposed development. Following demolition, we anticipate that earthen cuts of up to 35 feet may be required while limited earthen fills of only a few feet will be required to provide positive site drainage around the proposed structures. If our assumptions noted herein are inaccurate or if you have additional information that may be useful, please forward at your convenience.

SITE EXPLORATION PROCEDURES

The scope of the services performed for this project included a subsurface exploration program, laboratory testing, and engineering analysis.

Field Exploration: Our scope of services included geotechnical exploration of the subsurface materials at nine locations on the site at the locations shown on the Boring Location Diagram included in Appendix A. Boring Nos. 1 through 6 were advanced in the southern site extents (Buildings A and B), and Boring Nos. 7, 8, and 9 were advanced in the northern site extents (Building C). Borings were advanced in accessible locations within approximate footprints of the new buildings.

The borings were generally advanced to depths ranging from about 25 to 50 feet below existing site grade using truck-mounted drilling equipment utilizing 4-inch solid stem and 6-inch diameter, hollow-stem augers. However, refusal to auger drilling was encountered at a depth of about 16 feet in the bedrock in Boring No. 8.

Our field personnel recorded lithologic logs of each boring during the drilling operations. At selected intervals, samples of the subsurface materials were obtained by driving Modified California and Standard split-spoon samplers. Penetration resistance measurements were obtained by driving the sample barrels into the subsurface materials with a 140-pound manual hammer falling 30 inches. The penetration resistance value is a useful index to the consistency, relative density or hardness of the materials encountered.

Groundwater measurements were made in each boring at the time of site exploration. Boring No. 5 was finished as a monitoring well installed to a depth of 25 feet, with a slotted and screened PVC pipe in the

lower 20 feet of the boring. The remaining borings were backfilled with the drilling spoils immediately following drilling. Pavements were patched using a commercially available cold patch product.

Laboratory Testing: Samples retrieved during the field exploration were returned to our laboratory for observation by the project geotechnical engineer, and were classified in general accordance with the Unified Soil Classification System described in Appendix C. Samples of bedrock were classified in general accordance with the general notes for Rock Classification. At that time, an applicable laboratory-testing program was formulated to determine engineering properties of the subsurface materials. Following the completion of the laboratory testing, the field descriptions were confirmed or modified as necessary, and Boring Logs were prepared. These logs are presented in Appendix A.

Laboratory test results are presented in Appendix B. These results were used for the geotechnical engineering analyses and the development of foundation and earthwork recommendations. Laboratory tests were performed in general accordance with the applicable local or other accepted standards.

Selected soil and bedrock samples were tested for the following engineering properties:

- Water content
- Dry density
- Expansive potential
- Grain size
- Plasticity Index
- Unconfined compressive strength

SITE CONDITIONS

The site includes approximately 2.64 acres of developed land bound on the north by Pearl Street, on the east by 30th Street, on the south by a multi-family residential development, and on the west by an Existing retail development. An existing bank is present on the lot located at the southwest corner of 30th Street and Pearl Street and is not included in the subject site. The site is approximately bisected into northern and southern parcels by the Boulder and Left Hand Ditch, which appears to be an open, unlined channel that includes a significant growth of trees.

The site is currently occupied by several retail and office buildings, private access drives and parking lots, and associated landscaping. Existing asphalt concrete pavements are generally in poor to fair condition. Site grades are relatively flat with an estimated elevation differential of less than about 5 feet across the site, excluding the banks of the ditch. The water level in the ditch was estimated to vary from about 3 to 5 feet below surrounding site elevations. Site drainage was generally in the form of sheet surface flow directed by existing improvements.

SUBSURFACE CONDITIONS

Geology: Surficial geologic conditions on a majority of the site, as mapped by the U.S. Geological Survey (USGS) ([1]Wrucke, 1967), consist of Alluvium of Wisconsin Age, including Piney Creek Alluvium locally. These materials are described as pebbly, grey to reddish-brown stratified silt, sand, and pebbles. The alluvium is generally less than about 20 feet in thickness.

Bedrock underlying the surface units consists of the upper member of the Pierre Shale of Upper Cretaceous Age. This upper member chiefly contains olive-grey clayey to sandy siltstone. The finer-grained units within the formation contain montmorillonitic clays that produce low to very high swelling pressures when moisture content is elevated. The thickness of this unit has been reported to be on the order of 5,700 feet.

Mapping completed by the Colorado Geological Survey ([2]Hart, 1972) indicates the site is located in an area of "Low Swell Potential". Potentially expansive materials mapped in and outside this area generally include shale bedrock, weathered shale bedrock and alluvium (surficial units).

Due to the relatively flat nature of the site, geologic hazards at the site are anticipated to be low. Seismic activity in the area is anticipated to be low, and the property should be relatively stable from a structural standpoint. With the planned stabilization and channelization of the banks of the ditch and proper site grading around proposed structures, we believe that materials will erosion of the site soils will be minimal.

Soil and Bedrock Conditions: Based on the borings drilled for this preliminary study, the subsurface conditions at the site varying from the north side to the south side of the Boulder and Left Hand Ditch that bisects the site. The soils encountered (below approximately 5 inches of existing asphalt pavement) in the borings include sand and gravel soils with varying amounts of silt. Significant lenses of cobbles were also encountered. Sedimentary claystone bedrock was encountered beneath these sands at depths ranging from about 18 to 21 feet below existing site grade on the south side of the ditch and at depths ranging from about 7 to 14 feet below existing site grade in the borings located on the north side of the ditch. The bedrock extended to the full depth of exploration.

Field and Laboratory Test Results: Field test results indicate that the sand soils vary from medium dense to very dense, however, these results are highly affected by the presence of gravel and some cobble size stone in the sandy matrix. The bedrock is considered medium hard to very hard.

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[1]Wrucke, C.T. and Wilson, R.F., 1967, ***Geologic Map of the Boulder Quadrangle, Boulder County, Colorado,*** United States Geological Survey, Open-File Report OF-67-281.

[2]Hart, Stephen S., 1972, ***Potentially Swelling Soil and Rock in the Front Range Urban Corridor, Colorado***, Colorado Geological Survey, Sheet 1 of 4.

Laboratory test results indicate that the sand soils are fine to coarse grained and are dry to moist above groundwater. These materials are predominately non-plastic and are generally considered non-expansive. The bedrock materials are described as low to moderately plastic claystone bedrock that exhibits low to moderate expansive potential.

Groundwater Conditions: During drilling, groundwater was measured at depths ranging from about 10 to 13 feet below site pavements in borings drilled south of the ditch and at depths ranging from about 5 to 12 feet below existing site grade on the north side of the ditch. One boring located in close proximity of the south side of the ditch (Boring No. 5) was completed as a monitoring well. When checked on March 20, 2014, groundwater was present in this well at a depth of 1.2 feet below grade.

Based upon review of U.S. Geological Survey Maps ([3]Hillier, et al, 1983), regional groundwater beneath the project area is expected to be encountered in unconsolidated alluvial deposits on the site at depths ranging from 5 to 10 feet below present ground surface.

Our borings were drilled in a period normally associated with seasonal lows for groundwater fluctuations. Given the granular nature of the subsurface soils, we believe that additional fluctuations of up to 2 to 3 feet foot could be possible due to seasonal effects. Therefore, The possibility of groundwater fluctuations should be considered when developing design and construction plans for the project.

A hydraulic conductivity of 4.36×10^{-6} was measured in a monitoring well on installed in Boring No. 5. However, we have reason to believe that the screened portion of the well below 7 feet may have been mistakenly backfilled with bentonite by the contractor. Therefore, we do not believe this flow rate is representative of the subsurface conditions. Based on our subsurface exploration and field flow rate testing on this and other sites in the area, we recommend that temporary and permanent dewatering systems be designed for a hydraulic conductivity of 1.3×10^{-3} cm/sec.

ENGINEERING RECOMMENDATIONS

Geotechnical Considerations: The site appears suitable for the proposed construction as long as the recommendations included herein are incorporated into the design and construction aspects of the project. Based on the proposed construction and subsurface conditions the presence of shallow groundwater, caving soils, and expansive bedrock and are the key geotechnical considerations for the project as currently planned.

- **Groundwater and Below-grade Construction:** Groundwater was measured at depths ranging from about 5 to 13 feet below current site grades during drilling, However, water was measured at a

[3]Hillier, Donald E.; Schneider, Paul A., Jr.; and Hutchinson, E. Carter, 1983, ***Depth to Water Table (1976-1977) in the Greater Denver Area, Front Range Urban Corridor, Colorado***, United States Geological Survey, Map I-856-K.

depth of about 1.2 feet when checked several days after drilling in a monitoring well located near the south bank of the ditch.

Based on the planned depth of below grade construction, temporary dewatering will be required to complete the planned three levels of basement excavation at the site. Environmental testing and monitoring may be required to obtain/maintain temporary or permanent dewatering permits to discharge collected water into City storm drainage systems. Either constructing a water-tight foundation or installation of a permanent dewatering system will also be required to maintain dry conditions in these below-grade areas. Waterproofing consultants should be contacted for recommendations regarding the design and construction of below-grade foundations.

- **Caving Soils and Excavation Shoring:** In addition to dewatering, temporary shoring and will likely be required to complete the excavations for planned below-grade parking areas. The need for shoring will depend on the distance from the base of excavations to existing underground utility easements, right-of-way and property lines. Shoring systems are generally contracted as a design-build system. Typical shoring systems used in the area include soldier piers installed on relatively close centers along the extents of the excavation or piles and lagging. Other methods could also be considered, but require easements from adjacent property owners. Permanent shoring may also be used as formwork for the exterior side of foundation walls. Design-build shoring contractors should be contacted to review this report and provide recommendations to complete the planned excavations.

- **Expansive Bedrock Materials:** The bedrock materials exhibited low to moderate expansion when subjected to wetting in our laboratory. Excavations that penetrate the bedrock will potentially expose these materials. Post-construction wetting of these exposed materials can cause heave and potentially excessive movement of foundations and floor slabs. If excavation depths are limited and the bedrock materials are not exposed in excavations, we believe the risk of movement is low given that groundwater is present above the bedrock.

  Alternatives to mitigate this hazard include:

  - limiting excavation depths to avoid exposing bedrock,
  - use of deep foundations and structurally supported, suspended floors, and/or
  - subexcavation and recompaction or replacement of the expansive bedrock.

  Even if these procedures are used, some movement and at least minor cracking in the structure should be anticipated. The severity of cracking and other cosmetic damage such as uneven floor slabs will probably increase if any modification of the site results in excessive wetting or drying of the expansive soils. Eliminating the risk of movement and cosmetic distress may not be feasible, but it may be possible to further reduce the risk of movement if significantly more expensive measures are used during construction. Some of these options are discussed in this report. We would be pleased to discuss other construction alternatives with you upon request.

Foundation Alternatives: Based on the subsurface conditions and anticipated structural loads, the following foundation types were evaluated for support of the structure:

- Deep foundations such as conventional drilled piers, micropiles, or helical piles.
- Shallow foundations such as spread footings or a mat foundation.

Heavy column loads such as those associated with the proposed structure are often supported by deep foundations socketed into competent bedrock. Deep foundations would also socket the foundation below the expansive bedrock materials.

Drilled piers are commonly used in the area, however, due to the presence of caving soils and groundwater, we anticipate that conventional drilled piers would require temporary casing or drilling slurry to prevent caving. Other deep foundations systems such as cased micropiles or helical piles could also be considered.

It is also feasible to support the structure on shallow foundations. The sand and gravel soils appear to have good load-carrying capability and low settlement potential, however, heavy structural loads may result in large footing sizes. Based on our experience, if the areal extents of spread footings approaches 50% of the building footprint, the use of a mat foundation may be appropriate.

- **Drilled Pier/Deep Foundation Systems:** Deep foundations should be considered to limit the impacts of expansive bedrock and transmit structural loads into the underlying bedrock materials. Drilled piers are common in the area, however, considering the presence of caving soils and groundwater, we anticipate that conventional drilled pier construction would require casing or drilling slurry. The use of cased micropiles or helical steel piles should also be considered due to the presence of caving soils and groundwater. We believe shaft lengths for drilled piers or micropiles may vary from about between 30 and 45 feet below the lowest level of the structures depending on structural loads.

A qualified structural engineer should design deep foundations using the following criteria:

Criteria	Design Value
Maximum allowable end-bearing pressure[1]	50,000 pounds per square foot (psf)
Maximum skin friction for concrete in direct contact with undisturbed/non-weathered bedrock[1, 2, 3]	4,500 psf
Minimum bedrock embedment, below weathered zone[3]	10 feet
Minimum dead-load	Not Required
Minimum cast-in-place drilled pier diameter	12 inches
Void thickness between piers/piles[4]	4 inches
Estimated total movement	Less than ½ inch

[1] Maximum end-bearing pressure and skin friction values are applicable for the very hard bedrock encountered in the borings.

[2] The recommended shaft-to-bedrock skin friction value may be used to resist compressive or uplift axial loads. Due to potential weathering of the upper bedrock materials, we recommend ignoring the upper 2 feet of the bedrock should be ignored.

[3] Embedment depth recommended below the weathered zone is considered sufficient to develop the recommended allowable end-bearing capacity. Additional embedment could be required to support heavier structural loads.

[4] Void thickness considered sufficient when bearing directly on undisturbed bedrock.

If helical piles are used, likely shaft diameter/helix combinations should be preliminarily determined by the design engineer and site-specific load testing should be performed to confirm the adequacy of the design. At least one load test should be performed within the building footprint. Additionally, we believe it is prudent to temporarily install helical piles at several locations at the site to determine representative load testing locations. In-situ static load testing should be used to determine actual helical pile capacity. All helices should bear in the bedrock and extend a minimum depth of at least 10 feet below finished floor elevation. Based on the currently planned below-grade construction, pre-drilling of the bedrock will be required to properly install piles. Piles should be designed to bear at or near a common elevation.

Piers/piles should be considered to work as a group if the horizontal spacing is less than 6 pier diameters. A minimum practical horizontal spacing between piers of at least 3 diameters (3 helix diameters if helical piles are used) should be maintained to use full axial capacity, and adjacent piers should bear at near the same elevation. The capacity of individual piers must be reduced when considering the effects of group action. Capacity reduction is a function of pier spacing and the number of piers within a group. The axial capacity of each pier should be reduced by 30 percent at a spacing of two (2) diameters and by 50 percent at a spacing of one (1) diameter (piers touching).

For lateral loading, no reduction is needed for piers in-line with the direction of lateral loads with a minimum spacing of six diameters (center-to-center) based upon the larger pier. If a closer spacing is

required, the modulus of subgrade reaction for initial and trailing piers should be reduced. At a spacing of three diameters, the effective modulus of subgrade reaction of the first pier should be reduced by 30 percent and by 40 percent for trailing piers. Linear interpolation can be used for spacing between three and six diameters. Reducing the modulus of subgrade reaction in trailing piers will result in greater computed deflections on these piers. In practice, a grade beam will force lateral deflections of all piers to be equal. In the direction perpendicular to lateral loading, no reduction of lateral capacity would be needed at spacing of 3 diameters.

To satisfy forces in the horizontal direction, piers may be designed for the following lateral load criteria based on L-pile/Com624 parameters:

Parameters	Sand Soil	Bedrock
Unit Weight, pcf (moist)	120	130
Avg. Undrained Shear Strength, psf	N.A.	10,000
Angle of Internal Friction, ϕ (degrees)	36	0
Coeff. of Subgrade Reaction, k (pci)	Ignore the upper 3 feet 100 - above groundwater 60 - below groundwater	2,000
Strain, ε_{50}	N.A.	0.004

Drilling to design depths should be possible with heavy-duty, single-flight power augers. Groundwater and caving sands are present at the site and will likely require the use of temporary steel casing or drilling slurry to maintain shaft integrity and properly drill and clean piers prior to concrete placement. Groundwater should be removed from each pier hole prior to concrete placement. If pier concrete cannot be placed in dry conditions, a tremie should be used for concrete placement. Pier concrete should be placed immediately after completion of drilling and cleaning. Due to potential sloughing and raveling, foundation concrete quantities may exceed calculated geometric volumes.

If casing is used for pier construction, it should be withdrawn in a slow, continuous manner maintaining a sufficient head of concrete to prevent infiltration of water or the creation of voids in pier concrete. Pier concrete should have a relatively high fluidity when placed in cased pier holes or through a tremie. Pier concrete with slump in the range of 6 to 8 inches is recommended.

Free-fall concrete placement in piers will only be acceptable if provisions are taken to avoid striking the concrete on the sides of the hole or reinforcing steel. The use of a bottom-dump hopper, or an elephant's trunk discharging near the bottom of the hole where concrete segregation will be minimized, is recommended. Pier-bearing surfaces must be cleaned prior to concrete placement. A representative of the geotechnical engineer should observe pier/pile installation.

Spread Footing or Mat Foundations: To limit foundation movement deep foundations should be considered, however, if more movement can be tolerated, spread footing or mat foundations may be used to support the structure. We estimate that foundations bearing in the native sands may be subject to up to about 1 inch of movement. However, if excavations extend into bedrock, additional movement of foundations is possible due to the variable expansive potential of the bedrock materials. We estimate that foundations bearing directly on the expansive bedrock could exhibit movement on the order of 2 to 3 inches, depending on the extents of wetting.

Where foundation excavations will extend into the expansive bedrock, we recommend additional removal (overexcavation) and replacement or recompaction of the expansive bedrock materials to help limit movement. The following subexcavation options along with the estimated movements can be considered:

Depth of Overexcavation of Bedrock, below Foundations (ft.)	Estimated Total Foundation Movement (in.)
5	About 1 inch
3	About 1 to 2 inches

The bedrock materials may be processed, moisture conditioned, and recompacted for reuse below foundations. As an alternative, the on-site sands and gravels may also be used in this zone, however, since these materials are highly permeable, any planned dewatering systems should be installed at the base of the excavation prior to placement of this fill.

The following foundation design criteria may be used for the structural design of foundations:

Criteria	Design Value	
	Native Sands and Gravels	Overexcavated Fill Soils
Maximum net allowable bearing pressure[1]	6,000 psf	4,000 psf
Minimum dead load	N.A.	1,000 psf
Min. continuous footing width	12 inches	
Min. column footing width	24 inches	
Min. depth below grade, exterior wall footings	36 inches	
Min. depth below grade, interior footings	12 inches	
Estimated total foundation movement	1 inch or less	See Table above
Estimated differential movement	½ to ¾ of total	

[1] The allowable soil bearing pressure applies to dead loads plus design live load conditions and is the maximum pressure that should be transmitted to the bearing soils in excess of the minimum surrounding overburden pressure at the footing base elevation. The design bearing pressure may be increased by one-third when considering total loads that include wind or seismic conditions.

Should spread footings cover more than 50 percent of the plan area of the building, selection of a mat foundation may be more economical and would help limit differential settlement. For structural design of mat foundations, a modulus of subgrade reaction of 150 pounds per cubic inch (pci) may be used. Should the base of the mat be constructed below groundwater elevation or within about 3 feet of current water elevations, the effects of buoyancy should be considered in the design. Total settlement of mat foundations designed to the maximum bearing pressure is estimated to be on the order of 1 to 2 inches or less. Differential settlement between adjacent columns should not exceed 1/2 inch.

Footings, foundations and foundation walls should be reinforced as necessary to reduce the potential for distress caused by differential foundation movement. The use of joints at openings or other discontinuities in masonry walls is recommended.

Foundation excavations, and earthwork should be observed by the geotechnical engineer. If the soil conditions encountered differ significantly from those presented in this report, supplemental recommendations will be required.

Miscellaneous Structure Foundations: Based on the subsurface conditions encountered on the site, shallow spread footing foundations may be considered for other lightly-loaded structures (bridge foundations, retaining walls, etc.) that are supported on approved native granular soils and/or observed and tested engineered fill.

The following foundation design criteria may be used for the structural design of shallow foundations:

Criteria	Design Value for Shallow Foundations Bearing on Native Sands and Gravels[1]
Maximum net allowable bearing pressure[2]	3,000 psf
Minimum dead load	N.A.
Min. depth below grade, exterior footings	36 inches
Estimated total foundation movement	1 inch or less

[1] Design values apply to shallow foundations bearing at depths of approximately 3 to 6 feet below site grades.

[2] The allowable soil bearing pressure applies to dead loads plus design live load conditions and is the maximum pressure that should be transmitted to the bearing soils in excess of the minimum surrounding overburden pressure at the footing base elevation. The design bearing pressure may be increased by one-third when considering total loads that include wind or seismic conditions.

Backfill placed against structures should consist of the on-site granular soils or low plasticity, cohesive soils approved by the engineer. To calculate the resistance to sliding, a value of 0.35 should

be used as the ultimate coefficient of friction between concrete footings and the underlying soil. This value may be increased depending on the foundation soil improvement method used.

Below-Grade Construction: Based on the planned depth of below grade construction, temporary dewatering and shoring will be required to complete the planned three levels of basement excavation at the site. Construction dewatering would likely consist of well points installed into the bedrock below the base of basement excavations where pumps can be used to drawdown the existing aquifer level.

Either constructing a water-tight foundation or installation of a permanent dewatering system will also be required to maintain dry conditions in these below-grade areas. Waterproofing consultants should be contacted for recommendations regarding the design and construction of below-grade foundations. A permanent dewatering system would include a perimeter drain pipe installed in the bedrock at the base of the excavation and pipe network embedded within a subfloor gravel layer. Environmental testing and monitoring may be required to obtain/maintain temporary or permanent dewatering permits to discharge collected water into City storm drainage systems.

The following recommendations present preliminary design information that may be used for planning and budgeting purposes. The final design of temporary and permanent dewatering systems will be based on the depth of the final excavations, the configuration of the drain system, seasonal conditions, and the hydraulic conductivity of the sand and gravel soils. Additional information and recommendations have been provided under separate cover.

- **Construction Dewatering:** During the high-water season (generally the spring and summer months), we estimate that the depth to groundwater will be approximately 8 to 10 feet below the existing ground surface across most of the site, however, shallower conditions will be likely in close proximity to the existing ditch. Assuming that the basements for the buildings will extend to depths of about 15 to 20 feet below existing grade, the contractor could be required to draw the water surface down 10 to 15 feet or more during high-water season.

  For preliminary planning purposes, drawdown at the site area was conservatively projected using a range of 30 to 50 feet per day for hydraulic conductivity with a 15-foot aquifer thickness. Due to the relatively high hydraulic conductivity of the sand and gravel soils, we believe dewatering will require a series of wells on 25 to 50 foot spacing around the perimeter of the excavation. We initially estimated that the wells will initially require pumping rates in the range of 300 to 400 gallons per minute (gpm) to draw the water down for construction. This pump rate should rapidly decrease with time as the aquifer is drawn down. The contractor will need to monitor the drawdown and additional wells, well points or sumps within the excavation may be required to attain the necessary drawdown.

  Depending upon the chemical or metals constituents that may be present in the water, discharge of flows into the ditch may be possible, however, this could require treatment prior to discharge and

monitoring of the effluent. As an alternative, it may be possible to re-inject the flow back into the aquifer. Installing injection wells within the northern property should be feasible while completing construction of the southern buildings without significant "recycling" of the water.

Environmental testing and monitoring may be required to obtain/maintain temporary dewatering permits to discharge collected water into City storm drainage systems.

- **Permanent Dewatering:** We assume that the structure could be designed as a "water-tight" mat foundation, with the structural design accounting for buoyancy forces and hydrostatic lateral loading conditions below groundwater depth. Alternatively, the design and installation of permanent dewatering systems will be required to maintain dry conditions within the basement of the structures.

  The dewatering system should include PVC drain pipe installed around the perimeter of each foundation with a cross-connecting network of drainage trenches and pipes placed beneath the each building footprint.

  The drainage systems should consist of a perforated pipe, embedded in free-draining washed gravel, placed in a trench at least 12-inches in width. We anticipate that a 4-inch diameter perimeter collection drain should be sufficient to handle the anticipated flows. The trench should be excavated around the perimeter of the basement foundations. Gravel should extend a minimum of 3-inches beneath the bottom of the pipe. It is common to use washed ¾-inch to 1-inch gravel for these purposes, however, smaller sizes could be considered if using drainage pipe wrapped with filter fabric. The perimeter drainage trench should be sloped at a minimum of 0.5 percent to a suitable outlet, such as a sump and pump system. The pump should discharge to a suitable outfall. Environmental testing and monitoring may be required to obtain/maintain permanent dewatering permits to discharge collected water into City storm drainage systems.

  In addition to the perimeter drain for the foundations, cross-connecting (horizontal) drainage trenches and pipes should be placed beneath the basement floor slab. These cross-connecting drain trenches should be a minimum of 12 inches in width and depth, and should be sloped to discharge into the perimeter drain system. The pipes for the underslab network may consist of two-inch diameter perforated pipe. These connecting drains trenches should also be sloped at a minimum of 0.5 percent and should be spaced at a maximum of 15 feet throughout each building footprint.

  The underslab gravel drainage layer should consist of a minimum 6-inch thickness of free-draining gravel meeting the specifications of ASTM C33, Size No. 57 or 67. All of the drainage trenches should be lined with a geotextile fabric before placing the gravel.

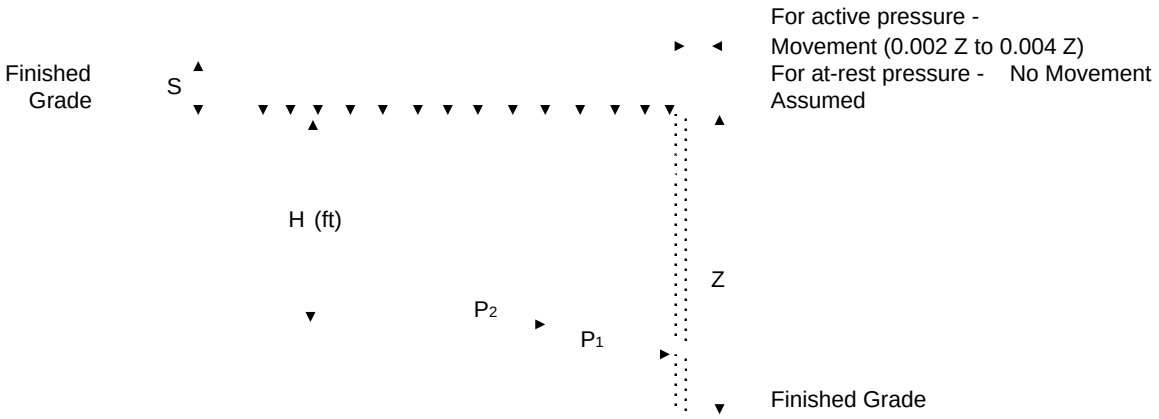
  For preliminary design purposes, the drainage pipe, sump and pump system should be sized for a projected flow of 1×10^{-5} cubic feet per second (cfs) per lineal foot of drainage pipe. Based on the

size of the buildings, we estimate that up to 35 to 50 gallons per minute could be collected by each drainage system during high-water season. The actual amount of water that may be encountered is dependent on proximity to and leakage from the Boulder and Left Hand Ditch. Groundwater captured by the drainage system during the drier times of year will be less than what is collected during the high-water season, especially when the ditch is not active.

Dewatering of the site could potentially affect adjacent properties, causing potential settlement of the soils supporting existing buildings, pavements and other elements. Based on the relative density of the sand and gravel soils encountered in our borings, we believe there is low potential of excessive settlement, However, the dewatering system should be designed to limit dewatering below adjacent properties. Monitoring of adjacent properties is recommended so that impacts can be promptly identified and mitigating action taken, if needed.

- **Caving Soils and Excavation Shoring:** Based on the soil types encountered, we believe that sloping of temporary excavations would need to be on the order of 1-½ to 1 (horizontal to vertical) in order to prevent caving or sloughing of the excavation sides. In addition to dewatering, temporary shoring and will likely be required to complete the excavations for planned below-grade parking areas. The need for shoring will depend on the distance from the base of excavations to existing underground utility easements, right-of-way and property lines. Shoring systems are generally contracted as a design-build system. Typical shoring systems used in the area include soldier piers installed on relatively close centers along the extents of the excavation or piles and lagging. Other methods could also be considered, but require easements from adjacent property owners. Permanent shoring may also be used as formwork for the exterior side of foundation walls. Design-build shoring contractors should be contacted to review this report and provide recommendations to complete the planned excavations.

Lateral Earth Pressures: Any foundation walls that will retain earth should be designed using the lateral earth pressures outlined below. Earth pressures will be influenced by structural design of the walls, conditions of wall restraint, methods of construction and/or compaction and the strength of the materials being restrained. Typical wall design parameters are shown in the diagram below.



EARTH PRESSURE DESIGN PARAMETERS

Two primary wall constraint conditions apply. “Active” earth pressure is commonly used for design of freestanding cantilever retaining walls and assumes wall movement. The "At-rest" condition assumes no wall rotation.

Walls with unbalanced backfill levels on opposite sides should be designed for earth pressures at least equal to those indicated in the following tables. The first table is appropriate for use when retaining overburden sand soils or structural backfill both above and below the groundwater table. The second table provides values for the in-tact bedrock materials. The recommended design lateral earth pressures do not include a factor of safety.

EARTH PRESSURE COEFFICIENTS FOR ON-SITE SANDS AND STRUCTURAL BACKFILL

Earth Pressure Conditions	Coefficient for on-site Sands	Equivalent Fluid Pressure (pcf)	Surcharge Pressure, P_1 (psf)	Earth Pressure, P_2 (psf)
Active (Ka)	0.30	35 – above groundwater 80 – submerged	(0.30)S	(35)H – above groundwater (80)H – submerged
At-Rest (Ko)	0.46	55 – above groundwater 90 – submerged	(0.46)S	(55)H – above groundwater (90)H – submerged
Passive (Kp)	3.2	375	--	--

The following lateral earth pressures may be used for the design of walls that extend below and are cast against the bedrock surface (or against shoring that is retaining undisturbed bedrock).

EARTH PRESSURE COEFFICIENTS FOR WALLS CAST AGAINST UNDISTURBED BEDROCK

Earth Pressure Conditions	Coefficient for in-tact Bedrock	Equivalent Fluid Pressure (pcf)	Surcharge Pressure, P_1 (psf)	Earth Pressure, P_2 (psf)
Active (Ka)	0.22	30 – undisturbed	(0.22)S	(30)H
At-Rest (Ko)	0.36	50 – submerged	(0.36)S	(50)H
Passive (Kp)	4.6	650	--	--

Conditions applicable to the above conditions include:

- for active earth pressure, wall must rotate about base, with top lateral movements 0.002 Z to 0.004 Z, where Z is wall height
- for passive earth pressure, wall must move horizontally to mobilize resistance
- uniform surcharge, where S is surcharge pressure
- in-situ soil or backfill weight a maximum of 120 pcf and 140 pcf for bedrock
- horizontal backfill, compacted to at least 95 percent of modified Proctor maximum dry density
- loading from heavy compaction equipment not included
- no safety factor included
- ignore passive pressure in frost zone

These pressures recommended do not include the influence of surcharge, equipment or floor loading, which should be added. Heavy equipment should not operate within a distance closer than the exposed height of retaining walls to prevent lateral pressures more than those provided.

Seismic Considerations: Based upon the relatively shallow bedrock conditions, a site classification "C" may be used for the design of structures for the proposed project (2009 International Building Code, Table No. 1613.5.2). This classification was based only on the blow counts obtained during drilling as allowed by the code and is not based on an actual measurement of the shear wave velocity of the soils and bedrock at the site.

Garage Floor Slab Recommendations: Based on the overburden soils and low to moderately expansive bedrock materials encountered at or near proposed basement elevation, we believe that slab-on-grade floors may be considered for the garage assuming that movement can be tolerated in unfinished areas. If basement excavations are limited to avoid penetrating the bedrock, we estimate that floor slabs bearing on the on-site sand and gravel soils will be subject to very little movement. We estimate that total and differential slab movement will be less than 1 inch and about ½-inch, respectively when bearing on the sand soils above the bedrock.

If bedrock materials are penetrated, additional floor slab movement is possible, given the extents of post-construction wetting that are likely to occur. We estimate that there is low to moderate risk of

post-construction floor slab movement being in the range of 2 to 3 inches when bearing directly on the bedrock materials. If this amount of movement cannot be tolerated, overexcavation and recompaction or replacement of the bedrock could be performed as discussed for spread footing/mat foundations.

Typical floor slab design and construction methods to help reduce the potential for distress due to floor slab movement are as follows:

- Floor slabs should not be constructed on frozen subgrade.
- Interior trench backfill placed beneath slabs should be compacted in accordance with recommended specifications outlined below.
- Positive separations and/or isolation joints should be provided between slabs and all foundations, columns or utility lines to allow independent movement.
- Control joints should be provided in slabs to control the location and extent of cracking.
- Use of slip joints or void spaces in the framing at the base or top of partition walls.
- Other design and construction considerations, as outlined in Section 302.1R of the *ACI Design Manual*, are recommended.

Private Pavement Thickness Design: Design of the limited private pavements for the project is based on the procedures outlined in the 1993 *Guideline for Design of Pavement Structures* by the American Association of State Highway and Transportation Officials (AASHTO) and the Colorado Department of Transportation (CDOT). We assume that pavements associated with the project will include the parking garage floor slab, private access drives and surface parking. We assume that the private drives and parking areas will be paved using asphalt or Portland cement concrete. Any improvements to adjacent public roadways will need to be designed and constructed according to the City of Boulder standards

The following traffic criteria were used for determining pavement thicknesses using a design life of 20 years:

- Parking stalls - maximum daily traffic of 1,000 cars per day (equivalent single-axle loads, ESAL's of 22,000)
- Driving lanes – up to 20 trips/day by single-axle delivery trucks per day, 1 combined-axle truck per day and 1 trash truck per day, plus maximum daily traffic of 1,000 cars per day (73,000 ESAL’s)

Recommended alternatives for flexible and rigid pavements are summarized for each traffic area as follows:

Traffic Area	Alternative	Recommended Pavement Thickness (Inches)		
		Asphalt Concrete Surface	Aggregate Base Course	Portland Cement Concrete
Light-Duty Surface Automobile Parking Only	A	5-½	--	--
	B	4	6	--
	C	--	--	5
Heavy-Duty Private Drives, Delivery truck access	A	6	--	--
	B	4	8	--
	C	--	--	6
Parking Garage Slab, Trash Enclosure		--	--	6

Pavement thicknesses recommended are based on the upper 12 inches of the subgrade materials being properly moisture conditioned and compacted prior to paving. A proofroll of the subgrade soils should also be performed prior to paving and any soft/yielding areas remediated. Paving materials used at the site should meet current CDOT specifications.

Future performance of pavements constructed on the subgrade soils at this site will be dependent upon several factors, including:

- Maintaining stable moisture content of the subgrade soils.
- Providing for a planned program of preventative maintenance.

Minimizing excess moisture, which can reach the subgrade soils, can enhance the performance of all pavements. Preventative maintenance should be planned and provided for an ongoing pavement management program in order to enhance future pavement performance. Preventative maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment.

Earthwork:

General Considerations: The following presents our initial recommendations for site preparation, excavation, subgrade preparation and placement of engineered fills on the project based on typical construction methods. As the design plans are finalized, these recommendations should be refined accordingly.

All earthwork on the project should be observed and evaluated by PCH. The evaluation of earthwork should include observation and testing of engineered fills, subgrade preparation, foundation bearing soils and other geotechnical conditions exposed during the construction of the project.

Site Preparation: Strip and remove existing pavements, underground utilities, foundation elements, loose or soft backfill soils, and associated construction debris along with any other deleterious materials from the site. Stripped materials consisting of vegetation and organic materials should be wasted from the site. Properly ground asphalt or Portland cement concrete may be utilized for on-site fills provided they are intermixed with the on-site soils under the observation of the geotechnical engineer. Maximum pulverized fragment sizes of about 3 to 4 inches are recommended.

The stability of the site subgrade may be affected by precipitation, proximity to groundwater, repetitive construction traffic, or other factors. If unstable conditions are encountered or develop during construction, workability may be improved by scarifying and aeration. Gravel augmentation or chemical treatment could also be considered for very soft areas. The methods used/required may be determined by the foundation system and or subgrade improvements performed.

Excavation and Trench Construction: Excavations into the on-site sands will be subject to caving and groundwater. The contractor is responsible for maintaining safe and dry excavations. According to current OSHA standards, we believe that the on-site sand soils classify as Type C soils requiring that the sides of temporary excavations be sloped at a minimum of 1-½ to 1 (horizontal to vertical).

If properly sloped excavations approach property lines, public right-of-way, or adjacent facilities the contractor should assess the potential need to shore the sides of excavations. All excavations should be sloped or shored in the interest of safety following local and federal regulations, including current OSHA excavation and trench safety standards. Individual contractors are responsible for the safety of excavations on the site. Shoring of surrounding development may consist of soldier piers, piles and lagging, or other methods. Permanent shoring may be used as formwork for the exterior side of foundation walls. Design-build shoring contractors should be contacted to review this report and provide recommendations to complete the planned excavations.

The contractor should verify that similar conditions exist throughout the proposed area of excavation. If different subsurface conditions are encountered at the time of construction, the actual conditions should be evaluated to determine any excavation modifications necessary to maintain safe conditions.

As a safety measure, it is recommended that all vehicles and soil piles be kept to a minimum lateral distance from the crest of the slope equal to no less than the slope height. The exposed slope face should be protected against the elements.

Fill Materials: Clean on-site soils or approved imported materials may be used as fill material upon approval of the geotechnical engineer. Imported structural fill soils (if required) should conform to the following:

Gradation	**Percent finer by weight (ASTM C136)**
6"	100
3"	70-100
No. 4 Sieve	50-100
No. 200 Sieve	20 maximum

- Liquid Limit ..... 30 (max)
- Plasticity Index ..... 10 (max)
- Maximum expansive potential (%)* 0.5

*Measured on a sample compacted to approximately 95 percent of the ASTM D698 maximum dry density near optimum water content. The sample is confined under a 100 psf surcharge and submerged.

Fill Placement and Compaction: Subgrade soils beneath new fill, engineered fills used to bring the site to construction grade, fill beneath structures, and other backfill soils should be placed and compacted according to the recommendation in the following table:

Criteria	**Recommended values**
Lift Thickness	8 to 12 inches, depending on compaction equipment
Moisture Content Range	Sand soils: -2% below to +3% above optimum Processed bedrock materials: optimum to +4% above optimum
Compaction	On-site or imported sands: ASTM D1557 modified Proctor dry density • Below foundations: 98% minimum • All other areas: 95% minimum Processed bedrock: ASTM D698 standard Proctor dry density • All areas 95% minimum

At a minimum, fill soils placed for site grading, utility trench backfill, foundation backfill, and floor slab and pavement subgrade soils should be tested to confirm that earthwork is being performed according to our recommendations and project specifications. Subsequent lifts of fill should not be placed on previous lifts if the moisture content or dry density is determined to be less than specified. We also

recommend that the in-place fill materials comprised of on-site clay be tested for expansion potential frequently to that the fill mass is low expansive.

Fill Settlement: Even when properly compacted, some settlement of fill soils should be anticipated. Typically, settlement of fill zones comprised of the on-site sand soils will be less than about 1 percent of fill thickness and settlement should occur during construction. Excessive settlement, beyond the estimated amount, may also result if concentrated water flow is allowed to infiltrate the fill zone or if water is allowed to pond above the fill.

Final Grading, Landscaping, and Surface Drainage: All grades must be adjusted to provide positive drainage away from structures during construction and maintained throughout the life of the proposed project. Infiltration of water into utility or foundation excavations must be prevented during construction. Landscaped irrigation adjacent to foundations should be eliminated where possible or minimized to only limited drip irrigation.

Water permitted to pond near or adjacent to the perimeter of the structure (either during or post-construction) can result in significantly higher soil movements than those discussed in this report. As a result, any estimations of potential movement described in this report cannot be relied upon if positive drainage is not obtained and maintained, and water is allowed to infiltrate the fill and/or subgrade.

Exposed ground should be sloped at a minimum of 5 percent grade for at least 5 feet beyond the perimeter of the building, where possible. We understand that this may not be feasible in all unpaved areas due to ADA access requirements and required design other features. Swales sidewalk chases, area drains may be required to facilitate drainage in these areas. Backfill against foundations, exterior walls and in utility and sprinkler line trenches should be well compacted and free of all construction debris to reduce the possibility of moisture infiltration. After building construction and prior to project completion, we recommend that verification of final grading be performed to document that positive drainage, as described above, has been achieved.

Flatwork will be subject to post construction movement. Maximum grades practical should be used for paving and flatwork to prevent areas where water can pond. In addition, allowances in final grades should take into consideration post-construction movement of flatwork, particularly if such movement would be critical. Where paving or flatwork abut the structure, care should be taken that joints are properly sealed and maintained to prevent the infiltration of surface water.

Planters located adjacent to the structure should preferably be self-contained (planter boxes, potted landscaping, etc.). Sprinkler mains and spray heads should be located a minimum of 5 feet away from the buildings. We recommend the use of Xeric landscaping, requiring little or no irrigation be used within 5 feet of foundations. If drip irrigation is required in this zone, systems should timed to provide only the amount of water needed to sustain growth. Irrigation systems should be frequently checked for proper performance and any breakages fixed as soon as possible.

Roof drains should discharge via solid pipe into storm sewer systems, if possible. Where this is not possible, roof drain flows should be directed onto pavements or discharge away from the structure a minimum of 5 to 10 feet through the use of splash blocks or downspout extensions.

GENERAL COMMENTS

PCH should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. PCH should also be retained to provide testing and observation during the excavation, grading, foundation and construction phases of the project.

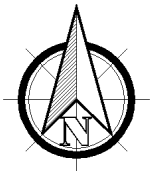
The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include, either specifically or by implication, any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes are planned in the nature, design, or location of the project as outlined in this report, the conclusions and recommendations contained in this report shall not be considered valid unless PCH reviews the changes, and either verifies or modifies the conclusions of this report in writing.

APPENDIX A

BORING LOCATION DIAGRAM
BORING LOGS



1 APPROXIMATE BORING LOCATIONS

BORING LOCATION DIAGRAM
PEARL PLACE- 30TH & PEARL STREETS
BOULDER, COLORADO
PCH PROJECT NO. 12.070.14

Pickering, Cole, & Hivner, LLC
1070 W. 124th Ave., Suite 300
Westminster, CO 80234
(303) 996-2999

LOG OF BORING NO. 1

PROJECT:	Pearl Place - Professional Office Development	PROJECT NO.:	12.070.14
CLIENT:	Forum Real Estate Group	DATE:	27-Feb-14
LOCATION:	Boulder, CO	ELEVATION:	Not Provided
DRILLER / RIG:	Dakota Drilling / CME-55	LOGGED BY:	G. Ohlsen
DEPTH TO WATER:	▼ 13 ft - 2/27/14 Backfilled - 2/27/14		

Depth	Soil Graphic	Description	Samples								
			No.	USCS	Type	Blows per foot*	Recovery, in	Moisture Content, %	Dry Density, pcf	Swell or Consol. (-), %	Surcharge, ksf
		Approximately 5 inches of asphalt pavement at surface									
		FINE TO COARSE SAND with SILT and GRAVEL, varies to Gravel with Silt and Sand, some cobbles, brown, rust-brown, moist, dense									
5			1	SW-SM	SS	46	12	3.4			
10			2	SW-SM	SS	42	12	7.5			
15	▼		3	SW-SM	SS	43	12	7.3			
20			4	SW-SM	SS	39	12	7.7			
		20.5 ft **CLAYSTONE BEDROCK**, silty, grey, moist, very hard									
25			5	SW-SM	CB	72/7"	7	7.2	123		
30			6		CB	50/1"	1	9.8	127		
35			7		CB	50/5"	5	8.6	126		
40			8		CB	50/3"	3	7.1			
		Boring terminated at about 40 feet									

* Values represent blows/ft (unless otherwise noted) using sampler indicated. This value may not be indicative of Standard Penetration Test (N-values).

Transitions between layers is shown for information only, actual transitions may be gradual.

This information pertains only to this boring and should not be interpreted as being indicative of the site.

** Disturbed sample

LOG OF BORING NO. 2

PROJECT:	Pearl Place - Professional Office Development	PROJECT NO.:	12.070.14
CLIENT:	Forum Real Estate Group	DATE:	27-Feb-14
LOCATION:	Boulder, CO	ELEVATION:	Not Provided
DRILLER / RIG:	Dakota Drilling / CME-55	LOGGED BY:	G. Ohlsen
DEPTH TO WATER:	▼ 13 feet - 2/27/14 Backfilled - 2/27/14		

Depth	Soil Graphic	Description	Samples									
			No.	USCS	Type	Blows per foot*	Recovery, in	Moisture Content, %	Dry Density, pcf	Swell or Consol. (-), %	Surcharge, ksf
		Approximately 5 inches of asphalt pavement at surface										
		FINE TO COARSE SAND with SILT and GRAVEL, varies to Gravel with Silt and Sand, some cobbles, brown, rust-brown, moist to wet, very dense										
5			1	SP-SM	SS	63	12	1.7			
10			2	SP-SM	SS	61	12	4.0			
15	▼		3	SP-SM	SS	84	12				
20		19.0 ft **CLAYSTONE BEDROCK**, silty, grey, moist, very hard	4		SS	50/5"	5	12.9			
25			5		SS	50/7"	7	10.3	123	0.4	1.0
30		Boring terminated at about 25 feet									
35											
40											

* Values represent blows/ft (unless otherwise noted) using sampler indicated. This value may not be indicative of Standard Penetration Test (N-values).

Transitions between layers is shown for information only, actual transitions may be gradual.

This information pertains only to this boring and should not be interpreted as being indicative of the site.

** Disturbed sample

LOG OF BORING NO. 3

PROJECT:	Pearl Place - Professional Office Development	PROJECT NO.:	12.070.14
CLIENT:	Forum Real Estate Group	DATE:	3-Mar-14
LOCATION:	Boulder, CO	ELEVATION:	Not Provided
DRILLER / RIG:	Dakota Drilling / CME-55	LOGGED BY:	G. Ohlsen
DEPTH TO WATER:	▼ 11 feet - 3/3/14 Backfilled - 3/3/14		

Depth	Soil Graphic	Description	Samples								
			No.	USCS	Type	Blows per foot*	Recovery, in	Moisture Content, %	Dry Density, pcf	Swell or Consol. (-), %	Surcharge, ksf
		Approximately 5 inches of asphalt pavement at surface									
		FINE TO COARSE SAND with SILT and GRAVEL, varies to Gravel with Silt and Sand, some cobbles, brown, rust-brown, moist to wet, dense to very dense									
5			1	SP-SM	SS	50/5"	5	2.1			
10			2	SP-SM	SS	38	12	7.2			
15	▼		3	SP-SM	SS	50/6"	6	7.9			
20		18.0 ft **CLAYSTONE BEDROCK**, silty, grey, moist, very hard	4		CB	50/5"	5	9.7	127	0.8	1.0
25			5		CB	50/2"	2	9.6	129		
30		Boring terminated at about 25 feet									
35											
40											

* Values represent blows/ft (unless otherwise noted) using sampler indicated. This value may not be indicative of Standard Penetration Test (N-values).

Transitions between layers is shown for information only, actual transitions may be gradual.

This information pertains only to this boring and should not be interpreted as being indicative of the site.

** Disturbed sample

LOG OF BORING NO. 4

PROJECT:	Pearl Place - Professional Office Development	PROJECT NO.:	12.070.14
CLIENT:	Forum Real Estate Group	DATE:	3-Mar-14
LOCATION:	Boulder, CO	ELEVATION:	Not Provided
DRILLER / RIG:	Dakota Drilling / CME-55	LOGGED BY:	G. Ohlsen
DEPTH TO WATER:	▼ 10 feet - 3/3/14 Backfilled - 3/3/14		

Depth	Soil Graphic	Description	Samples								
			No.	USCS	Type	Blows per foot*	Recovery, in	Moisture Content, %	Dry Density, pcf	Swell or Consol. (-), %	Surcharge, ksf
		Approximately 5 inches of asphalt pavement at surface									
		SILTY SAND, fine to coarse grained, some gravel, brown, moist, medium dense									
5		5.0 ft	1	SM	SS	29/6"	6	12.4			
		FINE TO COARSE SAND with SILT and GRAVEL, varies to Gravel with Silt and Sand, some cobbles, brown, rust-brown, moist to wet, very dense									
10 ▼			2	GP-GM	SS	50/6"	6				
15			3	GP-GM	SS	66	12				
20		19.0 ft **CLAYSTONE BEDROCK**, silty, grey, moist, hard to very hard	4		SS	50	12	14.6			
25			5		CB	50/1"	1	8.8			
		Boring terminated at about 25 feet									
30											
35											
40											

* Values represent blows/ft (unless otherwise noted) using sampler indicated. This value may not be indicative of Standard Penetration Test (N-values).

Transitions between layers is shown for information only, actual transitions may be gradual.

This information pertains only to this boring and should not be interpreted as being indicative of the site.

** Disturbed sample

LOG OF BORING NO. 5

PROJECT:	Pearl Place - Professional Office Development	PROJECT NO.:	12.070.14
CLIENT:	Forum Real Estate Group	DATE:	4-Mar-14
LOCATION:	Boulder, CO	ELEVATION:	Not Provided
DRILLER / RIG:	Dakota Drilling / CME-55	LOGGED BY:	G. Ohlsen
DEPTH TO WATER:	▼ 11 ft - 3/4/14 Backfilled - 2/27/14		

Depth	Soil Graphic	Description	Samples									
			No.	USCS	Type	Blows per foot*	Recovery, in	Moisture Content, %	Dry Density, pcf	Swell or Consol. (-), %	Surcharge, ksf
		Approximately 5 inches of asphalt pavement at surface										
5		**FINE TO COARSE SAND with SILT and GRAVEL**, varies to Gravel with Silt and Sand, some cobbles, brown, rust-brown, moist to wet, very dense	1	SP-SM	SS	50/6"	6	2.9			
10			2	SP-SM	SS	92	12	8.2			
15	▼		3	SP-SM	SS	50/5"	5	11.7			
20			4	SP-SM	CB	50/6"	6				
		21.0 ft									
25		**CLAYSTONE BEDROCK**, silty, grey, moist, very hard	5		CB	50/3"	3				
30			6		CB	50/3"	3	9.6	123		
35											
40			7		CB	50/1"	1	9.1	139		
		Boring continued on next page									

* Values represent blows/ft (unless otherwise noted) using sampler indicated. This value may not be indicative of Standard Penetration Test (N-values).

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This information pertains only to this boring and should not be interpreted as being indicative of the site.

** Disturbed sample

PCH

LOG OF BORING NO. 5 (Cont.)

PROJECT:	Pearl Place - Professional Office Development	PROJECT NO.:	12.070.14
CLIENT:	Forum Real Estate Group	DATE:	4-Mar-14
LOCATION:	Boulder, CO	ELEVATION:	Not Provided
DRILLER / RIG:	Dakota Drilling / CME-55	LOGGED BY:	G. Ohlsen
DEPTH TO WATER:	▼ 11 ft - 3/4/14 Backfilled - 2/27/14		

Depth	Soil Graphic	Description	Samples								
			No.	USCS	Type	Blows per foot*	Recovery, in	Moisture Content, %	Dry Density, pcf	Swell or Consol. (-), %	Surcharge, ksf
45		**CLAYSTONE BEDROCK**, silty, grey, moist, very hard									
50			2		CB	50/1"	1	7.1	133		
		Boring terminated at about 50 feet									
55											
60											
65											
70											
75											
80											

* Values represent blows/ft (unless otherwise noted) using sampler indicated. This value may not be indicative of Standard Penetration Test (N-values).
Transitions between layers is shown for information only, actual transitions may be gradual.
This information pertains only to this boring and should not be interpreted as being indicative of the site.
** Disturbed sample

LOG OF BORING NO. 6

PROJECT:	Pearl Place - Professional Office Development	PROJECT NO.:	12.070.14
CLIENT:	Forum Real Estate Group	DATE:	5-Mar-14
LOCATION:	Boulder, CO	ELEVATION:	Not Provided
DRILLER / RIG:	Dakota Drilling / CME-55	LOGGED BY:	G. Ohlsen
DEPTH TO WATER:	▼ 10 feet - 3/5/14 Backfilled - 3/5/14		

Depth	Soil Graphic	Description	Samples								
			No.	USCS	Type	Blows per foot*	Recovery, in	Moisture Content, %	Dry Density, pcf	Swell or Consol. (-), %	Surcharge, ksf
		Approximately 5 inches of asphalt pavement at surface									
5		**FINE TO COARSE SAND with SILT and GRAVEL**, varies to Gravel with Silt and Sand, some cobbles, brown, rust-brown, moist to wet, very dense	1	GP-GM	SS	50/2"	2				
10	▼		2	GP-GM	SS	50/6"	6				
15			3	GP-GM	SS	50/6"	6				
20		19.0 ft **CLAYSTONE BEDROCK**, silty, grey, moist, very hard	4		SS	50/5"	5	18.0			
25			5		CB	50/2"	2	7.8	127		
30		Boring terminated at about 25 feet									
35											
40											

* Values represent blows/ft (unless otherwise noted) using sampler indicated. This value may not be indicative of Standard Penetration Test (N-values).

Transitions between layers is shown for information only, actual transitions may be gradual.

This information pertains only to this boring and should not be interpreted as being indicative of the site.

** Disturbed sample

LOG OF BORING NO. 7

PROJECT:	Pearl Place - Professional Office Development	PROJECT NO.:	12.070.14
CLIENT:	Forum Real Estate Group	DATE:	5-Mar-14
LOCATION:	Boulder, CO	ELEVATION:	Not Provided
DRILLER / RIG:	Dakota Drilling / CME-55	LOGGED BY:	G. Ohlsen
DEPTH TO WATER:	▼ 8 feet - 3/5/14 Backfilled - 3/5/14		

Depth	Soil Graphic	Description	Samples									
			No.	USCS	Type	Blows per foot*	Recovery, in	Moisture Content, %	Dry Density, pcf	Swell or Consol. (-), %	Surcharge, ksf
		Approximately 5 inches of asphalt pavement at surface										
		SILTY SAND, fine to coarse grained, with gravel, brown, moist, medium dense										
5		5.0 ft	1	SM	SS	27	12				
		FINE TO COARSE SAND with SILT and GRAVEL, varies to Gravel with Silt and Sand, brown, rust-brown, moist to wet										
		9.0 ft										
10		**CLAYSTONE BEDROCK**, silty, grey, moist, hard to very hard	2		SS	62	12	17.5			
15			3		CB	50/5"	5				
20			4		CB	50/3"	0				
25			5		CB	50/6"	6	8.9			
		Boring terminated at about 25 feet										
30												
35												
40												

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Transitions between layers is shown for information only, actual transitions may be gradual.

This information pertains only to this boring and should not be interpreted as being indicative of the site.

** Disturbed sample

PCH

LOG OF BORING NO. 8

PROJECT:	Pearl Place - Professional Office Development	PROJECT NO.:	12.070.14
CLIENT:	Forum Real Estate Group	DATE:	4-Mar-14
LOCATION:	Boulder, CO	ELEVATION:	Not Provided
DRILLER / RIG:	Dakota Drilling / CME-55	LOGGED BY:	G. Ohlsen
DEPTH TO WATER:	▼ 5 feet - 3/4/14 Backfilled - 3/4/14		

Depth	Soil Graphic	Description	Samples								
			No.	USCS	Type	Blows per foot*	Recovery, in	Moisture Content, %	Dry Density, pcf	Swell or Consol. (-), %	Surcharge, ksf
		Approximately 5 inches of asphalt pavement at surface									
5 ▼		**SILTY SAND**, fine to coarse grained, with gravel, brown, moist to wet, medium dense, some claystone fragments with depth	1	SM	SS	26	12	8.3			
		7.0 ft									
10		**CLAYSTONE BEDROCK**, silty, grey, brown, moist, medium hard to very hard	2		CB	50/10"	10	13.2	120	0.7	0.50
15			3		CB	50/4"	4	11.6	118	2.4	0.50
		Auger refusal at 16 feet									
20											
25											
30											
35											
40											

* Values represent blows/ft (unless otherwise noted) using sampler indicated. This value may not be indicative of Standard Penetration Test (N-values).
Transitions between layers is shown for information only, actual transitions may be gradual.
This information pertains only to this boring and should not be interpreted as being indicative of the site.
** Disturbed sample

PCH

LOG OF BORING NO. 9

PROJECT:	Pearl Place - Professional Office Development	PROJECT NO.:	12.070.14
CLIENT:	Forum Real Estate Group	DATE:	3-Mar-14
LOCATION:	Boulder, CO	ELEVATION:	Not Provided
DRILLER / RIG:	Dakota Drilling / CME-55	LOGGED BY:	G. Ohlsen
DEPTH TO WATER:	▼ 12 ft - 3/3/14 Backfilled - 3/3/14		

Depth	Soil Graphic	Description	Samples									
			No.	USCS	Type	Blows per foot*	Recovery, in	Moisture Content, %	Dry Density, pcf	Swell or Consol. (-), %	Surcharge, ksf
		Approximately 5 inches of asphalt pavement at surface									
		FINE TO COARSE SAND with SILT and GRAVEL, varies to Gravel with Silt and Sand, some cobbles, brown, rust-brown, moist to wet, medium dense to very dense									
5			1	SW-SM	SS	50/5"	5				
10			2	SW-SM	SS	28	12				
▼		14.0 ft									
15		**CLAYSTONE BEDROCK**, silty, grey, moist, medium hard to very hard	3		SS	78/11"	11	15.5			
20			4		CB	50/11"	11	8.6	126		
25			5		CB	50/5"	5	7.3	134		
30			6		CB	50/3"	3	7.2	133		
35											
40			7		CB	50/5"	5	9.8	124		
		Boring terminated at about 40 feet									

* Values represent blows/ft (unless otherwise noted) using sampler indicated. This value may not be indicative of Standard Penetration Test (N-values).

Transitions between layers is shown for information only, actual transitions may be gradual.

This information pertains only to this boring and should not be interpreted as being indicative of the site.

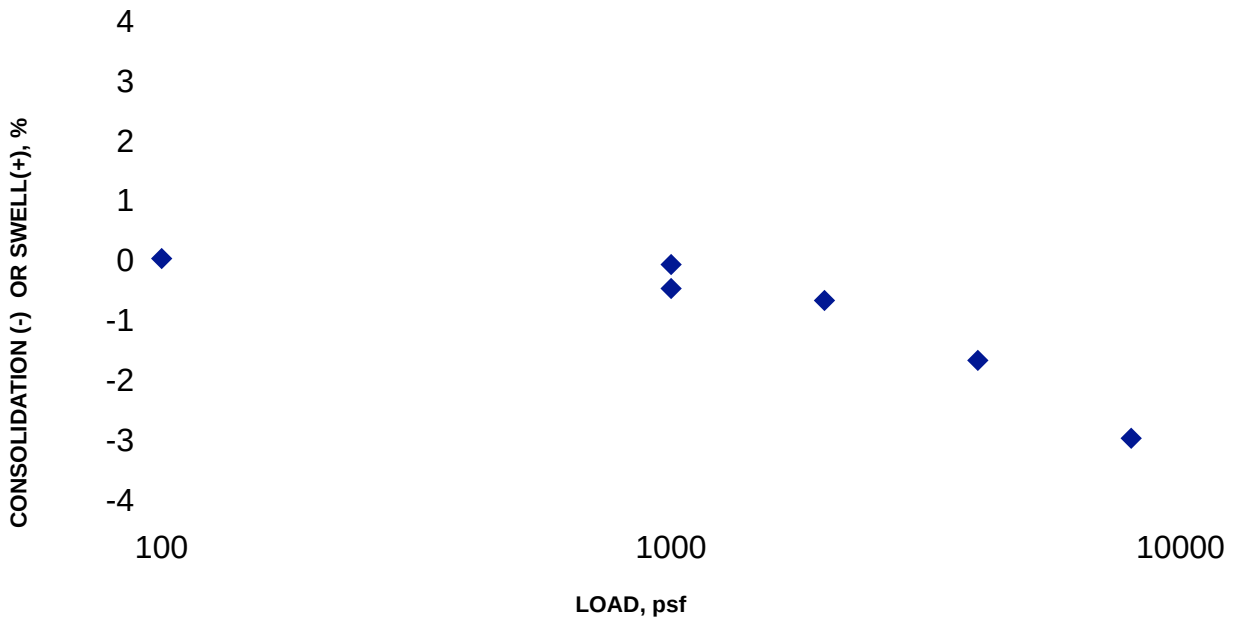
** Disturbed sample

PCH

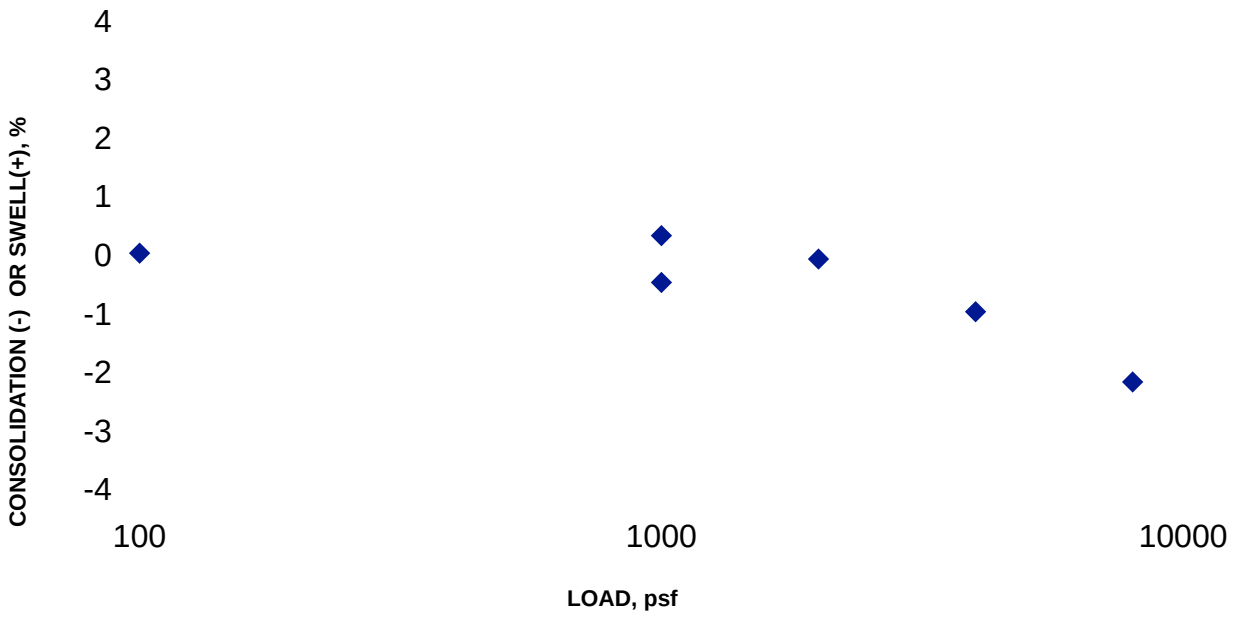
APPENDIX B

LABORATORY TEST RESULTS AND SUMMARY

SWELL/CONSOLIDATION TESTING

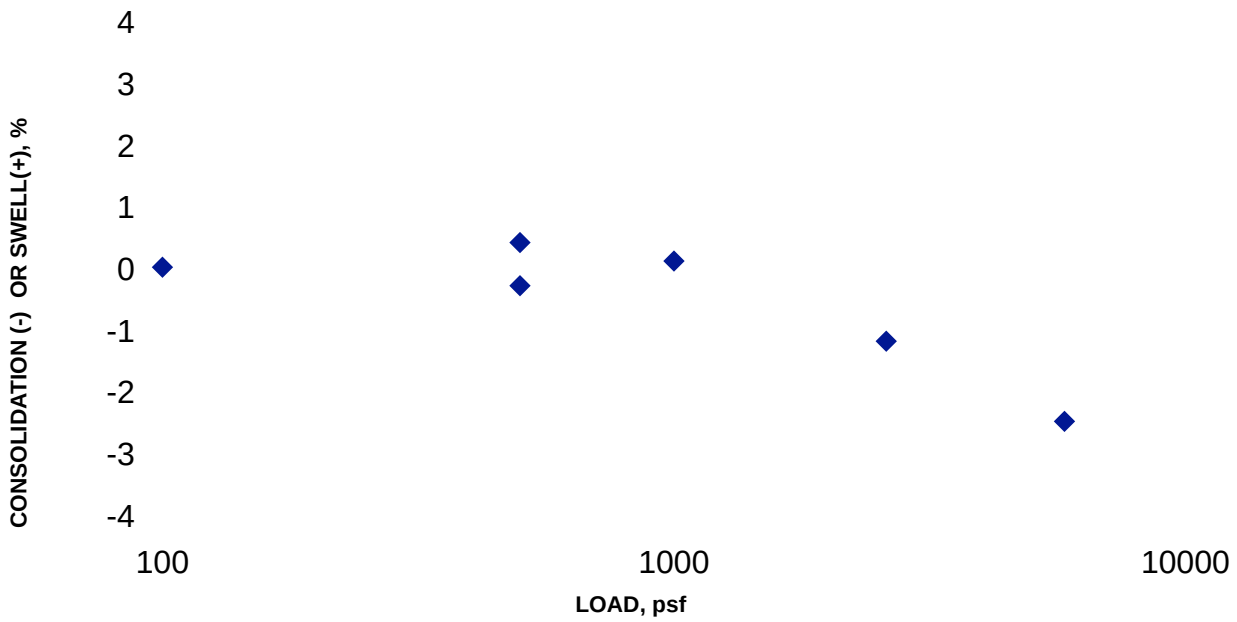


PROJECT	Pearl Place - Professional Office Development	**PROJECT NO.**	12.070.14
SAMPLE ID	Boring 2 @ 24 ft	**START DATE**	3/14/14
SAMPLE DESCRIPTION	Claystone Bedrock		
PRE-TEST MOISTURE CONTENT	10.3%	**DRY DENSITY**	123 pcf

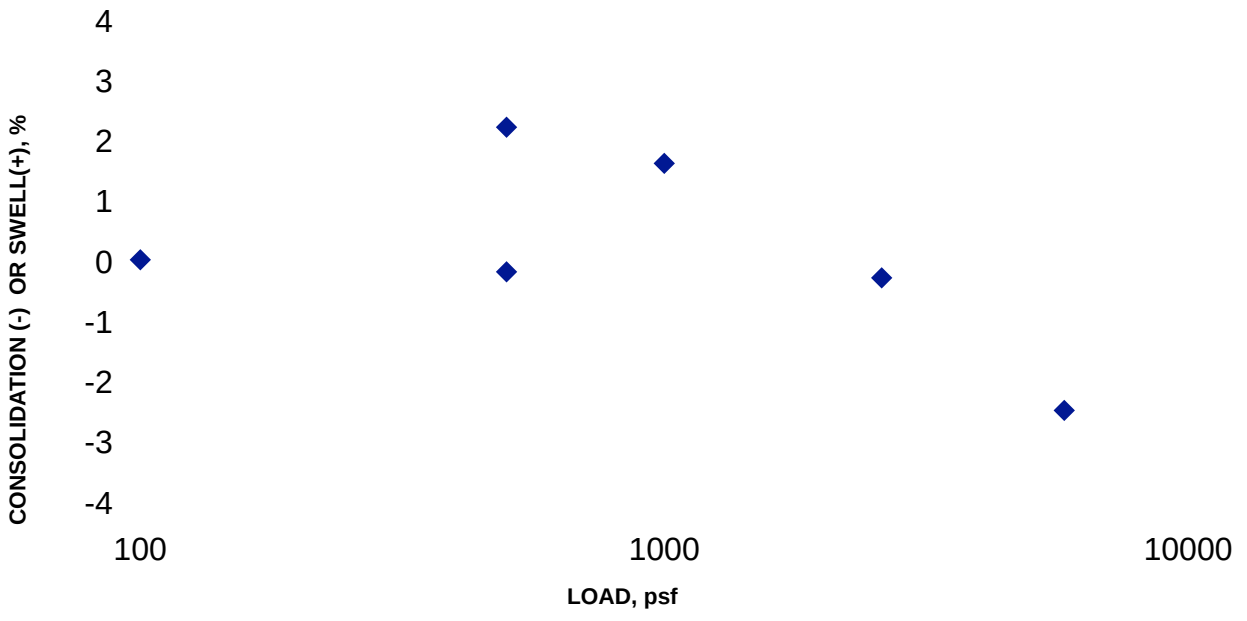


PROJECT	Pearl Place - Professional Office Development	**PROJECT NO.**	12.070.14
SAMPLE ID	Boring 3 @ 19 ft	**START DATE**	3/14/14
SAMPLE DESCRIPTION	Claystone Bedrock		
PRE-TEST MOISTURE CONTENT	9.6%	**DRY DENSITY**	127 pcf

SWELL/CONSOLIDATION TESTING



PROJECT	Pearl Place - Professional Office Development	**PROJECT NO.**	12.070.14
SAMPLE ID	Boring 8 @ 9 ft	**START DATE**	3/14/14
SAMPLE DESCRIPTION	Claystone Bedrock		
PRE-TEST MOISTURE CONTENT	13.2%	**DRY DENSITY**	120 pcf



PROJECT	Pearl Place - Professional Office Development	**PROJECT NO.**	12.070.14
SAMPLE ID	Boring 8 @ 14 ft	**START DATE**	3/14/14
SAMPLE DESCRIPTION	Claystone Bedrock		
PRE-TEST MOISTURE CONTENT	11.6%	**DRY DENSITY**	118 pcf

Information To Build On
Engineering • Consulting • Testing

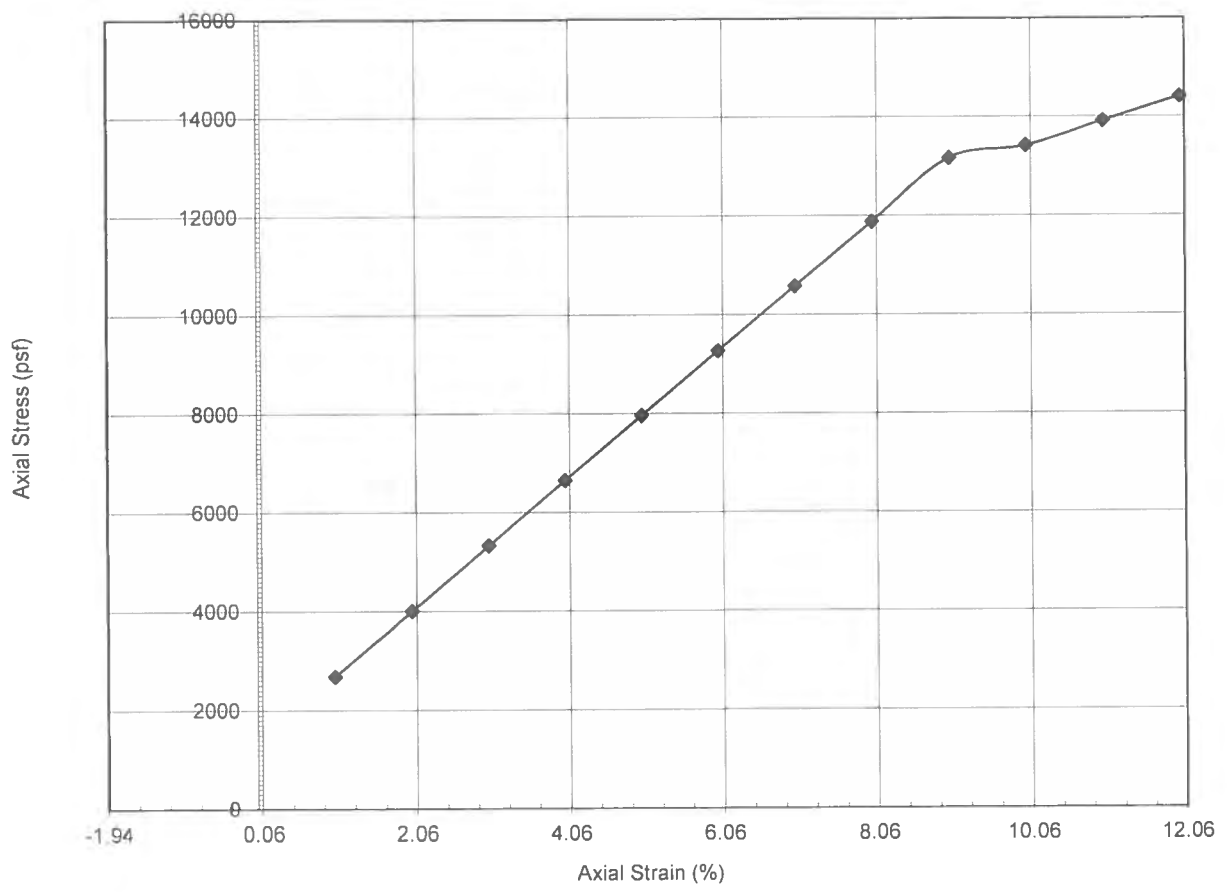
UNCONFINED COMPRESSION REPORT

Tested For: PCH 12.326

Project Name: PCH Testing
12.070

Project No. 0532482-33
Sample No. 1
Depth 34

UNCONFINED COMPRESSION TEST: ASTM D2166



Wet Density (pcf)	136.7	**Initial Height (in)**	3.76
Dry Density (pcf)	125.9	**Initial Diameter (in)**	1.95
Moisture Content (%)	8.6	**Relative Compaction (%)**	N/A
Compressive Strength (psf)	14,900	**Deviation From OMC (%)**	N/A

Remarks:

Respectfully Submitted,
Professional Service Industries, Inc.

psi Information To Build On
Engineering • Consulting • Testing

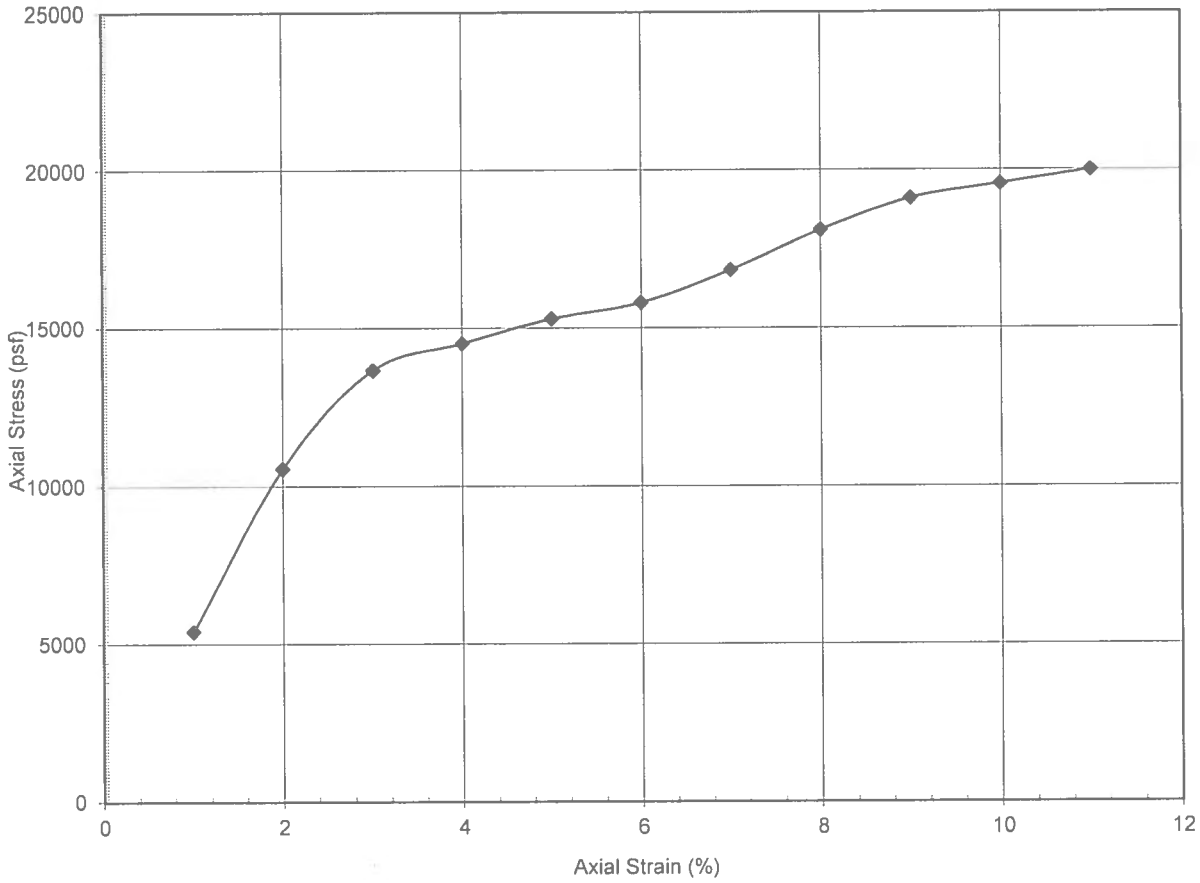
UNCONFINED COMPRESSION REPORT

Tested For: PCH 12.326

Project Name: PCH Testing
12.070

Project No. 0532482-33
Sample No. 9
Depth 39

UNCONFINED COMPRESSION TEST: ASTM D2166



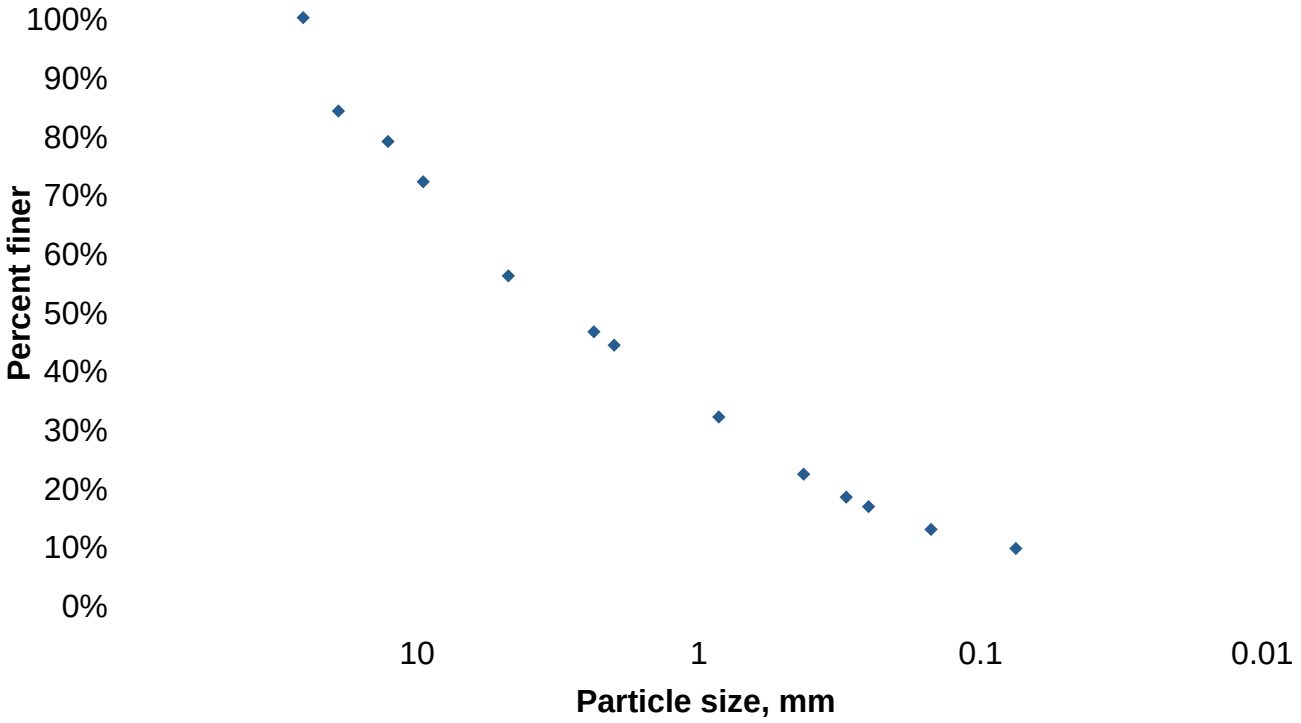
Wet Density (pcf)	136.5	**Initial Height (in)**	3.40
Dry Density (pcf)	124.4	**Initial Diameter (in)**	1.96
Moisture Content (%)	9.8	**Relative Compaction (%)**	N/A
Compressive Strength (psf)	20,000	**Deviation From OMC (%)**	N/A

Remarks:

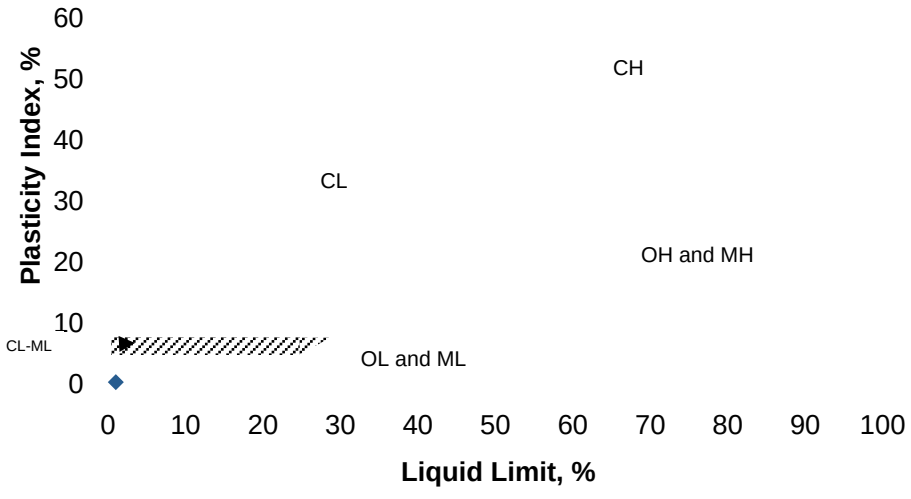
Respectfully Submitted,
Professional Service Industries, Inc.

SAMPLE CLASSIFICATION WORKSHEET

Grain Size Distribution



Plasticy Index Chart



Passing No. 4	**56%**
Passing #200	**10%**
Liquid Limit	**NV**
Plastic Limit	**NP**
Plasticity Index	**NP**

PCH

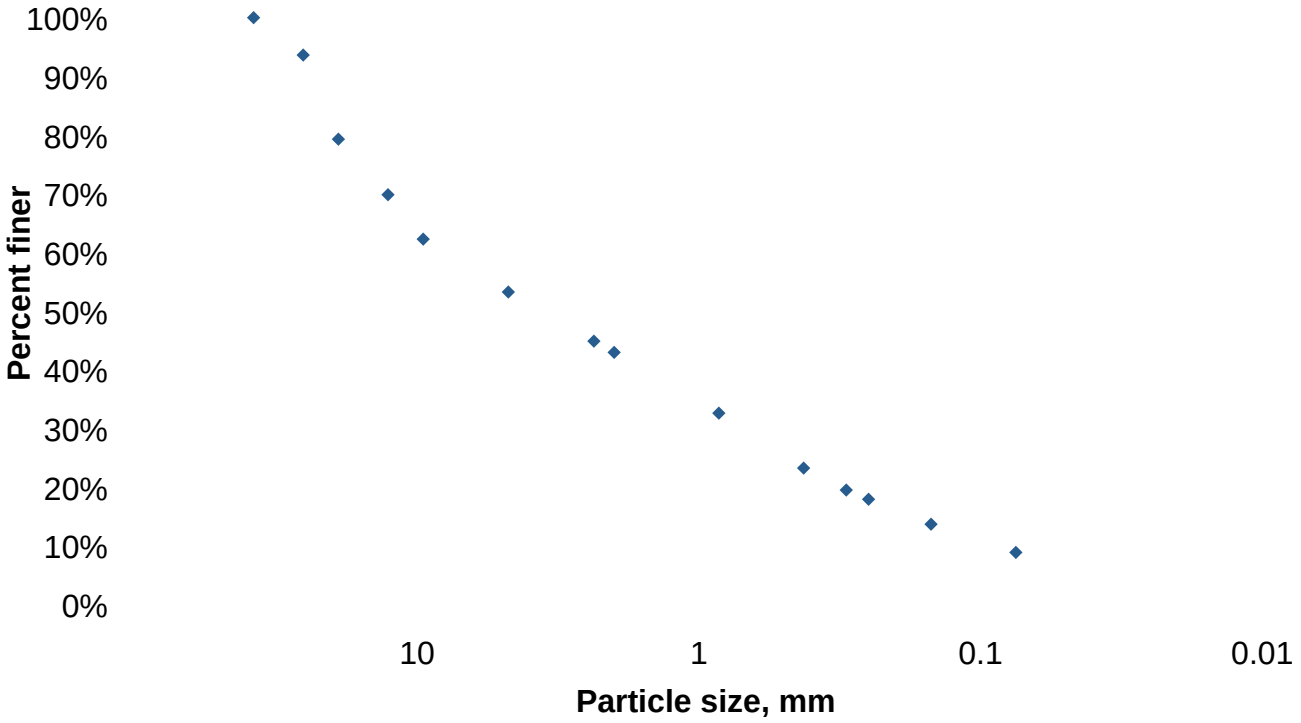
Pickering, Cole, & Hivner

Geotechnical and Environmental Engineers

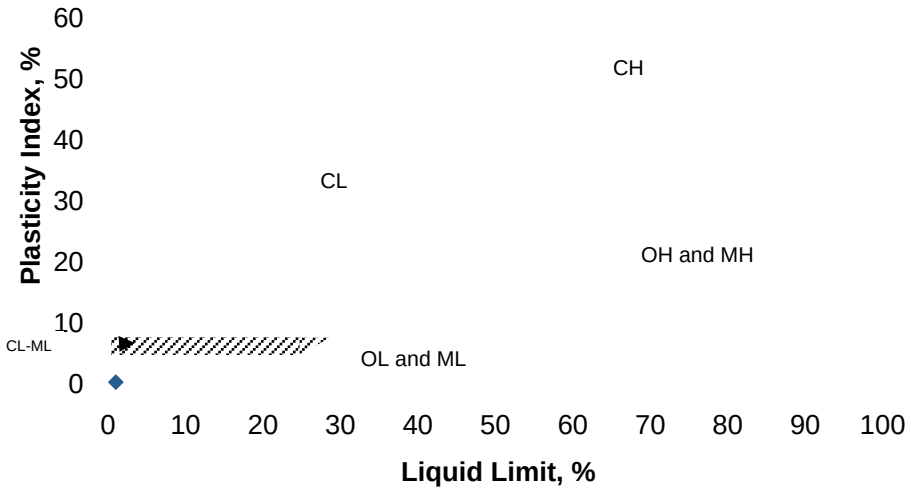
PROJECT	Pearl Place - Professional Office Development	**PROJECT NO.**	12.070.14
SAMPLE ID	Boring No. 1 @ 4 & 9 feet	**START DATE**	3/14/14
SAMPLE CLASSIFICATION	Well-Graded Sand with Silt and Gravel (SW-SM)		

SAMPLE CLASSIFICATION WORKSHEET

Grain Size Distribution



Plasticy Index Chart



Passing No. 4	**53%**
Passing #200	**9%**
Liquid Limit	**NV**
Plastic Limit	**NP**
Plasticity Index	**NP**

PCH

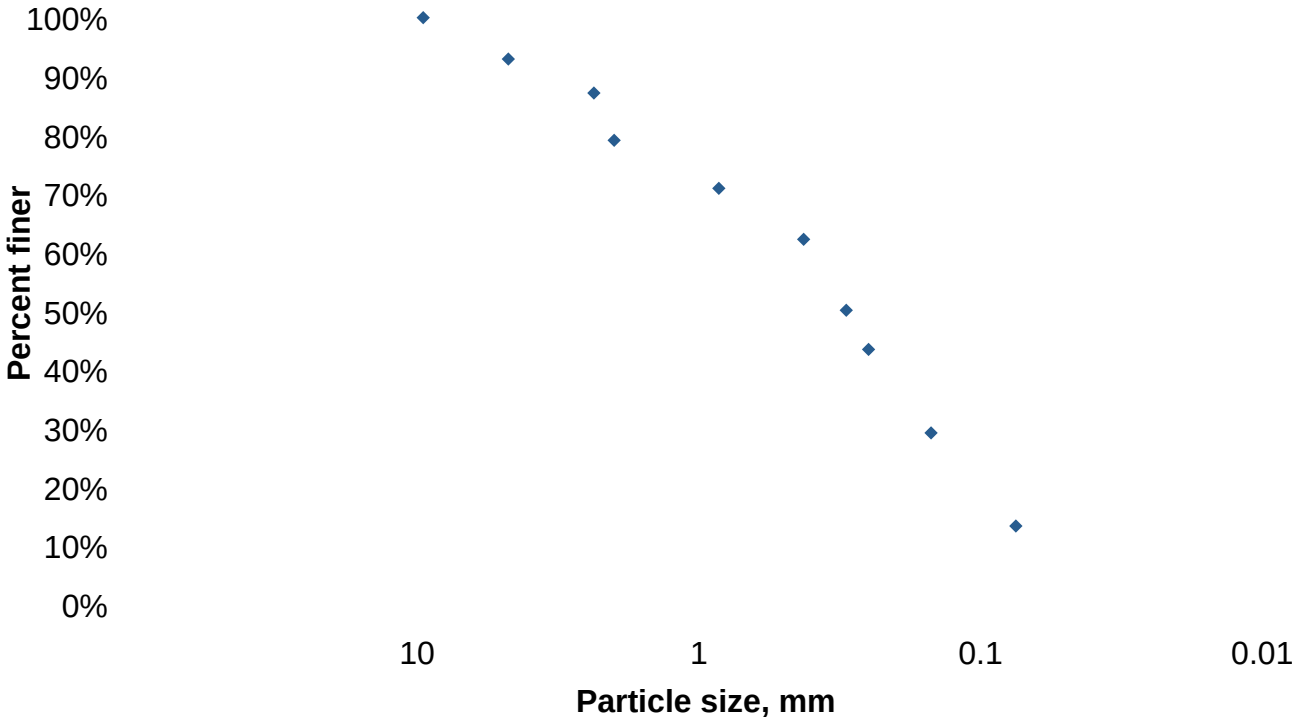
Pickering, Cole, & Hivner

Geotechnical and Environmental Engineers

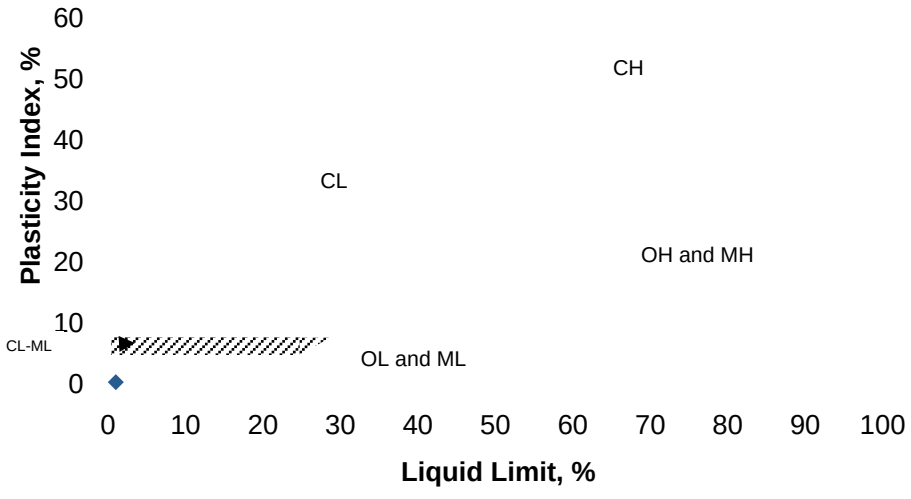
PROJECT	Pearl Place - Professional Office Development	**PROJECT NO.**	12.070.14
SAMPLE ID	Boring No. 2 @ 9 feet	**START DATE**	3/14/14
SAMPLE CLASSIFICATION	Poorly-Graded Gravel with Silt and Sand (GP-GM)		

SAMPLE CLASSIFICATION WORKSHEET

Grain Size Distribution



Plasticy Index Chart



Passing No. 4	**93%**
Passing #200	**13%**
Liquid Limit	**NV**
Plastic Limit	**NP**
Plasticity Index	**NP**

PCH

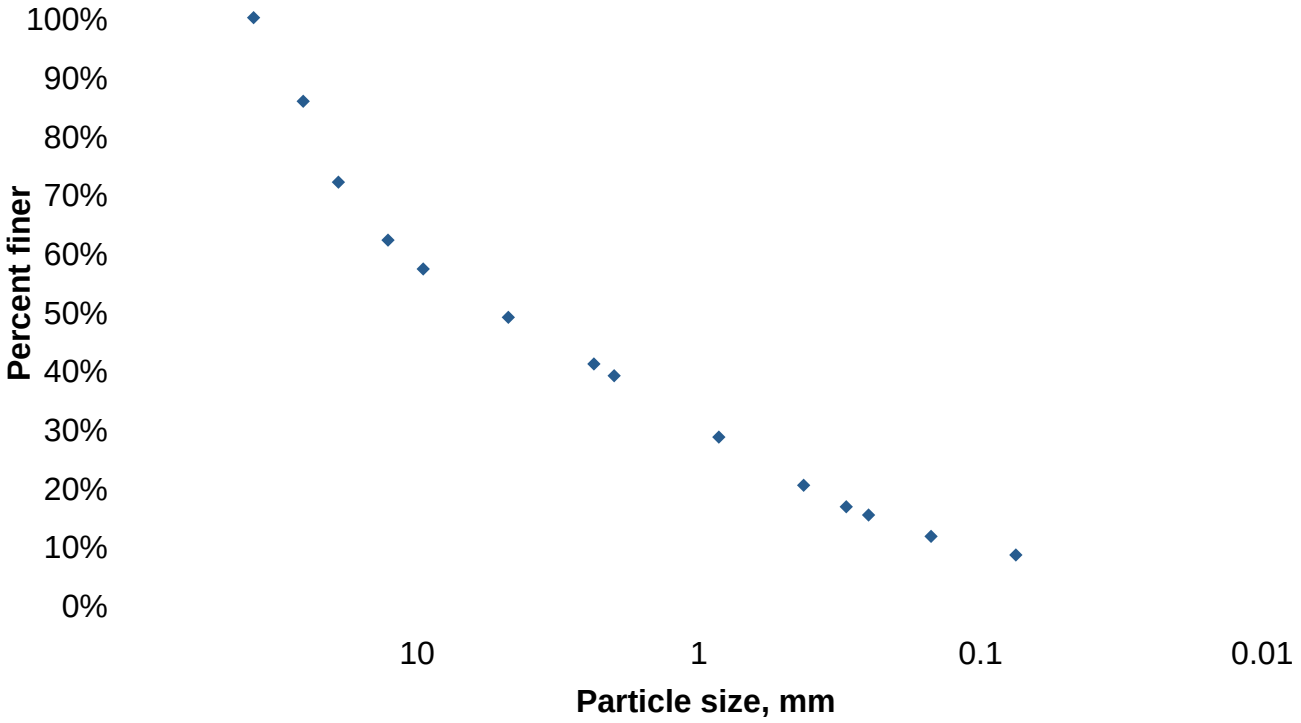
Pickering, Cole, & Hivner

Geotechnical and Environmental Engineers

PROJECT	Pearl Place - Professional Office Development	**PROJECT NO.**	12.070.14
SAMPLE ID	Boring No. 4 @ 4 feet	**START DATE**	3/14/14
SAMPLE CLASSIFICATION	Silty Sand (SM)		

SAMPLE CLASSIFICATION WORKSHEET

Grain Size Distribution



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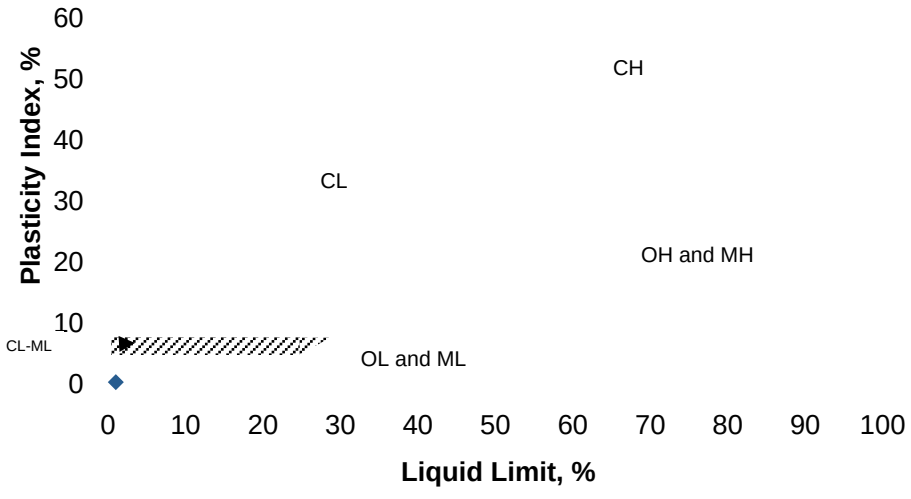


Passing No. 4	**49%**
Passing #200	**8%**
Liquid Limit	**NV**
Plastic Limit	**NP**
Plasticity Index	**NP**

PCH

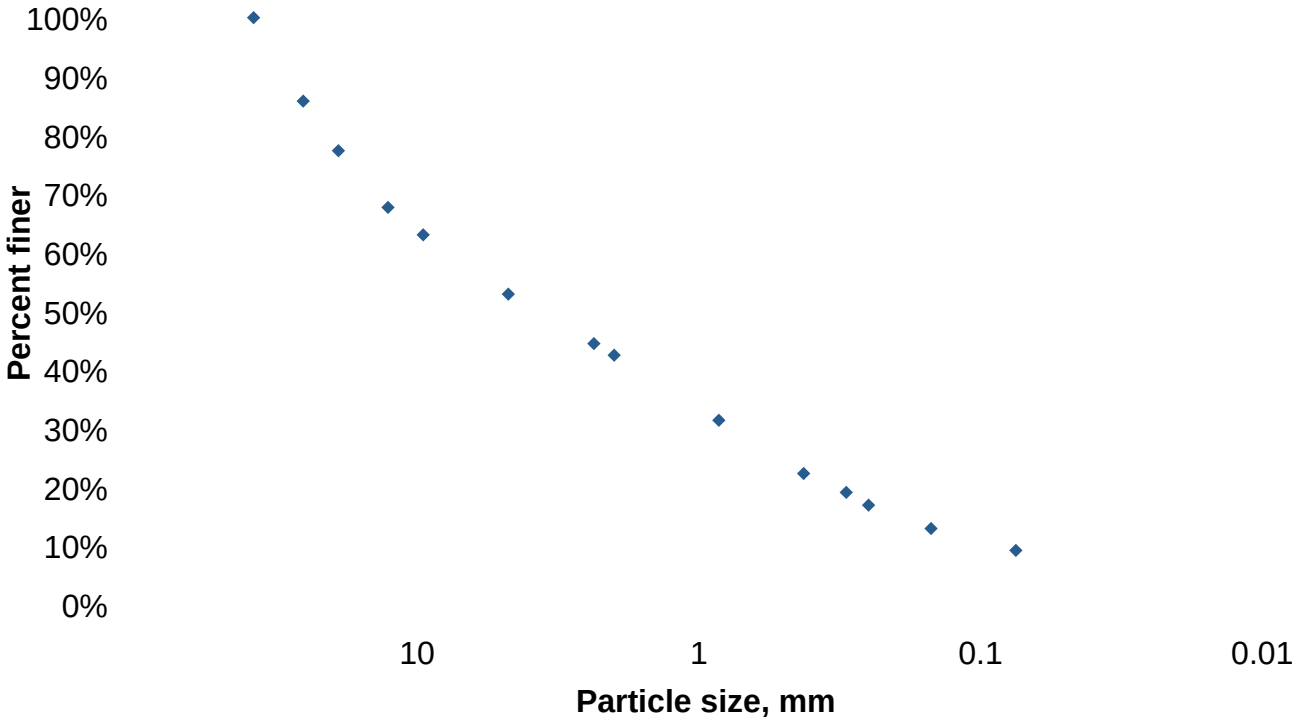
Pickering, Cole, & Hivner

Geotechnical and Environmental Engineers

PROJECT	Pearl Place - Professional Office Development	**PROJECT NO.**	12.070.14
SAMPLE ID	Boring No. 4 @ 9 & 14 feet	**START DATE**	3/14/14
SAMPLE CLASSIFICATION	Poorly-graded Gravel with Silt and Sand (GP-GM)		

SAMPLE CLASSIFICATION WORKSHEET

Grain Size Distribution



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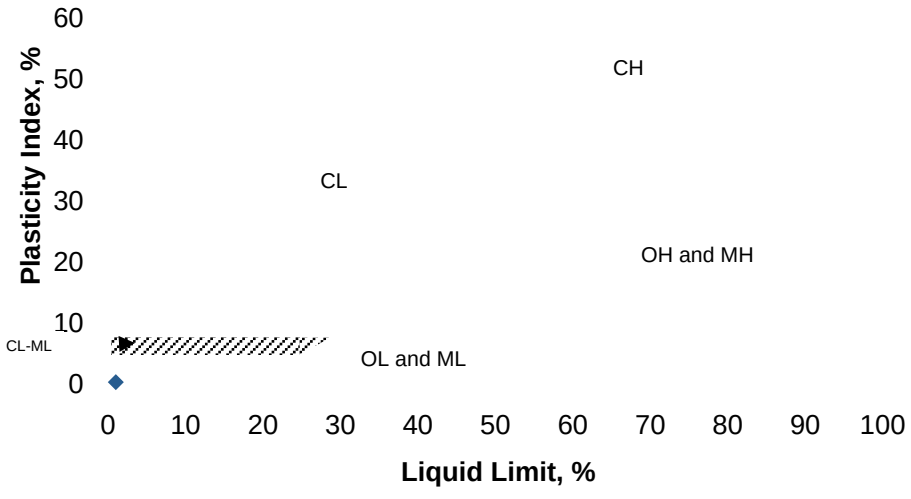


Passing No. 4	**53%**
Passing #200	**9%**
Liquid Limit	**NV**
Plastic Limit	**NP**
Plasticity Index	**NP**

PCH

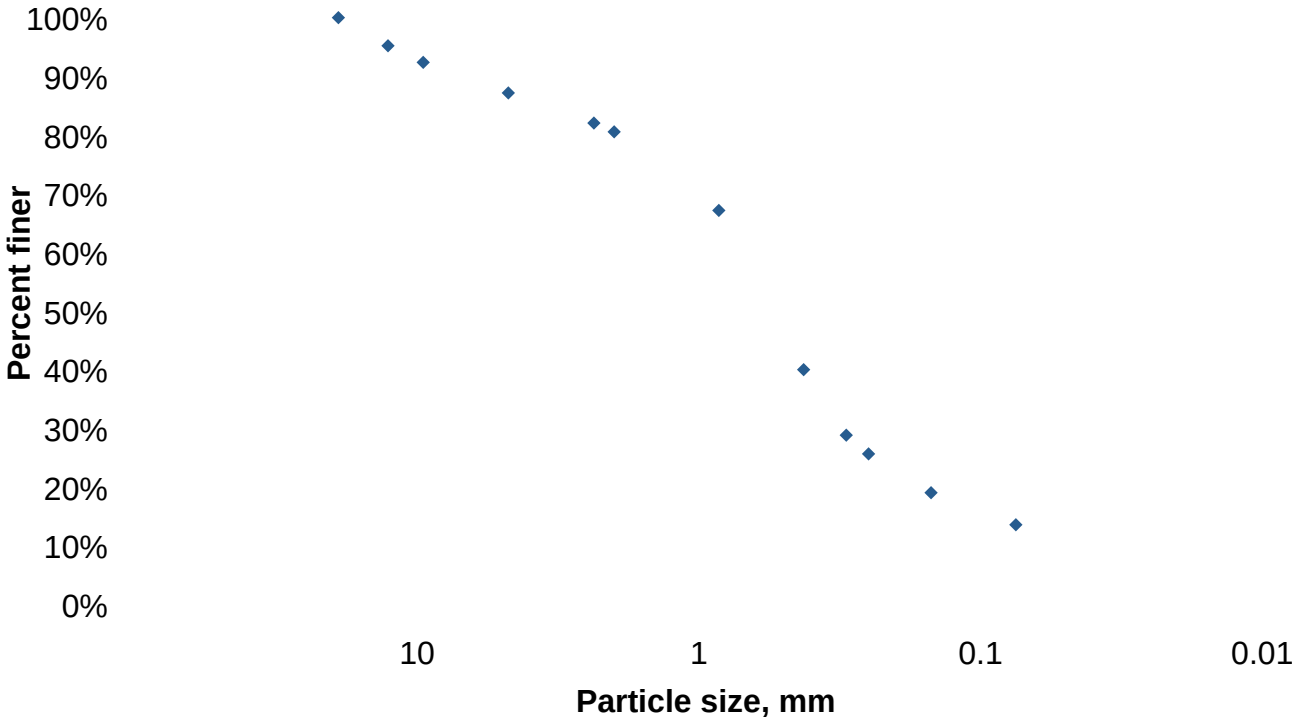
Pickering, Cole, & Hivner

Geotechnical and Environmental Engineers

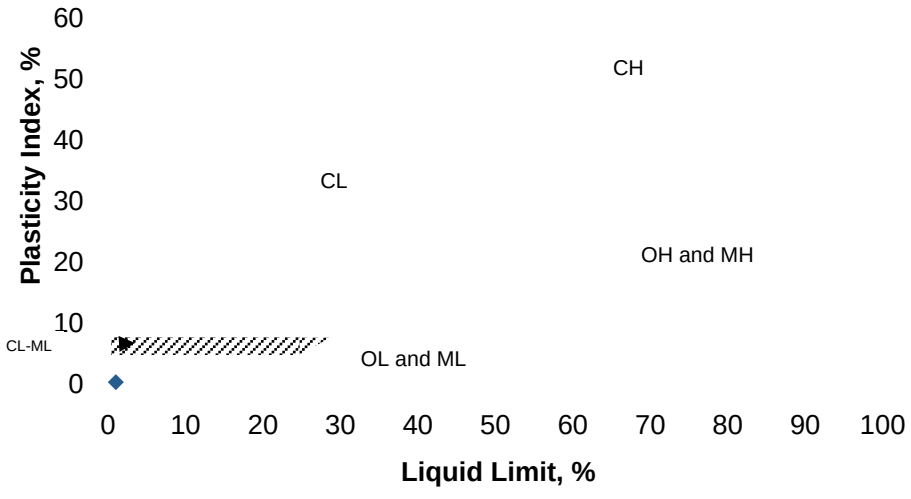
PROJECT	Pearl Place - Professional Office Development	**PROJECT NO.**	12.070.14
SAMPLE ID	Boring No. 6 @ 9 & 14 feet	**START DATE**	3/14/14
SAMPLE CLASSIFICATION	Poorly-graded Gravel with Silt and Sand (GP-GM)		

SAMPLE CLASSIFICATION WORKSHEET

Grain Size Distribution



Plasticy Index Chart



Passing No. 4	**87%**
Passing #200	**14%**
Liquid Limit	**NV**
Plastic Limit	**NP**
Plasticity Index	**NP**

PCH

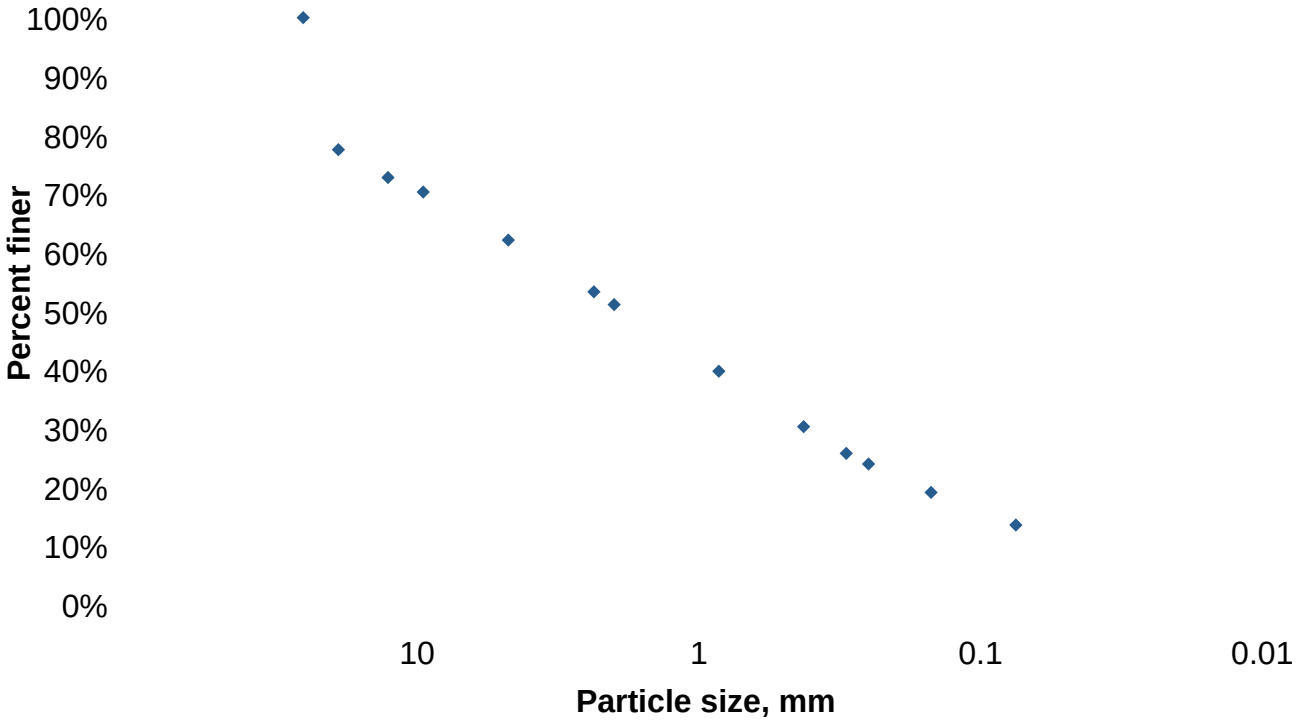
Pickering, Cole, & Hivner

Geotechnical and Environmental Engineers

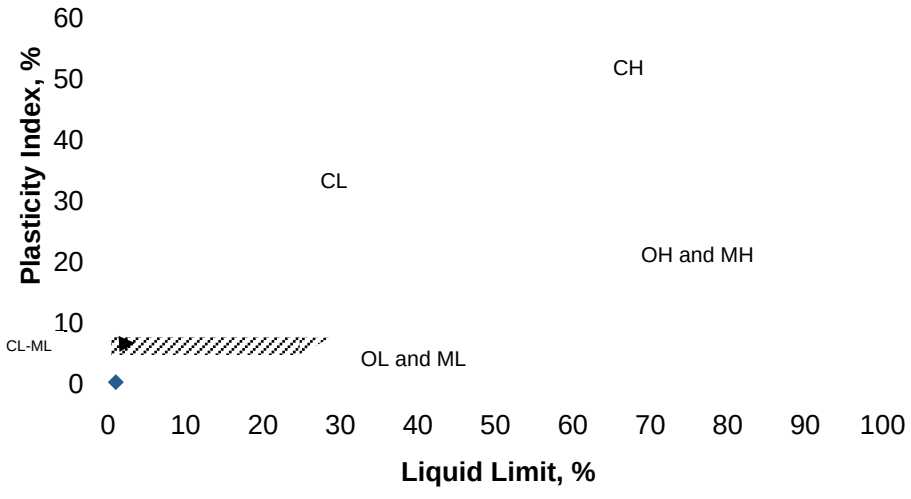
PROJECT	Pearl Place - Professional Office Development	**PROJECT NO.**	12.070.14
SAMPLE ID	Boring No. 7 @ 4 feet	**START DATE**	3/14/14
SAMPLE CLASSIFICATION	Silty Sand (SM)		

SAMPLE CLASSIFICATION WORKSHEET

Grain Size Distribution



Plasticy Index Chart



Passing No. 4	**62%**
Passing #200	**14%**
Liquid Limit	**NV**
Plastic Limit	**NP**
Plasticity Index	**NP**

PCH

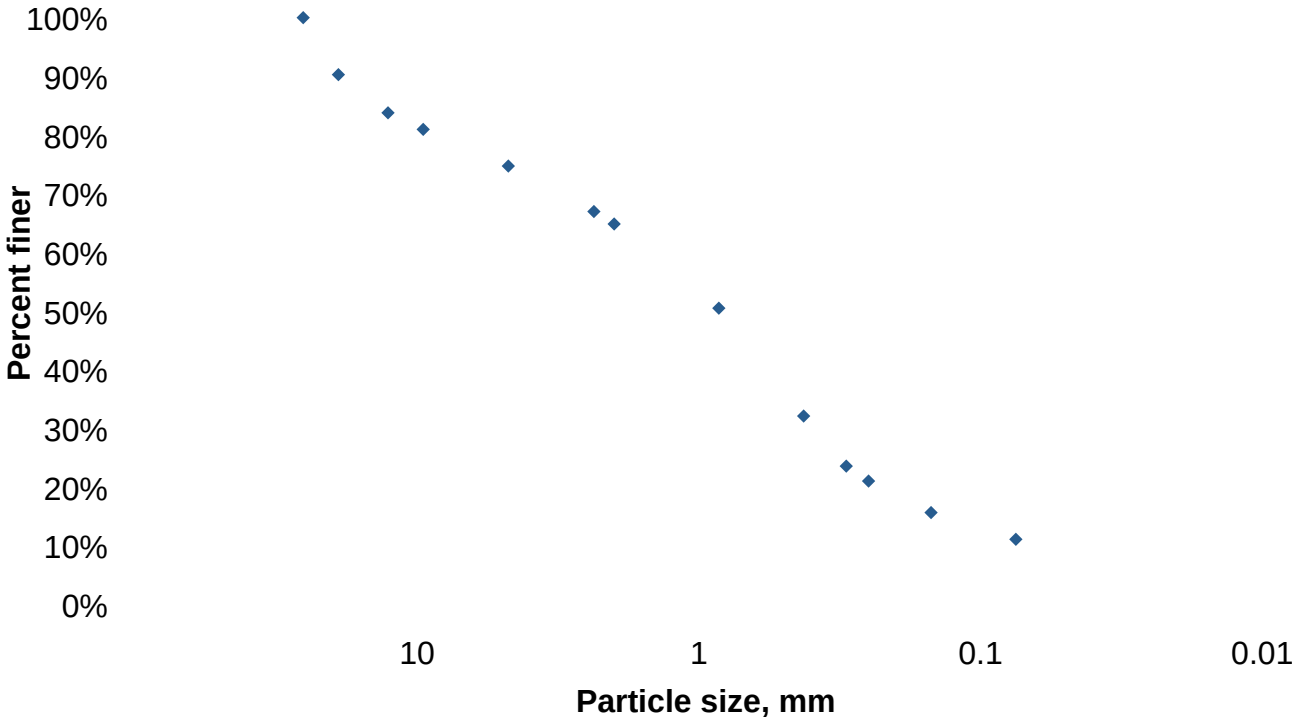
Pickering, Cole, & Hivner

Geotechnical and Environmental Engineers

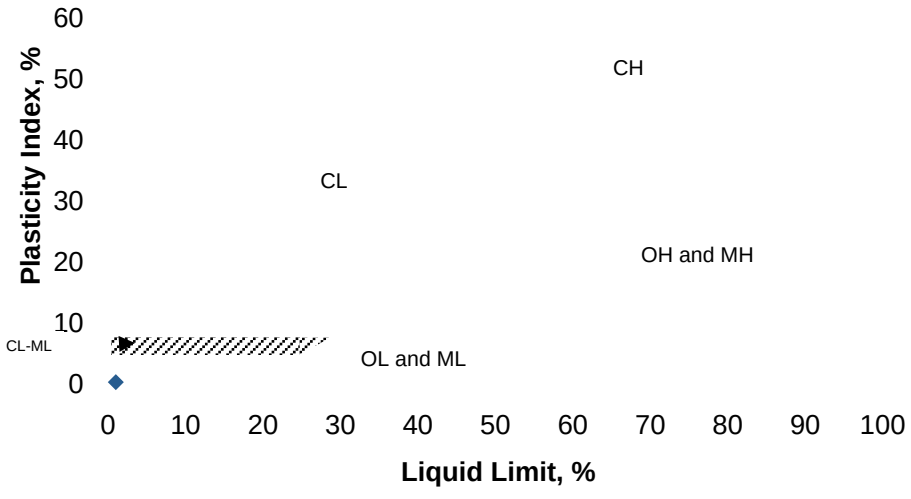
PROJECT	Pearl Place - Professional Office Development	**PROJECT NO.**	12.070.14
SAMPLE ID	Boring No. 8 @ 4 feet	**START DATE**	3/14/14
SAMPLE CLASSIFICATION	Silty Sand with Gravel (SM)		

SAMPLE CLASSIFICATION WORKSHEET

Grain Size Distribution



Plasticy Index Chart



Passing No. 4	**75%**
Passing #200	**11%**
Liquid Limit	**NV**
Plastic Limit	**NP**
Plasticity Index	**NP**

PCH

Pickering, Cole, & Hivner

Geotechnical and Environmental Engineers

PROJECT	Pearl Place - Professional Office Development	**PROJECT NO.**	12.070.14
SAMPLE ID	Boring No. 9 @ 4 & 9 feet	**START DATE**	3/14/14
SAMPLE CLASSIFICATION	Well-graded Sand with Silt and Gravel (SW-SM)		

SUMMARY OF LABORATORY TEST RESULTS

Boring No.	Depth (ft)	Sample Description	Moisture Content (%)	Dry Density (pcf)	Swell (+) or Consolidation (-) (%)	Surchagre Pressure (psf)	Unconfined Compressive Strength (psf)	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Atterberg Limits		
										LL	PL	PI
1	4	Fine to Coarse Sand with Silt & Gravel	3.4%	-								
1	9	Fine to Coarse Sand with Silt & Gravel	7.5%	-								
1	4 & 9	Fine to Coarse Sand with Silt & Gravel	-	-				56	10	Non-plastic		
1	14	Fine to Coarse Sand with Silt & Gravel	7.3%	-								
1	19	Fine to Coarse Sand with Silt & Gravel	7.7%	-								
1	24	Claystone Bedrock	7.2%	123								
1	29	Claystone Bedrock	9.8%	127								
1	34	Claystone Bedrock	8.6%	126			14,900					
1	39	Claystone Bedrock	7.1%	-								
2	4	Fine to Coarse Sand/Gravel with Silt	1.7%	-								
2	9	Fine to Coarse Sand/Gravel with Silt	4.0%	-				53	9	Non-plastic		
2	19	Claystone Bedrock	12.9%	-								
2	24	Claystone Bedrock	10.3%	123	+0.4	1,000						
3	4	Fine to Coarse Sand/Gravel with Silt	2.1%	-								
3	9	Fine to Coarse Sand/Gravel with Silt	7.2%	-								
3	14	Fine to Coarse Sand/Gravel with Silt	7.9%	-								
3	19	Claystone Bedrock	9.7%	127	+0.8	1,000						
3	24	Claystone Bedrock	9.6%	129								
4	4	Silty Sand	12.4%	-				93	13	Non-plastic		
4	9 & 14	Fine to Coarse Sand/Gravel with Silt	-	-				49	8	Non-plastic		
4	19	Claystone Bedrock	14.6%	-								
4	24	Claystone Bedrock	8.8%	-					93	51	17	34
5	4	Fine to Coarse Sand/Gravel with Silt	2.9%	-								
5	9	Fine to Coarse Sand/Gravel with Silt	8.2%	-								
5	14	Fine to Coarse Sand/Gravel with Silt	11.7%	-								
5	29	Claystone Bedrock	9.6%	123								
5	39	Claystone Bedrock	9.1%	139								
5	49	Claystone Bedrock	7.1%	133								
6	9 & 14	Fine to Coarse Sand/Gravel with Silt	11.0%	-				53	9	Non-plastic		

SUMMARY OF LABORATORY TEST RESULTS

Boring No.	Depth (ft)	Sample Description	Moisture Content (%)	Dry Density (pcf)	Swell (+) or Consolidation (-) (%)	Surchagre Pressure (psf)	Unconfined Compressive Strength (psf)	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Atterberg Limits		
										LL	PL	PI
6	19	Claystone Bedrock	18.0%	-					90	48	17	31
6	24	Claystone Bedrock	7.8%	127								
7	4	Silty Sand	-	-				87	14	Non-plastic		
7	9	Claystone Bedrock	17.5%	-					96	52	18	34
7	24	Claystone Bedrock	8.9%	-								
8	4	Silty Sand with Gravel	8.3%	-				62	14	Non-plastic		
8	9	Claystone Bedrock	13.2%	120	+0.7	500						
8	14	Claystone Bedrock	11.6%	118	+2.4	500						
9	4 & 9	Fine to Coarse Sand/Gravel with Silt	8.9%	-				75	11	Non-plastic		
9	14	Claystone Bedrock	15.5%	-					75	44	17	27
9	19	Claystone Bedrock	8.6%	126								
9	24	Claystone Bedrock	7.3%	134								
9	29	Claystone Bedrock	7.2%	133								
9	39	Claystone Bedrock	9.8%	124			20,000					

APPENDIX C

GENERAL NOTES

GENERAL NOTES

DRILLING & SAMPLING SYMBOLS:

SS:	Split Spoon - 1⅜" I.D., 2" O.D., unless otherwise noted	HS:	Hollow Stem Auger
ST:	Thin-Walled Tube – 2.5" O.D., unless otherwise noted	PA:	Power Auger
RS:	Ring Sampler - 2.42" I.D., 3" O.D., unless otherwise noted	HA:	Hand Auger
CB:	California Barrel - 1.92" I.D., 2.5" O.D., unless otherwise noted	RB:	Rock Bit
BS:	Bulk Sample or Auger Sample	WB:	Wash Boring or Mud Rotary

The number of blows required to advance a standard 2-inch O.D. split-spoon sampler (SS) the last 12 inches of the total 18-inch penetration with a 140-pound hammer falling 30 inches is considered the "Standard Penetration" or "N-value". For 2.5" O.D. California Barrel samplers (CB) the penetration value is reported as the number of blows required to advance the sampler 12 inches using a 140-pound hammer falling 30 inches, reported as "blows per inch," and is not considered equivalent to the "Standard Penetration" or "N-value".

WATER LEVEL MEASUREMENT SYMBOLS:

WL:	Water Level	WS:	While Sampling
WCI:	Wet Cave in	WD:	While Drilling
DCI:	Dry Cave in	BCR:	Before Casing Removal
AB:	After Boring	ACR:	After Casing Removal

Water levels indicated on the boring logs are the levels measured in the borings at the times indicated. Groundwater levels at other times and other locations across the site could vary. In pervious soils, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels may not be possible with only short-term observations.

DESCRIPTIVE SOIL CLASSIFICATION: Soil classification is based on the Unified 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.

FINE-GRAINED SOILS			COARSE-GRAINED SOILS			BEDROCK		
(CB) Blows/Ft.	(SS) Blows/Ft.	Consistency	(CB) Blows/Ft.	(SS) Blows/Ft.	Relative Density	(CB) Blows/Ft.	(SS) Blows/Ft.	Consistency
< 3	0-2	Very Soft	0-5	< 3	Very Loose	< 24	< 20	Weathered
3-5	3-4	Soft	6-14	4-9	Loose	24-35	20-29	Firm
6-10	5-8	Medium Stiff	15-46	10-29	Medium Dense	36-60	30-49	Medium Hard
11-18	9-15	Stiff	47-79	30-50	Dense	61-96	50-79	Hard
19-36	16-30	Very Stiff	> 79	> 50	Very Dense	> 96	> 79	Very Hard
> 36	> 30	Hard						

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Terms 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. (300mm)
Cobbles	12 in. to 3 in. (300mm to 75 mm)
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 Terms of Other Constituents	Percent of Dry Weight
Trace	< 5
With	5 – 12
Modifiers	> 12

PLASTICITY DESCRIPTION

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

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**	< 0.75	OL	Organic clay[K,L,M,N]
			Liquid limit - not dried			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	< 0.75	OH	Organic clay[K,L,M,P]
			Liquid limit - not dried			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] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 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 ≥ 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 ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

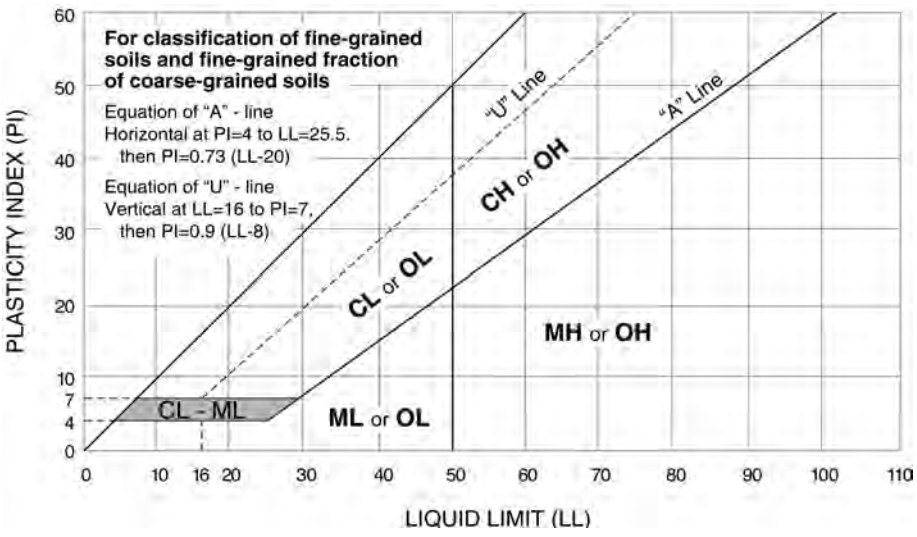
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 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.



ROCK CLASSIFICATION
(Based on ASTM C-294)

Sedimentary Rocks

Sedimentary rocks are stratified materials laid down by water or wind. The sediments may be composed of particles or pre-existing rocks derived by mechanical weathering, evaporation or by chemical or organic origin. The sediments are usually indurated by cementation or compaction.

Chert Very fine-grained siliceous rock composed of micro-crystalline or cyrptocrystalline quartz, chalcedony or opal. Chert is various colored, porous to dense, hard and has a conchoidal to splintery fracture.

Claystone Fine-grained rock composed of or derived by erosion of silts and clays or any rock containing clay. Soft massive and may contain carbonate minerals.

Conglomerate Rock consisting of a considerable amount of rounded gravel, sand and cobbles with or without interstitial or cementing material. The cementing or interstitial material may be quartz, opal, calcite, dolomite, clay, iron oxides or other materials.

Dolomite A fine-grained carbonate rock consisting of the mineral dolomite [$CaMg(CO_3)_2$]. May contain noncarbonate impurities such as quartz, chert, clay minerals, organic matter, gypsum and sulfides. Reacts with hydrochloric acid (HCL).

Limestone A fine-grained carbonate rock consisting of the mineral calcite ($CaCO_3$). May contain noncarbonate impurities such as quartz, chert, clay minerals, organic matter, gypsum and sulfides. Reacts with hydrochloric acid (HCL).

Sandstone Rock consisting of particles of sand with or without interstitial and cementing materials. The cementing or interstitial material may be quartz, opal, calcite, dolomite, clay, iron oxides or other material.

Shale Fine-grained rock composed of or derived by erosion of silts and clays or any rock containing clay. Shale is hard, platy, of fissile may be gray, black, reddish or green and may contain some carbonate minerals (calcareous shale).

Siltstone Fine grained rock composed of or derived by erosion of silts or rock containing silt. Siltstones consist predominantly of silt sized particles (0.0625 to 0.002 mm in diameter) and are intermediate rocks between claystones and sandstones and may contain carbonate minerals.

LABORATORY TEST
SIGNIFICANCE AND PURPOSE

TEST	SIGNIFICANCE	PURPOSE
California Bearing Ratio	Used to evaluate the potential strength of subgrade soil, subbase, and base course material, including recycled materials for use in road and airfield pavements.	***Pavement Thickness Design***
Consolidation	Used to develop an estimate of both the rate and amount of both differential and total settlement of a structure.	***Foundation Design***
Direct Shear	Used to determine the consolidated drained shear strength of soil or rock.	***Bearing Capacity, Foundation Design, and Slope Stability***
Dry Density	Used to determine the in-place density of natural, inorganic, fine-grained soils.	***Index Property Soil Behavior***
Expansion	Used to measure the expansive potential of fine-grained soil and to provide a basis for swell potential classification.	***Foundation and Slab Design***
Gradation	Used for the quantitative determination of the distribution of particle sizes in soil.	***Soil Classification***
Liquid & Plastic Limit, Plasticity Index	Used as an integral part of engineering classification systems to characterize the fine-grained fraction of soils, and to specify the fine-grained fraction of construction materials.	***Soil Classification***
Permeability	Used to determine the capacity of soil or rock to conduct a liquid or gas.	***Groundwater Flow Analysis***
pH	Used to determine the degree of acidity or alkalinity of a soil.	***Corrosion Potential***
Resistivity	Used to indicate the relative ability of a soil medium to carry electrical currents.	***Corrosion Potential***
R-Value	Used to evaluate the potential strength of subgrade soil, subbase, and base course material, including recycled materials for use in road and airfield pavements.	***Pavement Thickness Design***
Soluble Sulfate	Used to determine the quantitative amount of soluble sulfates within a soil mass.	***Corrosion Potential***
Unconfined Compression	To obtain the approximate compressive strength of soils that possess sufficient cohesion to permit testing in the unconfined state.	***Bearing Capacity Analysis for Foundations***
Water Content	Used to determine the quantitative amount of water in a soil mass.	***Index Property Soil Behavior***

REPORT TERMINOLOGY
(Based on ASTM D653)

Allowable Soil Bearing Capacity	The recommended maximum contact stress developed at the interface of the foundation element and the supporting material.
Alluvium	Soil, the constituents of which have been transported in suspension by flowing water and subsequently deposited by sedimentation.
Aggregate Base Course	A layer of specified material placed on a subgrade or subbase usually beneath slabs or pavements.
Backfill	A specified material placed and compacted in a confined area.
Bedrock	A natural aggregate of mineral grains connected by strong and permanent cohesive forces. Usually requires drilling, wedging, blasting or other methods of extraordinary force for excavation.
Bench	A horizontal surface in a sloped deposit.
Caisson (Drilled Pier or Shaft)	A concrete foundation element cast in a circular excavation which may have an enlarged base. Sometimes referred to as a cast-in-place pier or drilled shaft.
Coefficient of Friction	A constant proportionality factor relating normal stress and the corresponding shear stress at which sliding starts between the two surfaces.
Colluvium	Soil, the constituents of which have been deposited chiefly by gravity such as at the foot of a slope or cliff.
Compaction	The densification of a soil by means of mechanical manipulation
Concrete Slab-on-Grade	A concrete surface layer cast directly upon a base, subbase or subgrade, and typically used as a floor system.
Differential Movement	Unequal settlement or heave between, or within foundation elements of structure.
Earth Pressure	The pressure exerted by soil on any boundary such as a foundation wall.
ESAL	Equivalent Single Axle Load, a criteria used to convert traffic to a uniform standard, (18,000 pound axle loads).
Engineered Fill	Specified material placed and compacted to specified density and/or moisture conditions under observations of a representative of a geotechnical engineer.
Equivalent Fluid	A hypothetical fluid having a unit weight such that it will produce a pressure against a lateral support presumed to be equivalent to that produced by the actual soil. This simplified approach is valid only when deformation conditions are such that the pressure increases linearly with depth and the wall friction is neglected.
Existing Fill (or Man-Made Fill)	Materials deposited throughout the action of man prior to exploration of the site.
Existing Grade	The ground surface at the time of field exploration.

REPORT TERMINOLOGY
(Based on ASTM D653)

Expansive Potential	The potential of a soil to expand (increase in volume) due to absorption of moisture.
Finished Grade	The final grade created as a part of the project.
Footing	A portion of the foundation of a structure that transmits loads directly to the soil.
Foundation	The lower part of a structure that transmits the loads to the soil or bedrock.
Frost Depth	The depth at which the ground becomes frozen during the winter season.
Grade Beam	A foundation element or wall, typically constructed of reinforced concrete, used to span between other foundation elements such as drilled piers.
Groundwater	Subsurface water found in the zone of saturation of soils or within fractures in bedrock.
Heave	Upward movement.
Lithologic	The characteristics which describe the composition and texture of soil and rock by observation.
Native Grade	The naturally occurring ground surface.
Native Soil	Naturally occurring on-site soil, sometimes referred to as natural soil.
Optimum Moisture Content	The water content at which a soil can be compacted to a maximum dry unit weight by a given compactive effort.
Perched Water	Groundwater, usually of limited area maintained above a normal water elevation by the presence of an intervening relatively impervious continuous stratum.
Scarify	To mechanically loosen soil or break down existing soil structure.
Settlement	Downward movement.
Skin Friction (Side Shear)	The frictional resistance developed between soil and an element of the structure such as a drilled pier.
Soil (Earth)	Sediments or other unconsolidated accumulations of solid particles produced by the physical and chemical disintegration of rocks, and which may or may not contain organic matter.
Strain	The change in length per unit of length in a given direction.
Stress	The force per unit area acting within a soil mass.
Strip	To remove from present location.
Subbase	A layer of specified material in a pavement system between the subgrade and base course.
Subgrade	The soil prepared and compacted to support a structure, slab or pavement system.

APPENDIX C:

Geotechnical Design Criteria for Dewatering Systems

October 16, 2014

Forum Real Estate Group
4500 Cherry Creek Drive South, Suite 550
Glendale, CO 80246

Attn: Mr. Kevin Foltz
kfoltz@forumre.com

RE: **Updated Geotechnical Design Criteria for Dewatering Systems**
Pearl Place Office Development – Phases I & II
Boulder, Colorado
Proposal No: 12.070.14

Dear Mr. Foltz:

Pickering Cole & Hivner, LLC (PCH) completed a geotechnical engineering investigation for the proposed professional office development to be located at the southwest corner of the referenced intersection in Boulder, Colorado. Our design-level Geotechnical Engineering Report (GER) was issued on September 10, 2014. Subsequent to the issuance of this report, the design team evaluated several dewatering system options.

The current approach for dewatering includes the installation of well points around the perimeter of each excavation (Phase I and Phase II) to provide an initial draw down of groundwater perched within the overburden soil and the inclusion of a secondary sump system to capture the remaining water residing on the bedrock surface. Included herein are the geotechnical parameters that should be used in the design of both temporary and permanent dewatering systems.

PROJECT INFORMATION – We understand that the project will ultimately include the construction of three four-story office buildings on an approximately 3.5-acre site located to the southwest of the referenced intersection. Phase I will include two office buildings (Buildings A & B), each of about 100,000 square feet in total floor area, that will be connected by sky-bridges at levels two and three. Phase I buildings will be situated within the southern site extents. Phase II construction will include another four-story office building (Building C) of approximately 100,000 square feet in floor area and will be located in the northwest site extents. Three levels of subterranean parking will be provided beneath a portion of Building A and then entirety of Buildings B and C. The office buildings will be developed with Type B steel framed construction with elevated concrete decks constructed over conventionally reinforced columns and foundation walls. Exterior surfaces will vary from glazed aluminum curtain wall systems to masonry veneer.

Site improvements will include new asphalt/PCC automobile drives including a roundabout, an amphitheater type terraced seating along the existing creek north of Building A, PCC flatwork, underground utilities and site landscaping.

GEOTECHNICAL STUDY – As noted in the GER, site exploration included the advancement of nine exploratory borings to depths ranging from 25 to 50 feet below site grades. One of the boreholes, Boring No. 5, was completed as a monitoring well for future groundwater measurements. We believe that this initial monitoring well was flawed in its construction, therefore a replacement monitoring well was completed about 10 feet north of the original location on May 29, 2014. The replacement well consisted of 2-inch diameter PVC pipe installed to a depth of about 20 feet below existing site grade. The lower ten feet was completed as the screened interval with solid pipe extending to the ground surface. The annular space in the lower 16-feet included a sand pack while the upper four feet of the solid pipe was filled with bentonite chips. A permanent, flush-mounted well monument was installed with a locking expansion cap.

During initial site exploration, groundwater was measured at depths ranging from about 10 to 13 feet below site pavements within the borings advanced south of the Left Hand Ditch and depths ranging from about 5 to 12 feet below existing grades to the north of the ditch. The original monitoring well constructed in the close proximity to the ditch noted groundwater levels of about 1 foot when checked about three weeks after installation. The replacement well noted a groundwater level of about 4.5 feet when measured on June 12, 2014. When checked on September 3, 2014, the replacement well noted a depth to groundwater of about 5.5 feet below site grade. Additional groundwater measurements were taken within a formerly constructed monitoring well (installed by others) near the northwest quadrant of Building A and noted a depth to groundwater of about 8 feet below existing grade. The observed groundwater appears to be perched within the granular materials that overly the relatively low permeable bedrock lithology. Based on the planned basement elevations, construction dewatering and a permanent dewatering system will be required to complete the proposed project.

During the high-water season (generally the spring and summer months), we estimate that the depth to groundwater will be approximately 8 to 10 feet below the existing ground surface across most of the site, however, shallower conditions will be likely in close proximity to the existing ditch. Assuming that the basements for the buildings will extend to depths of about 25 to 35 feet below existing grade, the contractor could be required to draw the water surface down 10 to 15 feet or more during high-water season. The extent of drawdown at the site was projected considering hydraulic conductivity testing conducted at the site and subsequent analysis utilizing AQTESOLV® software. Flow rates ranged from an initial falling head rate of 2.281×10^{-4} to a rising head rate of 3.807×10^{-7}.

Construction Dewatering: For the purpose of developing construction dewatering design parameters engineering analysis was conducted considering a hydraulic conductivity for the overburden soil of 1x10-3 centimeters per second based upon our experience on sites in the vicinity (3100 Pearl Street Apartment

development). Groundwater elevations and associated head were determined considering actual lithologic conditions for each section of the excavation utilizing the nearest relevant soil boring information. The results of our analysis are provided in Table 1.

Table 1: Construction Dewatering Flow Calculations

Phase	Segment Length (ft)	Reference Boring	Depth to Water (ft)	Depth to Bedrock (ft)	Permeability (cm/s)	Flow Rate (GPM)
I	175	5	5	21	$1x10^{-3}$	41.2
I	210	4	8	19	$1x10^{-3}$	34.0
I	200	1	13	20.5	$1x10^{-3}$	22.1
I	215	2	13	19	$1x10^{-3}$	19.0
I	115	3	11	18	$1x10^{-3}$	11.9
I	255	5	5	21	$1x10^{-3}$	60.0
					Subtotal	188
II	145	9	12	14	$1x10^{-3}$	4.3
II	205	7	8	9	$1x10^{-3}$	3.0
II	155	8	5	7	$1x10^{-3}$	4.6
II	225	8	5	7	$1x10^{-3}$	6.6
					Subtotal	19
					Total Flow Rate	207

Flow calculation example: Phase I, segment 1

Q = kA

Where k = hydraulic conductivity in centimeters per second
A = wetted hydraulic front

Q = ($1x10^{-3}$ cm/s) (175 ft) (21 – 5 ft) * conversion factor of 14.7248 = 41.2 gpm
conversion factor – cm/s to ft/min and cfm to gpm

Due to the variability of the overburden soil encountered across the site and seasonal groundwater fluctuations, we believe that it is prudent to include a scaling factor to design the construction dewatering system components. For example, a similar analysis considering a constant head of 15 feet around the Phase I perimeter and a 5-foot head around the Phase 2 excavation, anticipated groundwater flow rates increase to about 315 GPM. Similar sensitivity would be realized with fluctuations in soil permeability. We

recommend the application of a scaling factor of 2 be applied to the calculated flows, thus system design should be based upon flows on the order of 400 GPM.

This pump rate should rapidly decrease with time as the aquifer is drawn down. The contractor will need to monitor the drawdown and adjust the number of wells, well points or sumps within the excavation as required to attain the necessary drawdown.

Environmental testing and monitoring will be required to obtain/maintain construction dewatering permits to discharge the collected water into City storm drainage systems or other surface waters (per applicable State, City, and/or County requirements).

Permanent Dewatering: The design and installation of permanent dewatering systems will be required to maintain dry conditions within the basement of the structures. Due to aquifer drawdown, permanent dewatering system flows will be less than those experienced at the initiation of construction dewatering. In order to estimate permanent flows into the dewatering system, we estimated the reduced height of the a perennially wetted zone to be a maximum of 8 feet above the bedrock surface around the perimeter of Phase I and a wetted thickness of 2 feet around the perimeter of Phase II. Using the falling head flow rate of 2.281×10^{-4}, an estimated flow total flow rate of 75 GPM was calculated for the design of the permanent dewatering and treatment system.

Based on our experience with an adjacent development, Solana 3100 Pearl, wherein a similarly sized basement was constructed and groundwater flows of about 50 GPM are currently being treated and discharged, we recommend that the permanent dewatering system be designed to accommodate flows of 100 GPM. Although the anticipated flows are similar to the adjacent development, we believe that the added capacity recommended for design will provide a suitable scaling factor and margin of safety to accommodate seasonal peak flows.

The dewatering system should include PVC drain-pipe installed around the perimeter of each foundation with a cross-connecting network of drainage trenches and pipes placed beneath the each building footprint. The drainage systems should consist of a perforated pipe, embedded in free draining washed gravel, placed in a trench at least 12-inches in width. We anticipate that a 4-inch diameter perimeter collection drain should be sufficient to handle the anticipated flows. The trench should be excavated around the perimeter of the basement foundations. Gravel should extend a minimum of 3-inches beneath the bottom of the pipe. It is common to use washed ¾-inch to 1-inch gravel for these purposes, however, smaller sizes could be considered if using drainage pipe wrapped with filter fabric. The perimeter drainage trench should be sloped at a minimum of 0.5 percent to a suitable outlet, such as a sump and pump system. The pump should discharge to a suitable outfall.

In addition to the perimeter drain for the foundations, cross-connecting (horizontal) drainage pipes should be placed beneath the basement floor slab. The pipes for the underslab network may consist of four-inch diameter perforated pipe. These connecting drains trenches should also be sloped at a minimum of 0.5 percent and should be spaced at a maximum of 50 feet throughout each building footprint.

The underslab gravel drainage layer should consist of a minimum 12-inch thickness of free-draining gravel meeting the specifications of ASTM C33, Size No. 57 or 67. All of the drainage trenches should be lined with a geotextile fabric before placing the gravel.

For preliminary design purposes, the drainage pipe, sump and pump system should be sized for a projected flow 100 GPM for both Phase I and Phase II developments. Assessment of construction dewatering flows will allow for the determination of a suitable flow rate upon which final system design should be based. The actual amount of water that may be encountered is dependent on proximity to and leakage from the Left Hand Ditch. Groundwater captured by the drainage system during the drier times of year will be less than what is collected during the high-water season, especially when the ditch is not active.

Dewatering of the site could potentially affect adjacent properties, causing potential settlement of the soils supporting existing buildings, pavements and other elements. Based on the relative density of the sand and gravel soils encountered in our borings, we believe there is low potential of excessive settlement, However, the dewatering system should be designed to limit dewatering below adjacent properties. Monitoring of adjacent properties is recommended so that impacts can be promptly identified and mitigating action taken, if needed.

Environmental testing and monitoring will be required to obtain/maintain permanent dewatering permits to discharge collected water into City storm drainage systems or other surface waters (per applicable State, City, and/or County requirements). Water samples obtained on June 10 and June 12, 2014 were submitted to Summit Scientific for analysis to assist in effluent discharge permitting and the design of permanent water treatment systems. The results of this analysis are attached hereto.

If you have any questions or if we may be of further assistance, please do not hesitate to contact our office.

Sincerely,
Pickering, Cole, & Hivner

Andrew J. Garner, P.E.
Senior Project Manager

COLORADO REGISTERED
ANDREW J. GARNER
34273
10/17/14
PROFESSIONAL ENGINEER

Thomas C. Cole, P.E.
Principal

APPENDIX D

Water Quality Sampling

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

June 26, 2014

Russ Pickering
Pickering, Cole & Hivner
1070 W. 124th Ave Building B300
Westminster, CO 80023

RE: Pearl Place

Enclosed are the results of analyses for samples received by Summit Scientific on 06/11/14 12:55. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

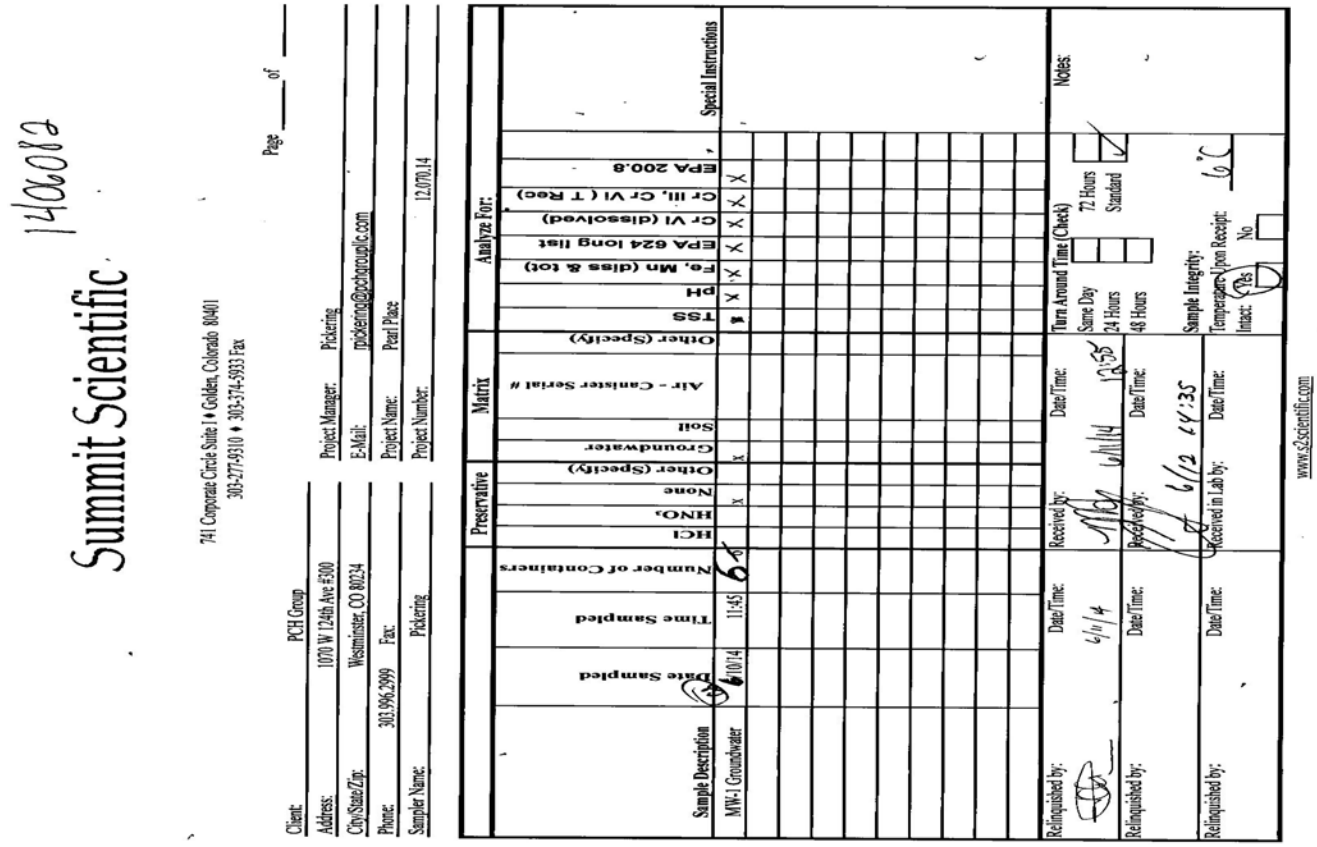
Ben Shrewsbury
President / Laboratory Manager

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1 Groundwater	1406082-01	Water	06/10/14 11:45	06/11/14 12:55
MW-1 Groundwater	1406082-02	Water	06/12/14 11:30	06/11/14 12:55

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08



Summit Scientific

1406082

741 Corporate Circle Suite I • Golden, Colorado 80401
303-277-9310 • 303-374-5933 Fax

Page ___ of ___

Client: PCH Group
Address: 1070 W 124th Ave #300
City/State/Zip: Westminster, CO 80234
Phone: 303.996.2999 Fax:
Sampler Name: Pickering

Project Manager: Pickering
E-Mail: mpickering@pchgroupllc.com
Project Name: Pearl Place
Project Number: 12.070.14

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative: HCl	HNO3	None	Other (Specify)	Matrix: Groundwater	Soil	Air - Canister Serial #	Other (Specify)	Analyze For: TSS	pH	Fe, Mn (diss & tot)	EPA 624 long list	Gr VI (dissolved)	Cr III, Cr VI (T Rec)	EPA 200.8	Special Instructions
MW-1 Groundwater	6/10/14	11:45	6			X		X					X	X	X	X	X	X	

Relinquished by: Date/Time: 6/11/14 — Received by: Date/Time: 6/11/14 12:55

Relinquished by: Date/Time: — Received by: Date/Time: 6/12 14:35

Relinquished by: Date/Time: — Received in Lab by: Date/Time:

Turn Around Time (Check): Same Day / 24 Hours / 48 Hours / 72 Hours / Standard

Sample Integrity: Temperature Upon Receipt: 6°C; Intact: Yes / No

Notes:

www.s2scientific.com

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

MW-1 Groundwater

1406082-01 (Water)

Summit Scientific

Volatile Organics Compounds by EPA Method 624

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	**1.4**	1.0	ug/l	1	1406098	06/13/14	06/13/14	EPA 624	
Bromobenzene	ND	1.0	"	"	"	"	"	"	
Bromochloromethane	ND	5.0	"	"	"	"	"	"	
Bromodichloromethane	ND	2.0	"	"	"	"	"	"	
Bromoform	ND	1.0	"	"	"	"	"	"	
Bromomethane	ND	1.0	"	"	"	"	"	"	
n-Butylbenzene	ND	1.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	1.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	1.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.0	"	"	"	"	"	"	
Chlorobenzene	**220**	1.0	"	"	"	"	"	"	
Chloroethane	ND	1.0	"	"	"	"	"	"	
Chloroform	ND	5.0	"	"	"	"	"	"	
Chloromethane	ND	1.0	"	"	"	"	"	"	
Chlorodibromomethane	ND	1.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	1.0	"	"	"	"	"	"	
4-Chlorotoluene	ND	1.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	1.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	1.0	"	"	"	"	"	"	
Dibromomethane	ND	1.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.0	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	1.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.0	"	"	"	"	"	"	
1,3-Dichloropropane	ND	1.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	1.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	1.0	"	"	"	"	"	"	

Summit Scientific

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

MW-1 Groundwater

1406082-01 (Water)

Summit Scientific

Volatile Organics Compounds by EPA Method 624

cis-1,3-Dichloropropene	ND	1.0	ug/l	1	1406098	06/13/14	06/13/14	EPA 624
trans-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"	"
Hexachlorobutadiene	ND	1.0	"	"	"	"	"	"
Tert-amyl methyl ether	ND	1.0	"	"	"	"	"	"
Tert-butyl alcohol	ND	20	"	"	"	"	"	"
Ethyl tert-butyl ether	ND	10	"	"	"	"	"	"
Isopropylbenzene	ND	1.0	"	"	"	"	"	"
Di-isopropyl ether	ND	5.0	"	"	"	"	"	"
p-Isopropyltoluene	ND	1.0	"	"	"	"	"	"
Methylene Chloride	ND	5.0	"	"	"	"	"	"
Methyl tert-butyl ether	ND	5.0	"	"	"	"	"	"
Naphthalene	ND	1.0	"	"	"	"	"	"
n-Propylbenzene	ND	1.0	"	"	"	"	"	"
Styrene	ND	1.0	"	"	"	"	"	"
1,1,2,2-Tetrachloroethane	ND	1.0	"	"	"	"	"	"
1,1,1,2-Tetrachloroethane	ND	1.0	"	"	"	"	"	"
Tetrachloroethene	ND	1.0	"	"	"	"	"	"
Toluene	ND	1.0	"	"	"	"	"	"
1,2,3-Trichlorobenzene	ND	1.0	"	"	"	"	"	"
1,2,4-Trichlorobenzene	ND	1.0	"	"	"	"	"	"
1,1,2-Trichloroethane	ND	1.0	"	"	"	"	"	"
1,1,1-Trichloroethane	ND	1.0	"	"	"	"	"	"
Trichloroethene	ND	1.0	"	"	"	"	"	"
Trichlorofluoromethane	ND	1.0	"	"	"	"	"	"
1,2,3-Trichloropropane	ND	1.0	"	"	"	"	"	"
1,3,5-Trimethylbenzene	ND	1.0	"	"	"	"	"	"
1,2,4-Trimethylbenzene	ND	1.0	"	"	"	"	"	"
Vinyl chloride	ND	1.0	"	"	"	"	"	"
2-Chloroethylvinyl ether	ND	1.0	"	"	"	"	"	"
m,p-Xylene	ND	2.0	"	"	"	"	"	"
o-Xylene	ND	1.0	"	"	"	"	"	"

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		*93.5 %*	*37-154*		"	"	"	"	

Summit Scientific

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

MW-1 Groundwater
1406082-01 (Water)

Summit Scientific

Volatile Organics Compounds by EPA Method 624

Surrogate: Toluene-d8	*98.2 %*	*45-149*	*1406098*	*06/13/14*	*06/13/14*	*EPA 624*	
Surrogate: 4-Bromofluorobenzene	*97.0 %*	*45-146*	*"*	*"*	*"*	*"*	

Total Recoverable Metals by EPA Method 200.8

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Silver	ND	0.0000300	mg/L	1	1406149	06/19/14	06/23/14	EPA 200.8	

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	**0.00144**	0.000600	"	"	"	"	06/22/14	"	

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Barium	**0.157**	0.00160	"	"	"	"	"	"	

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Cadmium	ND	0.0000600	"	"	"	"	06/23/14	"	

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Manganese	**1.59**	0.00100	"	"	"	"	"	"	

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Molybdenum	ND	0.100	"	"	"	"	06/22/14	"	

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

MW-1 Groundwater
1406082-01 (Water)

Summit Scientific

Total Recoverable Metals by EPA Method 200.8

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Nickel	**0.0115**	0.000800	mg/L	1	1406149	06/19/14	06/25/14	EPA 200.8	

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Lead	**0.00792**	0.000100	"	"	"	"	06/23/14	"	

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Antimony	**0.00203**	0.00100	"	"	"	"	06/25/14	"	

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Selenium	ND	0.000800	"	"	"	"	06/22/14	"	

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Zinc	**0.177**	0.0100	"	"	"	"	06/25/14	"	

Total Recoverable Metals by EPA Method 6020

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Iron	**3.28**	0.00100	mg/L	1	1406149	"	06/25/14	EPA 6020A	

Potentially Dissolved Metals by EPA Method 200.8

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

MW-1 Groundwater
1406082-01 (Water)

Summit Scientific

Potentially Dissolved Metals by EPA Method 200.8

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Silver	ND	0.0000300	mg/L	1	1406125	06/17/14	06/19/14	EPA 200.8	

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	**0.000903**	0.000600	"	"	"	"	"	"	

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Cadmium	ND	0.0000600	"	"	"	"	"	"	

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Copper	**0.00128**	0.00100	"	"	"	"	"	"	

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Nickel	**0.00706**	0.000800	"	"	"	"	"	"	

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Lead	**0.00193**	0.000100	"	"	"	"	"	"	

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Selenium	ND	0.000800	"	"	"	"	"	"	

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

MW-1 Groundwater
1406082-01 (Water)

Summit Scientific

Potentially Dissolved Metals by EPA Method 200.8

Dissolved Metals by EPA Method 200.8

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Manganese	**1.79**	0.00100	mg/L	1	1406125	06/17/14	06/19/14	EPA 200.8	

Dissolved Metals by EPA Method 6020

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Iron	**2.09**	0.00100	mg/L	1	1406125	"	06/19/14	EPA 6020A	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Total Suspended Solids	**176**	10.0	mg/L	1	1406132	06/17/14	06/17/14	EPA 160.2	

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	**6.80**	1.00	pH Units	"	1406164	06/20/14	06/20/14	EPA 9040	

Accutest Laboratories

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Titanium	**0.236**	0.00400	mg/L	1	1406190	06/19/14	06/20/14	EPA 200.8	

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

MW-1 Groundwater

1406082-01 (Water)

Summit Scientific

Accutest Laboratories

Date Sampled: **06/10/14 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Vanadium	**0.0104**	0.00200	mg/L	1	1406190	06/19/14	06/20/14	EPA 200.8	

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

MW-1 Groundwater

1406082-02 (Water)

Summit Scientific

Hexavalent Chromium by EPA 7196

Date Sampled: **06/12/14 11:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium, Hexavalent	ND	0.01	mg/L	1	1406103	06/13/14	06/13/14	EPA 7196	

Date Sampled: **06/12/14 11:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium, Hexavalent	ND	0.01	"	"	"	"	"	"	

Calculated Analytes

Date Sampled: **06/12/14 11:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium+3 Calculated	ND	0.0100	mg/L	1	1406203	06/25/14	06/25/14	Calculation	

Total Recoverable Metals by EPA Method 200.8

Date Sampled: **06/12/14 11:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium	ND	0.00150	mg/L	1	1406149	06/19/14	06/23/14	EPA 200.8	

Volatile Organics Compounds by EPA Method 624 - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1406098 - EPA 5030 Water MS										
Blank (1406098-BLK1)				Prepared & Analyzed: 06/13/14						
Benzene	ND	1.0	ug/l							
Bromobenzene	ND	1.0	"							
Bromochloromethane	ND	5.0	"							
Bromodichloromethane	ND	2.0	"							
Bromoform	ND	1.0	"							
Bromomethane	ND	1.0	"							
n-Butylbenzene	ND	1.0	"							
sec-Butylbenzene	ND	1.0	"							
tert-Butylbenzene	ND	1.0	"							
Carbon tetrachloride	ND	1.0	"							
Chlorobenzene	ND	1.0	"							
Chloroethane	ND	1.0	"							
Chloroform	ND	5.0	"							
Chloromethane	ND	1.0	"							
Chlorodibromomethane	ND	1.0	"							
2-Chlorotoluene	ND	1.0	"							
4-Chlorotoluene	ND	1.0	"							
1,2-Dibromo-3-chloropropane	ND	1.0	"							
1,2-Dibromoethane (EDB)	ND	1.0	"							
Dibromomethane	ND	1.0	"							
1,2-Dichlorobenzene	ND	1.0	"							
1,3-Dichlorobenzene	ND	1.0	"							
1,4-Dichlorobenzene	ND	1.0	"							
Dichlorodifluoromethane	ND	1.0	"							
1,1-Dichloroethane	ND	1.0	"							
1,2-Dichloroethane (EDC)	ND	1.0	"							
1,1-Dichloroethene	ND	1.0	"							
cis-1,2-Dichloroethene	ND	1.0	"							
trans-1,2-Dichloroethene	ND	1.0	"							
1,2-Dichloropropane	ND	1.0	"							
1,3-Dichloropropane	ND	1.0	"							
2,2-Dichloropropane	ND	1.0	"							
1,1-Dichloropropene	ND	1.0	"							
cis-1,3-Dichloropropene	ND	1.0	"							
trans-1,3-Dichloropropene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Hexachlorobutadiene	ND	1.0	"							
Tert-amyl methyl ether	ND	1.0	"							

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

Volatile Organics Compounds by EPA Method 624 - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1406098 - EPA 5030 Water MS										
Blank (1406098-BLK1)				Prepared & Analyzed: 06/13/14						
Ethyl tert-butyl ether	ND	10	ug/l							
Tert-butyl alcohol	ND	20	"							
Di-isopropyl ether	ND	5.0	"							
Isopropylbenzene	ND	1.0	"							
p-Isopropyltoluene	ND	1.0	"							
Methylene Chloride	ND	5.0	"							
Methyl tert-butyl ether	ND	5.0	"							
Naphthalene	ND	1.0	"							
n-Propylbenzene	ND	1.0	"							
Styrene	ND	1.0	"							
1,1,2,2-Tetrachloroethane	ND	1.0	"							
1,1,1,2-Tetrachloroethane	ND	1.0	"							
Tetrachloroethene	ND	1.0	"							
Toluene	ND	1.0	"							
1,2,3-Trichlorobenzene	ND	1.0	"							
1,2,4-Trichlorobenzene	ND	1.0	"							
1,1,2-Trichloroethane	ND	1.0	"							
1,1,1-Trichloroethane	ND	1.0	"							
Trichloroethene	ND	1.0	"							
Trichlorofluoromethane	ND	1.0	"							
1,2,3-Trichloropropane	ND	1.0	"							
1,3,5-Trimethylbenzene	ND	1.0	"							
1,2,4-Trimethylbenzene	ND	1.0	"							
Vinyl chloride	ND	1.0	"							
m,p-Xylene	ND	2.0	"							
2-Chloroethylvinyl ether	ND	1.0	"							
o-Xylene	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	*12.8*		*"*	*13.2*		*96.3*	*37-154*			
Surrogate: Toluene-d8	*12.4*		*"*	*13.3*		*92.9*	*45-149*			
Surrogate: 4-Bromofluorobenzene	*11.8*		*"*	*13.3*		*88.7*	*45-146*			

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

Volatile Organics Compounds by EPA Method 624 - Quality Control

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1406098 - EPA 5030 Water MS										
LCS (1406098-BS1)				Prepared & Analyzed: 06/13/14						
Benzene	48.1	1.0	ug/l	50.0		96.2	51-132			
Bromobenzene	48.3	1.0	"	50.0		96.5	90-110			
Bromochloromethane	49.4	5.0	"	50.0		98.9	83-120			
Bromodichloromethane	44.2	2.0	"	50.0		88.3	82-117			
Bromoform	41.8	1.0	"	50.0		83.6	76-112			
Bromomethane	59.1	1.0	"	50.0		118	60-144			
n-Butylbenzene	47.6	1.0	"	50.0		95.3	81-118			
sec-Butylbenzene	48.0	1.0	"	50.0		96.0	84-113			
tert-Butylbenzene	48.0	1.0	"	50.0		96.0	87-112			
Carbon tetrachloride	45.1	1.0	"	50.0		90.3	68-118			
Chlorobenzene	48.2	1.0	"	50.0		96.4	87-113			
Chloroethane	47.3	1.0	"	50.0		94.7	48-147			
Chloroform	48.1	5.0	"	50.0		96.2	85-116			
Chloromethane	48.8	1.0	"	50.0		97.5	60-133			
Chlorodibromomethane	43.7	1.0	"	50.0		87.3	80-117			
2-Chlorotoluene	46.3	1.0	"	50.0		92.6	84-117			
4-Chlorotoluene	46.9	1.0	"	50.0		93.9	86-114			
1,2-Dibromo-3-chloropropane	42.1	1.0	"	50.0		84.3	62-126			
1,2-Dibromoethane (EDB)	46.5	1.0	"	50.0		93.0	84-119			
Dibromomethane	48.9	1.0	"	50.0		97.8	83-118			
1,2-Dichlorobenzene	48.2	1.0	"	50.0		96.4	90-110			
1,3-Dichlorobenzene	47.0	1.0	"	50.0		94.1	90-110			
1,4-Dichlorobenzene	47.2	1.0	"	50.0		94.5	87-110			
Dichlorodifluoromethane	44.2	1.0	"	50.0		88.4	60-115			
1,1-Dichloroethane	48.2	1.0	"	50.0		96.3	71-131			
1,2-Dichloroethane (EDC)	46.7	1.0	"	50.0		93.4	84-117			
1,1-Dichloroethene	47.8	1.0	"	50.0		95.6	69-129			
cis-1,2-Dichloroethene	48.7	1.0	"	50.0		97.3	81-124			
trans-1,2-Dichloroethene	48.6	1.0	"	50.0		97.1	66-140			
1,2-Dichloropropane	48.6	1.0	"	50.0		97.2	86-114			
1,3-Dichloropropane	48.2	1.0	"	50.0		96.4	83-122			
2,2-Dichloropropane	42.0	1.0	"	50.0		83.9	42-130			
1,1-Dichloropropene	48.1	1.0	"	50.0		96.2	75-117			
cis-1,3-Dichloropropene	42.7	1.0	"	50.0		85.3	72-125			
trans-1,3-Dichloropropene	41.8	1.0	"	50.0		83.5	73-120			
Ethylbenzene	48.7	1.0	"	50.0		97.4	58-146			
Hexachlorobutadiene	47.9	1.0	"	50.0		95.8	78-118			
Tert-amyl methyl ether	48.6	1.0	"	49.8		97.5	72-128			

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Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

Volatile Organics Compounds by EPA Method 624 - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1406098 - EPA 5030 Water MS										
LCS (1406098-BS1)				Prepared & Analyzed: 06/13/14						
Ethyl tert-butyl ether	47.6	10	ug/l	50.0		95.1	74-131			
Tert-butyl alcohol	200	20	"	249		80.4	66-115			
Isopropylbenzene	49.4	1.0	"	50.0		98.7	77-115			
Di-isopropyl ether	47.4	5.0	"	50.0		94.8	77-119			
p-Isopropyltoluene	47.1	1.0	"	50.0		94.1	84-110			
Methylene Chloride	47.9	5.0	"	50.0		95.8	36-156			
Methyl tert-butyl ether	47.5	5.0	"	50.0		95.0	71-130			
Naphthalene	44.3	1.0	"	50.0		88.5	76-128			
n-Propylbenzene	46.7	1.0	"	50.0		93.5	82-117			
Styrene	49.2	1.0	"	50.0		98.4	82-123			
1,1,2,2-Tetrachloroethane	50.2	1.0	"	50.0		100	66-126			
1,1,1,2-Tetrachloroethane	50.2	1.0	"	50.0		100	86-116			
Tetrachloroethene	48.5	1.0	"	50.0		96.9	74-121			
Toluene	46.5	1.0	"	50.0		92.9	51-138			
1,2,3-Trichlorobenzene	46.7	1.0	"	50.0		93.3	81-122			
1,2,4-Trichlorobenzene	46.2	1.0	"	50.0		92.5	87-115			
1,1,2-Trichloroethane	49.4	1.0	"	50.0		98.8	77-129			
1,1,1-Trichloroethane	48.0	1.0	"	50.0		96.1	75-120			
Trichloroethene	48.7	1.0	"	50.0		97.4	88-114			
Trichlorofluoromethane	47.5	1.0	"	50.0		95.0	65-129			
1,2,3-Trichloropropane	49.0	1.0	"	50.0		98.0	72-128			
1,3,5-Trimethylbenzene	48.0	1.0	"	50.0		96.1	86-110			
1,2,4-Trimethylbenzene	47.1	1.0	"	50.0		94.2	85-117			
Vinyl chloride	48.2	1.0	"	50.0		96.3	65-133			
m,p-Xylene	95.1	2.0	"	100		95.1	57-144			
o-Xylene	48.3	1.0	"	50.0		96.5	53-146			
Surrogate: 1,2-Dichloroethane-d4	*13.4*		*"*	*13.2*		*101*	*37-154*			
Surrogate: Toluene-d8	*13.2*		*"*	*13.3*		*99.2*	*45-149*			
Surrogate: 4-Bromofluorobenzene	*13.6*		*"*	*13.3*		*102*	*45-146*			

Volatile Organics Compounds by EPA Method 624 - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1406098 - EPA 5030 Water MS										
Matrix Spike (1406098-MS1)	**Source: 1406012-01**			Prepared & Analyzed: 06/13/14						
Benzene	50.0	1.0	ug/l	50.0	ND	99.9	34-141			
Bromobenzene	50.5	1.0	"	50.0	ND	101	66-131			
Bromochloromethane	51.0	5.0	"	50.0	ND	102	74-125			
Bromodichloromethane	47.3	2.0	"	50.0	ND	94.5	64-131			
Bromoform	44.4	1.0	"	50.0	ND	88.8	63-122			
Bromomethane	66.3	1.0	"	50.0	ND	133	46-155			
n-Butylbenzene	51.0	1.0	"	50.0	ND	102	47-142			
sec-Butylbenzene	51.2	1.0	"	50.0	ND	102	52-135			
tert-Butylbenzene	51.6	1.0	"	50.0	ND	103	53-137			
Carbon tetrachloride	47.4	1.0	"	50.0	ND	94.9	62-121			
Chlorobenzene	50.7	1.0	"	50.0	ND	101	64-131			
Chloroethane	49.1	1.0	"	50.0	ND	98.2	60-130			
Chloroform	50.1	5.0	"	50.0	ND	100	70-130			
Chloromethane	51.6	1.0	"	50.0	ND	103	62-130			
Chlorodibromomethane	46.6	1.0	"	50.0	ND	93.2	60-134			
2-Chlorotoluene	49.9	1.0	"	50.0	ND	99.7	58-138			
4-Chlorotoluene	50.7	1.0	"	50.0	ND	101	62-131			
1,2-Dibromo-3-chloropropane	47.1	1.0	"	50.0	ND	94.2	63-125			
1,2-Dibromoethane (EDB)	48.2	1.0	"	50.0	ND	96.5	66-131			
Dibromomethane	51.5	1.0	"	50.0	ND	103	70-127			
1,2-Dichlorobenzene	51.6	1.0	"	50.0	ND	103	62-134			
1,3-Dichlorobenzene	50.8	1.0	"	50.0	ND	102	60-133			
1,4-Dichlorobenzene	49.3	1.0	"	50.0	ND	98.6	63-127			
Dichlorodifluoromethane	46.2	1.0	"	50.0	ND	92.3	24-136			
1,1-Dichloroethane	50.4	1.0	"	50.0	ND	101	73-124			
1,2-Dichloroethane (EDC)	49.8	1.0	"	50.0	ND	99.5	75-122			
1,1-Dichloroethene	49.8	1.0	"	50.0	ND	99.5	70-123			
cis-1,2-Dichloroethene	50.8	1.0	"	50.0	ND	102	72-129			
trans-1,2-Dichloroethene	50.0	1.0	"	50.0	ND	100	76-126			
1,2-Dichloropropane	51.7	1.0	"	50.0	ND	103	68-129			
1,3-Dichloropropane	50.1	1.0	"	50.0	ND	100	69-130			
2,2-Dichloropropane	44.3	1.0	"	50.0	ND	88.6	37-126			
1,1-Dichloropropene	50.3	1.0	"	50.0	ND	101	61-125			
cis-1,3-Dichloropropene	45.6	1.0	"	50.0	ND	91.1	59-127			
trans-1,3-Dichloropropene	43.9	1.0	"	50.0	ND	87.7	59-126			
Ethylbenzene	51.0	1.0	"	50.0	ND	102	29-160			
Hexachlorobutadiene	51.6	1.0	"	50.0	ND	103	41-141			
Tert-amyl methyl ether	47.9	1.0	"	49.8	ND	96.2	61-132			

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Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

Volatile Organics Compounds by EPA Method 624 - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1406098 - EPA 5030 Water MS										
Matrix Spike (1406098-MS1)	**Source: 1406012-01**		Prepared & Analyzed: 06/13/14							
Ethyl tert-butyl ether	48.6	10	ug/l	50.0	ND	97.3	65-130			
Tert-butyl alcohol	208	20	"	249	ND	83.7	60-130			
Di-isopropyl ether	49.0	5.0	"	50.0	ND	97.9	73-128			
Isopropylbenzene	52.1	1.0	"	50.0	ND	104	44-143			
p-Isopropyltoluene	50.7	1.0	"	50.0	ND	101	47-137			
Methylene Chloride	55.1	5.0	"	50.0	ND	110	42-129			
Methyl tert-butyl ether	47.9	5.0	"	50.0	ND	95.7	70-124			
Naphthalene	47.7	1.0	"	50.0	ND	95.4	73-132			
n-Propylbenzene	50.2	1.0	"	50.0	ND	100	61-129			
Styrene	51.6	1.0	"	50.0	ND	103	36-146			
1,1,2,2-Tetrachloroethane	52.4	1.0	"	50.0	ND	105	71-140			
1,1,1,2-Tetrachloroethane	53.3	1.0	"	50.0	ND	107	59-137			
Tetrachloroethene	50.1	1.0	"	50.0	ND	100	49-137			
Toluene	49.2	1.0	"	50.0	ND	98.5	27-151			
1,2,3-Trichlorobenzene	51.3	1.0	"	50.0	ND	103	61-137			
1,2,4-Trichlorobenzene	50.5	1.0	"	50.0	ND	101	55-141			
1,1,2-Trichloroethane	51.6	1.0	"	50.0	ND	103	67-134			
1,1,1-Trichloroethane	50.2	1.0	"	50.0	ND	100	66-128			
Trichloroethene	51.8	1.0	"	50.0	ND	104	65-119			
Trichlorofluoromethane	49.2	1.0	"	50.0	ND	98.4	65-121			
1,2,3-Trichloropropane	50.6	1.0	"	50.0	ND	101	69-125			
1,3,5-Trimethylbenzene	51.7	1.0	"	50.0	ND	103	50-138			
1,2,4-Trimethylbenzene	50.7	1.0	"	50.0	ND	101	54-137			
Vinyl chloride	50.3	1.0	"	50.0	ND	101	71-124			
m,p-Xylene	100	2.0	"	100	ND	100	20-166			
o-Xylene	50.8	1.0	"	50.0	ND	102	33-159			
Surrogate: 1,2-Dichloroethane-d4	*13.1*		*"*	*13.2*		*98.7*	*37-154*			
Surrogate: Toluene-d8	*13.6*		*"*	*13.3*		*102*	*45-149*			
Surrogate: 4-Bromofluorobenzene	*13.5*		*"*	*13.3*		*101*	*45-146*			

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

Volatile Organics Compounds by EPA Method 624 - Quality Control

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1406098 - EPA 5030 Water MS										
Matrix Spike Dup (1406098-MSD1)	**Source: 1406012-01**			Prepared & Analyzed: 06/13/14						
Benzene	52.2	1.0	ug/l	50.0	ND	104	34-141	4.35	32	
Bromobenzene	51.6	1.0	"	50.0	ND	103	66-131	2.21	30	
Bromochloromethane	54.0	5.0	"	50.0	ND	108	74-125	5.68	30	
Bromodichloromethane	48.4	2.0	"	50.0	ND	96.9	64-131	2.42	30	
Bromoform	45.7	1.0	"	50.0	ND	91.5	63-122	2.97	27	
Bromomethane	70.4	1.0	"	50.0	ND	141	46-155	6.03	95	
n-Butylbenzene	50.6	1.0	"	50.0	ND	101	47-142	0.747	33	
sec-Butylbenzene	50.4	1.0	"	50.0	ND	101	52-135	1.55	33	
tert-Butylbenzene	50.7	1.0	"	50.0	ND	101	53-137	1.78	38	
Carbon tetrachloride	47.1	1.0	"	50.0	ND	94.2	62-121	0.698	21	
Chlorobenzene	51.5	1.0	"	50.0	ND	103	64-131	1.51	30	
Chloroethane	49.5	1.0	"	50.0	ND	99.1	60-130	0.872	29	
Chloroform	52.5	5.0	"	50.0	ND	105	70-130	4.76	32	
Chloromethane	53.8	1.0	"	50.0	ND	108	62-130	4.20	24	
Chlorodibromomethane	47.6	1.0	"	50.0	ND	95.3	60-134	2.21	30	
2-Chlorotoluene	49.7	1.0	"	50.0	ND	99.4	58-138	0.362	34	
4-Chlorotoluene	50.6	1.0	"	50.0	ND	101	62-131	0.277	29	
1,2-Dibromo-3-chloropropane	48.0	1.0	"	50.0	ND	96.0	63-125	1.94	34	
1,2-Dibromoethane (EDB)	48.9	1.0	"	50.0	ND	97.8	66-131	1.32	31	
Dibromomethane	52.8	1.0	"	50.0	ND	106	70-127	2.36	28	
1,2-Dichlorobenzene	52.0	1.0	"	50.0	ND	104	62-134	0.927	29	
1,3-Dichlorobenzene	51.1	1.0	"	50.0	ND	102	60-133	0.628	30	
1,4-Dichlorobenzene	49.6	1.0	"	50.0	ND	99.2	63-127	0.627	31	
Dichlorodifluoromethane	47.7	1.0	"	50.0	ND	95.5	24-136	3.39	31	
1,1-Dichloroethane	52.3	1.0	"	50.0	ND	105	73-124	3.76	33	
1,2-Dichloroethane (EDC)	51.3	1.0	"	50.0	ND	103	75-122	3.09	19	
1,1-Dichloroethene	51.3	1.0	"	50.0	ND	103	70-123	3.07	32	
cis-1,2-Dichloroethene	52.9	1.0	"	50.0	ND	106	72-129	4.01	31	
trans-1,2-Dichloroethene	51.8	1.0	"	50.0	ND	104	76-126	3.36	31	
1,2-Dichloropropane	53.3	1.0	"	50.0	ND	107	68-129	2.95	29	
1,3-Dichloropropane	51.8	1.0	"	50.0	ND	104	69-130	3.34	31	
2,2-Dichloropropane	45.7	1.0	"	50.0	ND	91.5	37-126	3.20	33	
1,1-Dichloropropene	51.6	1.0	"	50.0	ND	103	61-125	2.45	28	
cis-1,3-Dichloropropene	47.1	1.0	"	50.0	ND	94.2	59-127	3.32	28	
trans-1,3-Dichloropropene	45.7	1.0	"	50.0	ND	91.5	59-126	4.17	28	
Ethylbenzene	51.4	1.0	"	50.0	ND	103	29-160	0.801	50	
Hexachlorobutadiene	51.0	1.0	"	50.0	ND	102	41-141	1.07	35	
Tert-amyl methyl ether	52.1	1.0	"	49.8	ND	105	61-132	8.40	34	

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Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

Volatile Organics Compounds by EPA Method 624 - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1406098 - EPA 5030 Water MS										
Matrix Spike Dup (1406098-MSD1)	**Source: 1406012-01**			Prepared & Analyzed: 06/13/14						
Ethyl tert-butyl ether	51.6	10	ug/l	50.0	ND	103	65-130	5.95	38	
Tert-butyl alcohol	225	20	"	249	ND	90.4	60-130	7.74	31	
Isopropylbenzene	52.1	1.0	"	50.0	ND	104	44-143	0.0960	35	
Di-isopropyl ether	51.9	5.0	"	50.0	ND	104	73-128	5.85	25	
p-Isopropyltoluene	50.0	1.0	"	50.0	ND	99.9	47-137	1.45	38	
Methylene Chloride	58.5	5.0	"	50.0	ND	117	42-129	5.99	31	
Methyl tert-butyl ether	51.2	5.0	"	50.0	ND	102	70-124	6.68	35	
Naphthalene	49.9	1.0	"	50.0	ND	99.8	73-132	4.59	23	
n-Propylbenzene	49.5	1.0	"	50.0	ND	99.0	61-129	1.44	35	
Styrene	52.4	1.0	"	50.0	ND	105	36-146	1.42	33	
1,1,2,2-Tetrachloroethane	53.7	1.0	"	50.0	ND	107	71-140	2.32	32	
1,1,1,2-Tetrachloroethane	54.6	1.0	"	50.0	ND	109	59-137	2.48	32	
Tetrachloroethene	50.4	1.0	"	50.0	ND	101	49-137	0.637	32	
Toluene	50.4	1.0	"	50.0	ND	101	27-151	2.23	25	
1,2,3-Trichlorobenzene	52.3	1.0	"	50.0	ND	105	61-137	2.01	27	
1,2,4-Trichlorobenzene	51.2	1.0	"	50.0	ND	102	55-141	1.30	28	
1,1,2-Trichloroethane	53.9	1.0	"	50.0	ND	108	67-134	4.21	29	
1,1,1-Trichloroethane	51.7	1.0	"	50.0	ND	103	66-128	2.93	31	
Trichloroethene	52.3	1.0	"	50.0	ND	105	65-119	1.08	30	
Trichlorofluoromethane	50.4	1.0	"	50.0	ND	101	65-121	2.37	30	
1,2,3-Trichloropropane	52.0	1.0	"	50.0	ND	104	69-125	2.71	33	
1,3,5-Trimethylbenzene	50.9	1.0	"	50.0	ND	102	50-138	1.62	34	
1,2,4-Trimethylbenzene	50.1	1.0	"	50.0	ND	100	54-137	1.15	34	
Vinyl chloride	51.3	1.0	"	50.0	ND	103	71-124	1.87	26	
m,p-Xylene	101	2.0	"	100	ND	101	20-166	0.596	36	
o-Xylene	51.6	1.0	"	50.0	ND	103	33-159	1.48	26	
Surrogate: 1,2-Dichloroethane-d4	*13.4*		*"*	*13.2*		*101*	*37-154*			
Surrogate: Toluene-d8	*13.5*		*"*	*13.3*		*101*	*45-149*			
Surrogate: 4-Bromofluorobenzene	*13.6*		*"*	*13.3*		*102*	*45-146*			

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

Hexavalent Chromium by EPA 7196 - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1406103 - * DEFAULT PREP *** **										
Blank (1406103-BLK1)				Prepared & Analyzed: 06/13/14						
Chromium, Hexavalent	ND	0.01	mg/L							
Chromium, Hexavalent	ND	0.01	"							
LCS (1406103-BS1)				Prepared & Analyzed: 06/13/14						
Chromium, Hexavalent	0.103	0.01	mg/L	0.111		92.8	85-115			
Chromium, Hexavalent	0.1144444	0.01	"	0.111		103	85-115			
LCS Dup (1406103-BSD1)				Prepared & Analyzed: 06/13/14						
Chromium, Hexavalent	0.1166667	0.01	mg/L	0.111		105	85-115	1.92	20	
Chromium, Hexavalent	0.105	0.01	"	0.111		94.6	85-115	1.92	20	
Duplicate (1406103-DUP1)		**Source: 1406082-02**		Prepared & Analyzed: 06/13/14						
Chromium, Hexavalent	ND	0.01	mg/L		ND				200	
Chromium, Hexavalent	ND	0.01	"		0.007				20	
Matrix Spike (1406103-MS1)		**Source: 1406082-02**		Prepared & Analyzed: 06/13/14						
Chromium, Hexavalent	0.014	0.01	mg/L	0.111	0.007	6.31	85-115			
Chromium, Hexavalent	1.555556E-02	0.01	"	0.111	ND	14.0	85-115			

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

Total Recoverable Metals by EPA Method 200.8 - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1406149 - EPA 3010A										
Blank (1406149-BLK1)				Prepared: 06/19/14 Analyzed: 06/22/14						
Antimony	0.00121	0.00100	mg/L							
Arsenic	ND	0.000600	"							
Barium	ND	0.00160	"							
Cadmium	ND	0.0000600	"							
Chromium	ND	0.00150	"							
Lead	ND	0.000100	"							
Manganese	ND	0.00100	"							
Molybdenum	ND	0.100	"							
Nickel	ND	0.000800	"							
Selenium	ND	0.000800	"							
Silver	ND	0.0000300	"							
Zinc	ND	0.0100	"							
LCS (1406149-BS1)				Prepared: 06/19/14 Analyzed: 06/22/14						
Antimony	0.00142	0.00100	mg/L	0.000100		NR	80-120			
Arsenic	0.000962	0.000600	"	0.00100		96.2	80-120			
Barium	0.00879	0.00160	"	0.0100		87.9	80-120			
Cadmium	0.0000950	0.0000600	"	0.000100		95.0	80-120			
Chromium	0.0106	0.00150	"	0.0100		106	80-120			
Lead	0.00106	0.000100	"	0.00100		106	80-120			
Manganese	0.0106	0.00100	"	0.0100		106	80-120			
Nickel	0.00147	0.000800	"	0.00100		147	80-120			
Selenium	0.000854	0.000800	"	0.00100		85.4	80-120			
Silver	0.000105	0.0000300	"	0.000100		105	80-120			
Zinc	0.0251	0.0100	"	0.0100		251	80-120			
LCS Dup (1406149-BSD1)				Prepared: 06/19/14 Analyzed: 06/22/14						
Antimony	0.00154	0.00100	mg/L	0.000100		NR	80-120	7.69	20	
Arsenic	0.000968	0.000600	"	0.00100		96.8	80-120	0.644	20	
Barium	0.00878	0.00160	"	0.0100		87.8	80-120	0.135	20	
Cadmium	0.0000968	0.0000600	"	0.000100		96.8	80-120	1.84	20	
Chromium	0.0102	0.00150	"	0.0100		102	80-120	4.04	20	
Lead	0.00107	0.000100	"	0.00100		107	80-120	0.539	20	
Manganese	0.0102	0.00100	"	0.0100		102	80-120	3.67	20	
Nickel	0.00159	0.000800	"	0.00100		159	80-120	8.07	20	
Selenium	0.000844	0.000800	"	0.00100		84.4	80-120	1.22	20	
Silver	0.000101	0.0000300	"	0.000100		101	80-120	3.41	20	
Zinc	0.0288	0.0100	"	0.0100		288	80-120	13.7	20	

Summit Scientific

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

Total Recoverable Metals by EPA Method 200.8 - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1406149 - EPA 3010A										
Matrix Spike (1406149-MS1)		**Source: 1406082-01**		Prepared: 06/19/14		Analyzed: 06/22/14				
Antimony	0.00199	0.00100	mg/L	0.000100	0.00203	NR	75-125			QM-4X
Arsenic	0.00195	0.000600	"	0.00100	0.00144	50.5	75-125			
Barium	0.177	0.00160	"	0.0100	0.157	199	75-125			QM-07
Cadmium	0.000148	0.0000600	"	0.000100	0.0000296	119	75-125			
Chromium	0.0172	0.00150	"	0.0100	0.00402	132	75-125			QM-07
Lead	0.00422	0.000100	"	0.00100	0.00792	NR	75-125			QM-07
Manganese	1.65	0.00100	"	0.0100	1.59	632	75-125			QM-4X
Nickel	0.0123	0.000800	"	0.00100	0.0115	80.6	75-125			QM-4X
Selenium	0.000765	0.000800	"	0.00100	0.0000333	73.2	75-125			QM-07
Silver	0.000118	0.0000300	"	0.000100	0.0000274	90.3	75-125			
Zinc	0.383	0.0100	"	0.0100	0.177	NR	75-125			QM-4X
Matrix Spike Dup (1406149-MSD1)		**Source: 1406082-01**		Prepared: 06/19/14		Analyzed: 06/22/14				
Antimony	0.00227	0.00100	mg/L	0.000100	0.00203	244	75-125	13.1	25	QM-4X
Arsenic	0.00177	0.000600	"	0.00100	0.00144	32.8	75-125	9.51	25	
Barium	0.160	0.00160	"	0.0100	0.157	35.7	75-125	9.70	25	QM-07
Cadmium	0.000119	0.0000600	"	0.000100	0.0000296	89.8	75-125	21.5	25	
Chromium	0.0139	0.00150	"	0.0100	0.00402	99.1	75-125	20.9	25	
Lead	0.00271	0.000100	"	0.00100	0.00792	NR	75-125	43.6	25	
Manganese	1.67	0.00100	"	0.0100	1.59	803	75-125	1.03	25	QM-4X
Nickel	0.00971	0.000800	"	0.00100	0.0115	NR	75-125	23.9	25	QM-4X
Selenium	0.000819	0.000800	"	0.00100	0.0000333	78.6	75-125	6.79	25	
Silver	0.000105	0.0000300	"	0.000100	0.0000274	77.2	75-125	11.7	25	
Zinc	0.230	0.0100	"	0.0100	0.177	527	75-125	50.0	25	QM-4X

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

Total Recoverable Metals by EPA Method 6020 - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1406149 - EPA 3010A										
Blank (1406149-BLK1)				Prepared: 06/19/14 Analyzed: 06/22/14						
Iron	0.0544	0.00100	mg/L							
LCS (1406149-BS1)				Prepared: 06/19/14 Analyzed: 06/22/14						
Iron	0.0700	0.00100	mg/L	0.0100		700	80-120			
LCS Dup (1406149-BSD1)				Prepared: 06/19/14 Analyzed: 06/22/14						
Iron	0.0594	0.00100	mg/L	0.0100		594	80-120	16.3	20	
Matrix Spike (1406149-MS1)		**Source: 1406082-01**		Prepared: 06/19/14 Analyzed: 06/22/14						
Iron	6.65	0.00100	mg/L	0.0100	3.28	NR	75-125			QM-4X
Matrix Spike Dup (1406149-MSD1)		**Source: 1406082-01**		Prepared: 06/19/14 Analyzed: 06/22/14						
Iron	4.17	0.00100	mg/L	0.0100	3.28	NR	75-125	46.0	25	QM-4X

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

Potentially Dissolved Metals by EPA Method 200.8 - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1406125 - EPA 200.8										
Blank (1406125-BLK1)				Prepared: 06/17/14 Analyzed: 06/19/14						
Selenium	ND	0.000800	mg/L							
Arsenic	ND	0.000600	"							
Cadmium	ND	0.0000600	"							
Copper	ND	0.00100	"							
Lead	ND	0.000100	"							
Nickel	ND	0.000800	"							
Silver	ND	0.0000300	"							
LCS (1406125-BS1)				Prepared: 06/17/14 Analyzed: 06/19/14						
Selenium	0.00961	0.000800	mg/L	0.0100		96.1	80-120			
Arsenic	0.00866	0.000600	"	0.0100		86.6	80-120			
Cadmium	0.00105	0.0000600	"	0.00100		105	80-120			
Copper	0.00905	0.00100	"	0.0100		90.5	80-120			
Lead	0.0119	0.000100	"	0.0100		119	80-120			
Nickel	0.00932	0.000800	"	0.0100		93.2	80-120			
Silver	0.00104	0.0000300	"	0.00100		104	80-120			
LCS Dup (1406125-BSD1)				Prepared: 06/17/14 Analyzed: 06/19/14						
Selenium	0.00922	0.000800	mg/L	0.0100		92.2	80-120	4.18	20	
Arsenic	0.00898	0.000600	"	0.0100		89.8	80-120	3.72	20	
Cadmium	0.000997	0.0000600	"	0.00100		99.7	80-120	4.92	20	
Copper	0.00924	0.00100	"	0.0100		92.4	80-120	2.05	20	
Lead	0.0111	0.000100	"	0.0100		111	80-120	6.93	20	
Nickel	0.00961	0.000800	"	0.0100		96.1	80-120	3.04	20	
Silver	0.00102	0.0000300	"	0.00100		102	80-120	2.26	20	
Matrix Spike (1406125-MS1)		**Source: 1406082-01**		Prepared: 06/17/14 Analyzed: 06/19/14						
Selenium	0.00819	0.000800	mg/L	0.0100	ND	81.9	75-125			
Arsenic	0.0103	0.000600	"	0.0100	0.000903	94.2	75-125			
Cadmium	0.00100	0.0000600	"	0.00100	0.0000472	95.4	75-125			
Copper	0.0131	0.00100	"	0.0100	0.00128	118	75-125			
Lead	0.0172	0.000100	"	0.0100	0.00193	152	75-125			
Nickel	0.0208	0.000800	"	0.0100	0.00706	137	75-125			
Silver	0.000935	0.0000300	"	0.00100	ND	93.5	75-125			

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

Potentially Dissolved Metals by EPA Method 200.8 - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1406125 - EPA 200.8										
Matrix Spike Dup (1406125-MSD1)		**Source: 1406082-01**		Prepared: 06/17/14 Analyzed: 06/19/14						
Selenium	0.00814	0.000800	mg/L	0.0100	ND	81.4	75-125	0.666	25	
Arsenic	0.0103	0.000600	"	0.0100	0.000903	94.2	75-125	0.0176	25	
Cadmium	0.00101	0.0000600	"	0.00100	0.0000472	96.2	75-125	0.777	25	
Copper	0.0129	0.00100	"	0.0100	0.00128	117	75-125	0.956	25	
Lead	0.0175	0.000100	"	0.0100	0.00193	156	75-125	2.20	25	
Nickel	0.0208	0.000800	"	0.0100	0.00706	138	75-125	0.449	25	
Silver	0.000919	0.0000300	"	0.00100	ND	91.9	75-125	1.74	25	

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

Dissolved Metals by EPA Method 200.8 - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1406125 - EPA 200.8										
Blank (1406125-BLK1)				Prepared: 06/17/14 Analyzed: 06/19/14						
Manganese	ND	0.00100	mg/L							
LCS (1406125-BS1)				Prepared: 06/17/14 Analyzed: 06/19/14						
Manganese	0.0971	0.00100	mg/L	0.100		97.1	80-120			
LCS Dup (1406125-BSD1)				Prepared: 06/17/14 Analyzed: 06/19/14						
Manganese	0.100	0.00100	mg/L	0.100		100	80-120	2.93	20	
Matrix Spike (1406125-MS1)		**Source: 1406082-01**		Prepared: 06/17/14 Analyzed: 06/19/14						
Manganese	1.92	0.00100	mg/L	0.100	1.79	131	75-125			QM-4X
Matrix Spike Dup (1406125-MSD1)		**Source: 1406082-01**		Prepared: 06/17/14 Analyzed: 06/19/14						
Manganese	1.90	0.00100	mg/L	0.100	1.79	108	75-125	1.20	25	QM-4X

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

Dissolved Metals by EPA Method 6020 - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1406125 - EPA 200.8										
Blank (1406125-BLK1)				Prepared: 06/17/14 Analyzed: 06/19/14						
Iron	ND	0.00100	mg/L							
LCS (1406125-BS1)				Prepared: 06/17/14 Analyzed: 06/19/14						
Iron	0.0936	0.00100	mg/L	0.100		93.6	80-120			
LCS Dup (1406125-BSD1)				Prepared: 06/17/14 Analyzed: 06/19/14						
Iron	0.120	0.00100	mg/L	0.100		120	80-120	24.3	20	
Matrix Spike (1406125-MS1)		**Source: 1406082-01**		Prepared: 06/17/14 Analyzed: 06/19/14						
Iron	3.68	0.00100	mg/L	0.100	2.09	NR	75-125			QM-4X
Matrix Spike Dup (1406125-MSD1)		**Source: 1406082-01**		Prepared: 06/17/14 Analyzed: 06/19/14						
Iron	3.74	0.00100	mg/L	0.100	2.09	NR	75-125	1.57	25	QM-4X

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

Physical Parameters by APHA/ASTM/EPA Methods - Quality Control

Summit Scientific

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1406132 - General Preparation										
Blank (1406132-BLK1)				Prepared & Analyzed: 06/17/14						
Total Suspended Solids	ND	10.0	mg/L							
Duplicate (1406132-DUP1)		**Source: 1406078-01**		Prepared & Analyzed: 06/17/14						
Total Suspended Solids	ND	10.0	mg/L		ND				20	
Batch 1406164 - General Preparation										
Duplicate (1406164-DUP1)		**Source: 1406082-01**		Prepared & Analyzed: 06/20/14						
pH	6.88	1.00	pH Units		6.80			1.17	13.7	

Pickering, Cole & Hivner 1070 W. 124th Ave Building B300 Westminster CO, 80023	Project: Pearl Place Project Number: [none] Project Manager: Russ Pickering	**Reported:** 06/26/14 00:08

Notes and Definitions

QM-4X	The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

APPENDIX E

Dewatering Overview

Jessica,

Per our conversations regarding the dewatering of the development site, and treating the water; The following describes the parameters around which we came up with the basis of design for the dewatering systems and a summary of those systems.

Initially we are using our geotech report from PCH to design the temporary dewatering system for use during construction. The report can't definitively predict how much groundwater we will have to treat after our initial draw down with the permanent filtration system. Based on our experience with nearby sites; 29 North and 3100 Pearl Place we extrapolated a gpm to design to then added a safety factor. At 29 North the filtration system currently treats about 12gpm though it designed to handle up to 30 gpm. At 3100Pearl Place that system is designed to handle a 50 gpm flow. As it is the worst case scenario, we took the 3100 Pearl Place system at 50 gpm and doubled it so our system is designed for 100gpm and that we have a measure of safety. We designed for 100 gpm in PH1 and PH2.

Below and attached to our submittal in another document, we describe both the temporary and permanent systems.

In addition we have also contacted the Ditch Companies, who are in general acceptance to both our ditch realignment plan and to accepting the treated groundwater from our site into the ditch. They have asked to measure the flow of water we will be sending into the ditch, which we will do with a flow meter designed into the system.

We will continue to develop these designs as we move into the Technical Documents phase. We will also continue to keep communications with you on a regular basis as we further develop the design.

TEMPORARY DEWATERING SYSTEM

Our Team appreciates the opportunity to present this budgetary proposal. We will provide you with a temporary water treatment system capable of treating up to 400 gallons per minute of water generated from dewatering activities at this site.

We have reviewed the latest PCH – Geotechnical Design Criteria dated June 30th 2014 for the potential groundwater constituents for this project based on those that may exceed the effluent limitations during the dewatering stages of this project. Our Team has designed this system to treat these type constituents under a site specific General NPDES Order applied for with the Colorado Water Board Agency.

The typical treatment system consists of the following functional equipment:

- 21,000 gallon Frac type holding tank

- Process pump & Control panel; Performance 400 GPM at 50-60 psi
- Sand filter Unit
- Chemical Injection
- (2) 4-chamber Bag filters
- IXR Media Vessels – 2 x PEL10,000 in parallel flow. Anti-siphon loop Flow Meter/Totalizer (Flexible hoses for our equipment)

TYPICAL SYSTEM LAYOUT/FOOTPRINT = 22’ wide x 50’ length x 18’ height

PERMANENT DEWATERING SYSTEM
We have reviewed the latest PCH – Geotechnical Design Criteria dated June 30th 2014 for the potential groundwater constituents for this project based on those that may exceed the effluent limitations during the dewatering stages of this project. Our Team has designed this system to treat these type constituents under a site specific General NPDES Order applied for with the Colorado Water Board Agency.

The typical treatment system consists of the following functional equipment

- Holding Tank, that will receive the raw water generated from the dewatering activities.
- Electrically powered pumping system, external of the holding tank, centrifugal, maximum capacity of 75 gallons per minute (Client to provide electrical service; 230/460V; 3-Phase)
- solid removal filters, Bag type, for removal of suspended solids, to 25 microns
- PEL 2000 Media Pressure Vessels Filled w/ Ion Exchange Resin Medias.
- Chemical Injection System – Polymer Flocculent.
- Flow meter and totalizer system, and effluent sampling port.
- Set of interconnecting piping, hoses, 50 ft. of flexible discharge line and pressure gauges.
- Anti-siphon system, electrical control panel with auto float controls.

TYPICAL SYSTEM LAYOUT/FOOTPRINT = 12’ Wide x 35’ Length x 9.5’ Height

Should you have any questions please feel free to contact me.

Sincerely,
Matt Beecher
Forum Real Estate Group
303-552-6003

Temporary Groundwater Dewatering System

The excavation is to be about 380' x 240' and is to extend through the lower permeable soils and into the nonpermeable claystone bedrock roughly to elevation 5255. Sub-surface information available from the Geotech report by Pickering, Cole, and Hivner, indicates the soil profile at the jobsite will consist of fine to coarse sand with silt and gravel, with some possible cobbles from existing grade to the top of claystone bedrock 19' to 21' in depth below grade. The groundwater was encountered about 10' below grade or elevation 5275 in borings from 3/2014, but later dropped to elevation 5269 or lower in measurements taken 8/2014. Due to the fact that the excavation will extend 10' below the sand/bedrock interface, complete dewatering will not be possible. Additional sumping will be required to handle the groundwater perched on top of the impervious claystone bedrock. It was also mentioned in the report that the estimated flows from dewatering activities may be on the order of 400-500 gpm.

Given the above information, We will provide and install two separate dewatering systems to first, draw down the water table as close to the bedrock as it can, then a second, a sumping system to handle additional groundwater remaining on top of the bedrock and any water that will continue to accumulate from leakage through the shoring wall and/or precipitation.

The first system will be a vacuum SilterVac wellpoint system consisting of a series of wellpoints drilled with a hollow stem auger, to the top of the bedrock. Each SilterVac Wellpoint will be wrapped fabric to prevent the pumping of fine soil particles to the treatment system. The excavation would be subcut at or near the water table inside the excavation, then the system would be installed at that elevation.

Once the SilterVac Wellpoint system has drawn down the water table as far as possible, (probably within 1'-2' of bedrock), the second system can be installed. One SilterMop turbidity control sump device with internal 5 horsepower, 460V, 3 phase, electric submersible pump will be installed. The contractor shall bed (install) each sump in washed filter sand and place in the excavation in a low area within the building footprint. The SilterMop is fitted with a proprietary expendable geotextile filter assembly tailored and sized to suit the soil conditions at the jobsite. Flexible rubber hose will be installed from the sump to the designated discharge point at the ditch, laid on the surface.

A certified, third party firm will monitor and maintain the temporary system.

Permanent groundwater treatment system

A permanent groundwater treatment system will be constructed to deal with the anticipated permanent groundwater flow. We expect the anticipated flow to be worst case based upon actual flows of nearby projects. Once construction progresses to a point where actual flows can be assessed (adjusted for seasonal flows), the system's design will be finalized to accommodate the more accurate rate.

A brief summary of the permanent system includes:

- Holding Tank, that will receive the raw water generated from the dewatering activities.

- Electrically powered pumping system, external of the holding tank, centrifugal, maximum capacity of 100 gallons per minute
- Solid removal filters, Bag type, for removal of suspended solids, to 25 microns
- PEL 2000 Media Pressure Vessels Filled w/ Ion Exchange Resin Medias.
- Chemical Injection System – Polymer Flocculent.
- Flow meter and totalizer system, and effluent sampling port.
- Set of interconnecting piping, hoses, 50 ft. of flexible discharge line and pressure gauges.
- Anti-siphon system, electrical control panel with auto float controls.

A certified, third party firm will monitor and maintain the temporary system.

APPENDIX F

Temporary Ditch Location

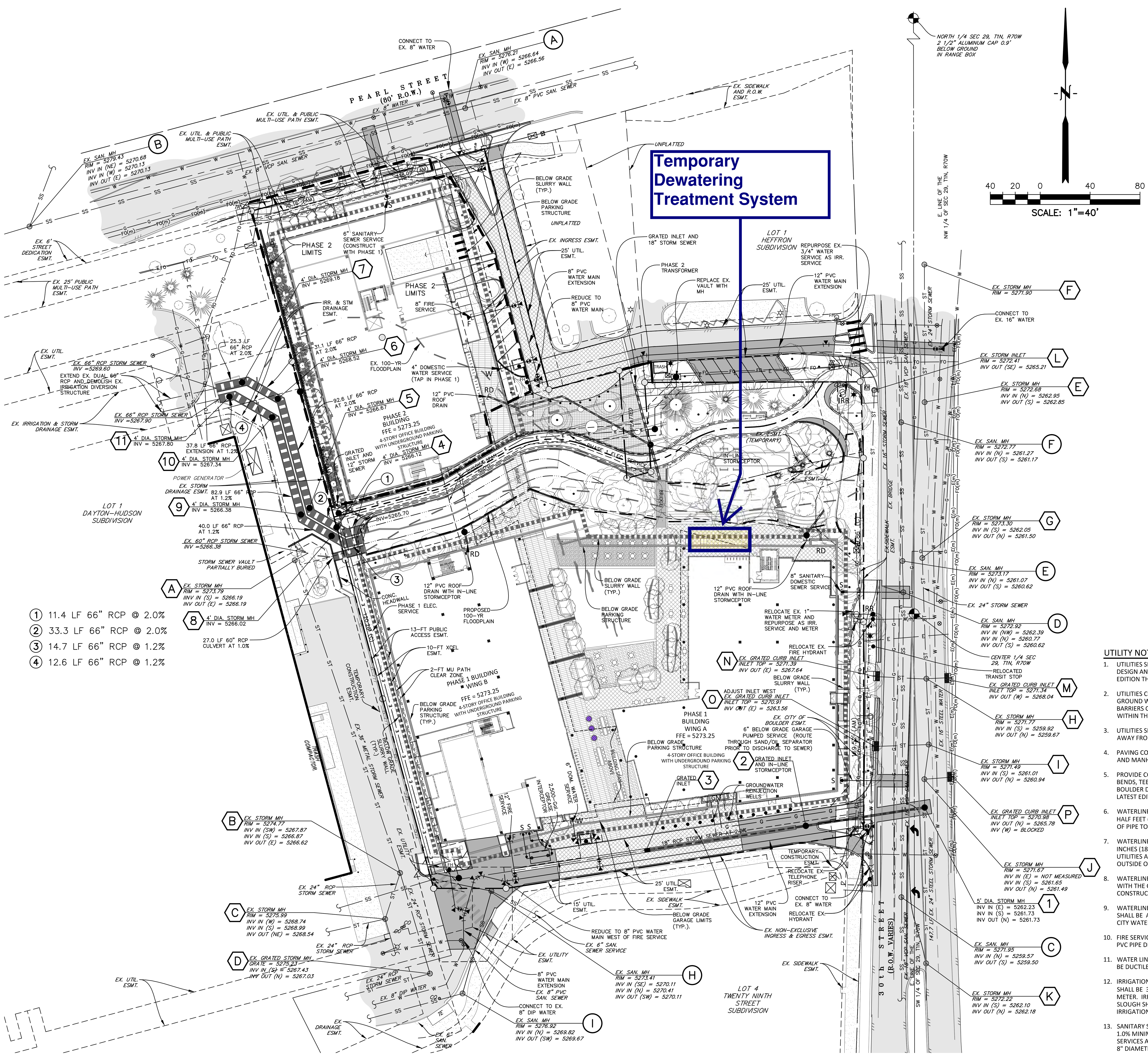
PROJECT
Lloyd
Phase 1
Office Development

30TH AND PEARL STREET
BOULDER, COLORADO

TRYBA ARCHITECTS
1620 Logan Street
Denver, Colorado 80203
303-831-4010

forum real estate group

The Sanitas Group
801 MAIN ST, SUITE 210
LOUISVILLE, CO 80027
303.981.9238



LEGEND

- PROPERTY BOUNDARY
- ADJACENT PROPERTY BOUNDARY
- EX. RIGHT-OF-WAY
- EX. SECTION LINE
- EX. PROPERTY MONUMENT
- EX. SECTION MONUMENT
- EX. EASEMENT
- EX. FENCE
- EX. STORM SEWER — ST
- EX. SANITARY SEWER — SS
- EX. WATER LINE — W
- EX. WATER LINE (PER CITY MAPPING) — W(m)
- EX. NATURAL GAS LINE — G
- EX. NATURAL GAS LINE (PER AGENCY MAPPING) — G(m)
- EX. FIBER OPTIC LINE — FO
- EX. FIBER OPTIC LINE (PER AGENCY MAPPING) — FO(m)
- EX. CABLE TV — CTV
- EX. TELEPHONE — T
- EX. UNDERGROUND ELECTRICAL LINE — E
- EX. UNDERGROUND ELECTRICAL LINE (PER AGENCY MAPPING) — E(m)
- EX. OVERHEAD UTILITY LINE — OVH
- EX. UTILITY MANHOLE
- EX. FIRE HYDRANT
- EX. WATER VALVE
- EX. WATER METER
- EX. TELECOMMUNICATIONS RISER — TR
- EX. ELECTRICAL EQUIPMENT
- EX. ELECTRICAL METER
- EX. LIGHT POLE
- EX. POWER POLE
- EX. SANITARY SEWER CLEAN-OUT — CO
- EX. MONITORING WELL
- EX. TEST HOLE
- EX. SIGN
- SANITARY SEWER MANHOLE DESIGNATOR — A
- STORM STRUCTURE DESIGNATOR — A
- REMOVE EX. UTILITY LINE
- PROPOSED SANITARY SEWER SERVICE — S
- PROPOSED FIRE SERVICE — F
- PROPOSED WATER SERVICE — W
- PROPOSED WATER METER
- PROPOSED WATER VALVE
- PROPOSED TEE WITH THRUST BLOCKING
- PROPOSED HORZ. BEND WITH THRUST BLOCKING
- EX. ASPHALT PAVEMENT
- PROPOSED ASPHALT PAVEMENT
- EX. CONCRETE
- PROPOSED CONCRETE
- EX. TREES
- PROPOSED TREES (SEE LANDSCAPE PLANS)

UTILITY NOTES

1. UTILITIES SHALL COMPLY WITH THE CITY OF BOULDER DESIGN AND CONSTRUCTION STANDARDS, LATEST EDITION THEREOF.
2. UTILITIES CONSTRUCTED IN THE SEASONAL HIGH GROUND WATER TABLE SHALL HAVE GROUND WATER BARRIERS CONSTRUCTED AT REGULAR INTERVALS WITHIN THE UTILITY TRENCH.
3. UTILITIES SHALL BE LOCATED A MINIMUM OF 10-FT AWAY FROM PROPOSED AND EXISTING TREES.
4. PAVING CONTRACTOR SHALL ADJUST WATER VALVES AND MANHOLE RIM TO FINAL GRADE.
5. PROVIDE CONCRETE THRUST BLOCKING AT ALL FIRE LINE BENDS, TEES AND PLUGS IN ACCORDANCE WITH CITY OF BOULDER DESIGN AND CONSTRUCTION STANDARDS, LATEST EDITION THEREOF.
6. WATERLINES SHALL HAVE A MINIMUM FOUR AND A HALF FEET (4.5-FT) OF COVER AS MEASURED FROM TOP OF PIPE TO FINAL GRADE.
7. WATERLINES SHALL HAVE A MINIMUM OF EIGHTEEN INCHES (18-IN) OF VERTICAL CLEARANCE FROM OTHER UTILITIES AS MEASURED FROM OUTSIDE OF PIPE TO OUTSIDE OF PIPE.
8. WATERLINES PIPE SHALL BE BEDDED IN ACCORDANCE WITH THE CITY OF BOULDER DESIGN AND CONSTRUCTION, LATEST EDITION THEREOF.
9. WATERLINES AND DOMESTIC WATER SERVICE PIPES SHALL BE AWWA C900 CLASS 200 PVC PIPE DR14 WITH CITY WATER METER.
10. FIRE SERVICE LINES SHALL BE AWWA C900 CLASS 200 PVC PIPE DR14.
11. WATER LINE FITTINGS AND FIRE SERVICE FITTINGS SHALL BE DUCTILE IRON OR CAST-IRON AWWA C110 CLASS 250.
12. IRRIGATION SERVICE LINE NORTH OF BOULDER SLOUGH SHALL BE 3/4" COPPER 'K' PIPE WITH 3/4" IRRIGATION METER. IRRIGATION SERVICE LINE SOUTH OF BOULDER SLOUGH SHALL BE 1" COPPER 'K' PIPE WITH 1" IRRIGATION METER.
13. SANITARY SEWER SERVICES SHALL BE SDR 35 PVC PIPE AT 1.0% MINIMUM SLOPE OR GREATER FOR 6" DIAMETER SERVICES AND 0.5% MINIMUM SLOPE OR GREATER FOR 8" DIAMETER SERVICES.

EXISTING CONDITIONS SURVEY NOTES

1. THE EXISTING CONDITIONS BASED ON ALTA/ACSM LAND TITLE SURVEY PREPARED BY FLATIRONS, INC. ISSUED 03/21/14.
2. THE LOCATION OF THE ABOVE GROUND UTILITIES SHOWN HEREON ARE BASED ON THE FIELD SURVEY BY FLATIRONS, INC.
2. THE LOCATION OF THE ABOVE GROUND UTILITIES SHOWN HEREON ARE BASED ON THE FIELD SURVEY BY FLATIRONS, INC. THE LOCATIONS OF THE UNDERGROUND UTILITIES SHOWN HEREON ARE BASED ON SAID SURVEY AND INFORMATION PROVIDED BY OTHERS (WHICH MAY INCLUDE THE UTILITY OWNER OR UTILITY LOCATING SERVICES). THE SANITAS GROUP, LLC IS NOT RESPONSIBLE FOR UTILITY INFORMATION PROVIDED BY OTHERS. SANITAS GROUP, LLC RECOMMENDS THAT THE LOCATION OF THE UTILITIES BE FIELD VERIFIED PRIOR TO ANY DIGGING ON, OR ADJACENT TO THE SUBJECT PROPERTY.
3. EXISTING TREE LOCATIONS BASED ON FIELD SURVEY BY FLATIRONS, INC.

811
Know what's below. Call before you dig.

NOT FOR CONSTRUCTION PURPOSES

PROGRESS SET ONLY

ISSUE

DATE	NO.	REMARKS
2014.06.20	01	100% SCHEMATIC DESIGN
2014.09.12	02	95% QA/QC CHECK - DESIGN DEVELOPMENT
2014.09.19	03	100% DESIGN DEVELOPMENT

REVISIONS

DATE	NO.	REMARKS

DRAWN: TSG
CHECKED: LRE
APPROVED:

PROJECT:
PROJECT LLOYD
Phase 1 Office Development

PROJECT NO.: 1402.00
DATE: 2014.06.20

C2.0

DRAWING TITLE:
PRELIMINARY UTILITY PLAN

APPENDIX G

Left Hand Ditch Company & North Boulder Farmers Ditch Company
Acceptance of Preliminary Design Proposal

Alexa Taylor

To: e
Subject: FW: Pearl Place Office Development (2930 Pearl Place)

From: Matt Beecher [mailto:mbeecher@forumre.com]
Sent: Monday, October 20, 2014 6:23 AM
To: Alexa Taylor; Kevin Foltz; Doug Hatfield
Subject: Fwd: Pearl Place Office Development (2930 Pearl Place)

FYI

Sent from my Verizon Wireless 4G LTE smartphone

-------- Original message --------
From: "Scott E. Holwick" <SHolwick@lgkhlaw.com>
Date:10/19/2014 11:24 PM (GMT-07:00)
To: Matt Beecher <mbeecher@forumre.com>
Cc: niwot_farm@juno.com, Dan Lisco <LiscoHorse@aol.com>, 'Mike Ballantine' <mike.ballantine@deereault.com>
Subject: Pearl Place Office Development (2930 Pearl Place)

Dear Matt,

Per the request from the City of Boulder (as communicated to the Boulder & Left Hand Ditch Company and the North Boulder Farmers Ditch Company to me via communication from you), I am writing this email to confirm that the Companies have received and reviewed your preliminary design proposal for the modifications to the Companies' ditch which runs through the real property at 2930 Pearl Place in Boulder, CO. Your design has been preliminarily reviewed by the Companies' engineering consultant, Deere & Ault Consultants, Inc., with the Companies' preliminary comments contained within the letter from Deere and Ault dated August 21, 2014. Subject to the issues raised in the letter which you will need to address before the Companies provide final approval, and subject to those issues raised when the parties met at on-site, which you will need to address before the Companies provide final approval, the Companies generally have no objection to, and generally accept the proposed ditch modifications. Such final approval may or may not also require concurrent or joint approval from the City of Boulder, which has an interest in the Boulder Slough, which runs in the same channel as the Companies' ditch through a portion of the real property at 2930 Pearl Place. Furthermore, the Companies are currently working with your attorneys to develop an agreement to implement the issues raised in the aforementioned letter and during the site visit. The Companies will continue to work with you as the design is further developed and the agreement(s) and conveyance documents are finalized.

Please don't hesitate to contact me for any additional clarification on this project.

Best regards,
Scott

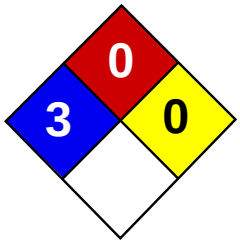
Scott E. Holwick
P.O. Box 978

Longmont, CO 80502-0978
303-776-9900; Facsimile 303-776-9100
Email: sholwick@lgkhlaw.com *Website:* www.lgkhlaw.com

Lyons Gaddis Kahn Hall
Jeffers Dworak & Grant
A Professional Corporation Attorneys and Counselors

APPENDIX H

Material Safety Data Sheets



Health	3
Fire	0
Reactivity	0
Personal Protection	J

Material Safety Data Sheet
Sodium bisulfate MSDS

Section 1: Chemical Product and Company Identification

Product Name: Sodium bisulfate

Catalog Codes: SLS2104, SLS4258

CAS#: 7681-38-1

RTECS: VZ1860000

TSCA: TSCA 8(b) inventory: Sodium bisulfate

CI#: Not available.

Synonym: GBS; Nitre cake; Sodium acid sulfate; Sodium pyrosulfate; Sodium hydrogen sulfate; Sulfuric acid, monosodium salt.

Chemical Name: Sodium Bisulfate

Chemical Formula: NaHSO4

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

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

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

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

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Sodium bisulfate	7681-38-1	100

Toxicological Data on Ingredients: Sodium bisulfate: ORAL (LD50): Acute: 2800 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator). The amount of tissue damage depends on length of contact. Eye contact can result in corneal damage or blindness. Skin contact can produce inflammation and blistering. Inhalation of dust will produce irritation to gastro-intestinal or respiratory tract, characterized by burning, sneezing and coughing. Severe over-exposure can produce lung damage, choking, unconsciousness or death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated exposure of the eyes to a low level of dust can produce eye irritation. Repeated skin exposure can produce local skin destruction, or dermatitis. Repeated inhalation of dust can produce varying degree of respiratory irritation or lung damage.

Section 4: First Aid Measures

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

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

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

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

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

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

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

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

Large Spill:
Corrosive solid. Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal.

Section 7: Handling and Storage

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

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

Section 8: Exposure Controls/Personal Protection

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

Personal Protection:
Splash goggles. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

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

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

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

Odor: Not available.

Taste: Not available.

Molecular Weight: 120.6 g/mole

Color: Off-white.

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

Boiling Point: Not available.

Melting Point: 157.22°C (315°F)

Critical Temperature: Not available.

Specific Gravity: 2.435 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility:

Easily soluble in hot water. Soluble in cold water. Soluble in 2 parts cold water. Soluble in 1 part boiling water. Decomposed by alcohol into sodium sulfate and free H2SO4.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, moisture

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

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Do not mix with liquid chlorine bleach (hypochlorites), ammonia cleansers or similar products, or alcohols. Hygroscopic; keep container tightly closed.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

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

Toxicity to Animals: Acute oral toxicity (LD50): 2800 mg/kg [Rat].

Chronic Effects on Humans: MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast.

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: May affect genetic material (mutagenic)

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Can cause severe skin irritation or burns. Eyes: Can cause severe irritation or burns of the eyes. Inhalation: It is destructive to the mucous membranes of the upper respiratory tract. Causes irritation and chemical burns to the respiratory tract with burning pain in the nose and throat, coughing , wheezing, shortness of breath, and pulmonary edema. Inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema. Ingestion: Causes gastrointestinal tract irritation and burns. Symptoms may include nausea and vomiting. May cause severe and permanent damage to the digestive tract. Chronic Potential Health Effects: Repeated exposure may cause erosion of teeth, lung irritation, bronchitis, persistant coughing,

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

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

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

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

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Corrosive Solid, n.o.s.(Sodium Bisulfate) UNNA: 1759 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Sodium bisulfate New Jersey: Sodium bisulfate TSCA 8(b) inventory: Sodium bisulfate

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

Other Classifications:

WHMIS (Canada): CLASS E: Corrosive solid.

DSCL (EEC):
R34- Causes burns. R41- Risk of serious damage to eyes. S24/25- Avoid contact with skin and eyes. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S36/37/39- Wear suitable protective clothing, gloves and eye/face protection.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 0

Personal Protection: j

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

Health: 3

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:27 PM

Last Updated: 11/01/2010 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

Material Safety Data Sheet

Provided by:

DPC Industries, Inc. **DX Systems Company**
DPC Enterprises, LP **DX Terminals**
DXI Industries, Inc.

PO Box 24600
Houston, Tx 77229-4600
281-457-4888
888-647-7717
www.dxgroup.com

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name DIXICHLOR

Synonyms BLEACH

Chemical Name SODIUM HYPOCHLORITE 10%

Emergency phone: *281-457-4888*
Chemtrec: *800-424-9300*

Date of Issue: 1/8/2001

Reviewed / Revision Date: 2/26/2010

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENTS	*PERCENT*	*CAS NO.*
SODIUM HYPOCHLORITE	10	7681-52-9
SODIUM CHLORIDE	7 - 8	7647-14-5
SODIUM HYDROXIDE	0.5 - 2	1310-73-2
WATER	REMAINDER	7732-18-5

SECTION 3 - HAZARDS IDENTIFICATION

Potential Health Effects

ACGIH - TLV: NOT ESTABLISHED; 2 mg/m3 RECOMMENDED

Eye Contact MAY CAUSE SEVERE PAIN, BLURRED VISION, TEARING AND SWELLING. CONCENTRATED SOLUTIONS MAY CAUSE BURNING.

Skin Contact MAY CAUSE MODERATE SKIN IRRITATION. CONTACT WITH CONCENTRATED SOLUTIONS MAY BLEACH THE SKIN AND CAUSE REDNESS, PAIN, BLISTERING, ITCHY ECZEMA AND POSSIBLE CHEMICAL BURNS.

Ingestion MAY CAUSE PAIN AND INFLAMMATION OF THE MOUTH, THROAT, ESOPHAGUS, AND STOMACH. CAN CAUSE EROSION OF MUCOUS MEMBRANES, ESPECIALLY IN THE STOMACH.

Inhalation VAPORS MAY CAUSE SLIGHT TO SEVERE IRRITATION OF THE RESPIRATORY TRACT. HIGH CONCENTRATIONS MAY CAUSE SORE THROAT, BLISTERING, DELAYED PULMONARY EDEMA (SWELLING OF LUNG TISSUE) AND SHORTNESS OF BREATH.

Carcinogenicity: ***NTP*** NO ***IARC*** NO ***OSHA*** NO

SECTION 4 - FIRST AID PROCEDCURES

Eye Contact: IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE HOLDING EYELIDS OPEN. GET MEDICAL ATTENTION.

Skin Contact: IMMEDIATELY REMOVE CONTAMINATED CLOTHING OR SHOES, WIPE EXCESS FROM SKIN AND FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. USE SOAP IF AVAILABLE OR FOLLOW BY WASHING WITH SOAP AND WATER. DO NOT REUSE CLOTHING UNTIL THOROUGHLY CLEANED. GET MEDICAL ATTENTION.

Inhalation: REMOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET MEDICAL ATTENTION.

Ingestion: DO NOT INDUCE VOMITING. RINSE MOUTH WITH WATER. IF CONSCIOUS, GIVE LARGE QUANTITIES OF WATER OR MILK AND GET IMMEDIATE MEDICAL ATTENTION. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON!

SECTION 5 -FIRE FIGHTING MEASURES

Flash Point (°F)	NONFLAMMABLE.
Extinguishing Media	USE MEDIA APPROPRIATE FOR SURROUNDING AREA.
Special Firefighting Procedures/Precuations	WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE GEAR. STAY UPWIND AND KEEP OUT OF LOW AREAS. MAY RELEASE TOXIC GASES.

SECTION 6 -ACCIDENTAL RELEASE MEASURES

For Spill: CLEAN-UP PERSONNEL SHOULD USE PROTECTIVE EQUIPMENT TO PREVENT CONTACT. CONTAIN MATERIAL. PLACE COLLECTED MATERIAL IN A DISPOSAL CONTAINER. PREVENT LIQUID FROM ENTERING SEWERS OR WATERWAYS. DO NOT USE COMBUSTIBLE ABSORBENTS.

SECTION 7 - HANDLING AND STORAGE

Keep container tightly closed when not in use. Store in a cool, dry, well-ventilated area, away from heat and incompatible materials. Protect containers from physical damage.

AVOID CONTACT WITH EYES AND SKIN AND INHALATION OF VAPORS, MISTS, AND FUMES. AVOID DIRECT SUNLIGHT. AVOID HEAT, FLAMES, SPARKS, AND OTHER IGNITION SOURCES.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Respiratory Protection	NOT NECESSARY UNDER NORMAL USE AND CONDITIONS. FOR AREAS WITH HIGH VAPOR CONCENTRATIONS, USE NIOSH APPROVED RESPIRATOR PROTECTION. FOR CANISTER TYPE RESPIRATORS, USE CHLORINE FILTERS. IN CASE OF FIRE, WEAR SELF-CONTAINED BREATHING APPARATUS.
Ventilation	LOCAL AND MECHANICAL RECOMMENDED.
Protective Gloves	CHEMICAL IMPERVIOUS GLOVES.
Eye/Face Protection	CHEMICAL SAFETY GOGGLES AND/OR FULL-FACE SHIELD.
Other Protection	CHEMICAL RESISTANT CLOTHING SUCH AS COVERALLS/APRON, BOOTS, ETC.
Work Practices	USE GOOD PERSONAL HYGIENE PRACTICES. WASH HANDS BEFORE EATING, DRINKING, SMOKING, OR USING TOILET FACILITIES. PROMPTLY REMOVE SOILED CLOTHING AND WASH THOROUGHLY BEFORE REUSE. SHOWER AFTER WORK USING PLENTY OF SOAP AND WATER.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point (°F):	DECOMPOSES	***Vapor Pressure (mmHg):***	17.5 (@ 20 C)
Freezing Point (°F):	7 - 10	***Vapor Density (Air=1):***	NOT ESTABLISHED.
Solubility (H2O):	COMPLETE	***Specific Gravity (H2O=1):***	1.20 - 1.40
pH	12 - 13	***Evaporation Rate:***	NOT ESTABLISHED.

Appearance/Odor: CLEAR, PALE YELLOW OR GREENISH LIQUID WITH A CHLORINE ODOR.

SECTION 10 - STABILITY AND REACTIVITY

Chemical Stability:	YES
Incompatible Material:	ANY ACIDIC MATERIAL, AMMONIA, UREA, OXIDIZABLE MATERIALS AND METALS, SUCH AS NICKEL, COPPER, TIN, ALUMINUM AND IRON.
Hazardous Polymerization:	WILL NOT OCCUR.
Decomposition Products:	HYDROGEN CHLORIDE AND CHLORINE. CHLORINE GAS RATE OF DECOMPOSITION INCREASES WITH THE CONCENTRATION WITH TEMPERATURES ABOVE 85 DEGREES F.

SECTION 11 - TOXICITY INFORMATION

Oral = > 8000 mg/kg (Rat) Dermal LD50 = N.E.. Inhalation LC50= > 10.5 mg/l (Rat)

SECTION 12 - ECOLOGICAL INFORMATION

DAPHNIA MAGNA 24 HR. LC50 = > 500 MG/L ZEBRA FISH STATIC 24 HR. LC50 = > 500 MG/L

SECTION 13 - DISPOSAL CONSIDERATIONS

DO NOT DISCHARGE INTO WATERWAYS OR SEWER SYSTEMS WITHOUT PRIOR APPROVAL. EMPTY DRUMS, AS DEFINED BY RCRA, MAY BE SENT TO LICENSED DRUM RECONDITIONED FOR REUSE.

DISPOSE OF WASTE MATERIALS ACCORDING TO ALL FEDERAL, STATE AND LOCAL REGULATIONS.

SECTION 14 - TRANSPORT INFORMATION

USA DOT Shipping Name: HYPOCHLORITE SOLUTION

Hazard Class: 8

UN/NA Number: UN1791

Packing Group: III

Subsidiary Hazard:

Marine Pollutant: NO

SECTION 15 - REGULATORY INFORMATION

CERCLA RQ (lbs): 100

SARA Title III Section 312:

☑ *Acute* ☐ *Chronic* ☐ *Flammable* ☐ *Sudden Release of Pressure* ☐ *Reactive*

SARA Title III Section 313: No

SARA Extremely Hazardous Substance: No

HMIS HAZARD RATING

Health: 2 *Fire:* 0 *Reactivity:* 1

0 - Least 1 - Slight 2 - Moderate 3 - High 4 - Extreme

SECTION 16 - OTHER INFORMATION

EPA Pesticide Registration Number: 813-16

NSF Maximum Use Level for Potable Water (Standard 60): CHECK BOL FOR FACILITY DATA (46 mg/l TO 105 mg/l)

TSCA (Toxic Substance Control Act), 40 CFR 710:

Sources of the raw materials used in this mixture assure that all chemical ingredients present are in compliance with Section 8(b) Chemical Substance Inventory, or are otherwise in compliance with TSCA.

DISCLAIMER

THE DATA PRESENTED IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF; HOWEVER, NEITHER SELLER NOR PREPARER MAKES ANY WARRANTIES, EXPRESSED OR IMPLIED, CONCERNING THE INFORMATION PRESENTED. THE USER IS CAUTIONED TO PERFOM HIS OWN HAZARD EVALUATION AND TO RELY UPON HIS OWN DETERMINATIONS.

PURE EFFECT INC.

PRODUCT

PURE EFFECT POLYMER-M

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : POLYMER-M

APPLICATION : Total Suspended Solids Removal

COMPANY IDENTIFICATION : Pure Effect, Incorporated
601 W. Valencia Drive
Fullerton CA 92832

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 1 / 1 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER : 0
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Based on our hazard evaluation, none of the substances in this product are hazardous.

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

WARNING
Irritating to eyes and skin.
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.
Wear suitable protective clothing.
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
May cause irritation with prolonged contact.

SKIN CONTACT :
May cause irritation with prolonged contact.

INGESTION :
Not a likely route of exposure. No adverse effects expected.

INHALATION :
Not a likely route of exposure. No adverse effects expected.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

HUMAN HEALTH HAZARDS - CHRONIC :
No adverse effects expected other than those mentioned above.

4. FIRST AID MEASURES

EYE CONTACT :
Flush affected area with water. If symptoms develop, seek medical advice.

SKIN CONTACT :
Flush affected area with water. If symptoms develop, seek medical advice.

INGESTION :
Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. If symptoms develop, seek medical advice.

INHALATION :
Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :
This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Keep containers cool by spraying with water. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :

SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :

Avoid eye and skin contact. Do not take internally. Do not get in eyes, on skin, on clothing. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labelled. Keep the containers closed when not in use. Use with adequate ventilation.

STORAGE CONDITIONS :

Store the containers tightly closed. Store in suitable labelled containers.

SUITABLE CONSTRUCTION MATERIAL :

HDPE (high density polyethylene), Stainless Steel 304, Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :

This product does not contain any substance that has an established exposure limit.

ENGINEERING MEASURES :

General ventilation is recommended.

RESPIRATORY PROTECTION :

Respiratory protection is not normally needed.

HAND PROTECTION :

Neoprene gloves, Nitrile gloves, Butyl gloves, PVC gloves

SKIN PROTECTION :
Wear standard protective clothing.

EYE PROTECTION :
Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :
If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Keep an eye wash fountain available. Keep a safety shower available.

HUMAN EXPOSURE CHARACTERIZATION :
Based on our recommended product application and personal protective equipment, the potential human exposure is: Moderate

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Light yellow Brown
ODOR	Sulfurous
SPECIFIC GRAVITY	1.10 - 1.35 @ 77 °F / 25 °C
DENSITY	9.2 - 11.2 lb/gal
SOLUBILITY IN WATER	Complete
pH (100 %)	11.5 - 13.0
VISCOSITY	100 - 500 cps @ 77 °F / 25 °C
VOC CONTENT	0.00 % EPA Method 24

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Freezing temperatures.

MATERIALS TO AVOID :
Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon, Oxides of nitrogen, Oxides of sulfur

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

SENSITIZATION :
This product is not expected to be a sensitizer.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: Low

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Rainbow Trout	96 hrs	20 mg/l	Product
Sheepshead Minnow	96 hrs	> 1,000 mg/l	Product
Fathead Minnow	96 hrs	> 1,000 mg/l	Product
Rating : Slightly toxic			

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Mysid Shrimp (Mysidopsis bahia)	96 hrs	140 mg/l		Product
Daphnia magna	48 hrs	11 mg/l	11 mg/l	Product
Rating : Slightly toxic				

PERSISTENCY AND DEGRADATION :

Chemical Oxygen Demand (COD) : 463,000 mg/l

Biological Oxygen Demand (BOD) :

Incubation Period	Value	Test Descriptor
5 d	3,100 mg/l	Product

The organic portion of this preparation is expected to be poorly biodegradable.

MOBILITY :
The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM , provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL
This preparation or material is not expected to bioaccumulate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION
Based on our hazard characterization, the potential environmental hazard is: Low
Based on our recommended product application and the product's characteristics, the potential environmental exposure is: High

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

Hazardous Waste: D002

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name :	CORROSIVE LIQUID, N.O.S.
Technical Name(s) :	SODIUM HYDROXIDE, ORGANIC POLYAMINE
UN/ID No :	UN 1760
Hazard Class - Primary :	8
Packing Group :	III

Flash Point :	None

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	CORROSIVE LIQUID, N.O.S.
Technical Name(s) :	SODIUM HYDROXIDE, ORGANIC POLYAMINE
UN/ID No :	UN 1760
Hazard Class - Primary :	8
Packing Group :	III
IATA Cargo Packing Instructions :	820
IATA Cargo Aircraft Limit :	60 L (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	CORROSIVE LIQUID, N.O.S.
Technical Name(s) :	SODIUM HYDROXIDE, ORGANIC POLYAMINE
UN/ID No :	UN 1760
Hazard Class - Primary :	8
Packing Group :	III

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, none of the substances in this product are hazardous.

CERCLA/SUPERFUND, 40 CFR 117, 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FOOD AND DRUG ADMINISTRATION (FDA) Federal Food, Drug and Cosmetic Act :
When use situations necessitate compliance with FDA regulations, this product is acceptable under : 21 CFR 176.170 Components of paper and paperboard in contact with aqueous and fatty foods and 21 CFR 176.180 Components of paper and paperboard in contact with dry foods.

For use up to 1 pound per ton as a brightener for pulp.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
None of the substances are specifically listed in the regulation.

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :
E - Corrosive Material

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

INTERNATIONAL CHEMICAL CONTROL LAWS

CHINA
All substances in this product comply with the Chemical Control Law and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE
The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

KOREA
All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

NEW ZEALAND
This product's trade name is registered with the Environmental Risk Management Authority (ERMA).

16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

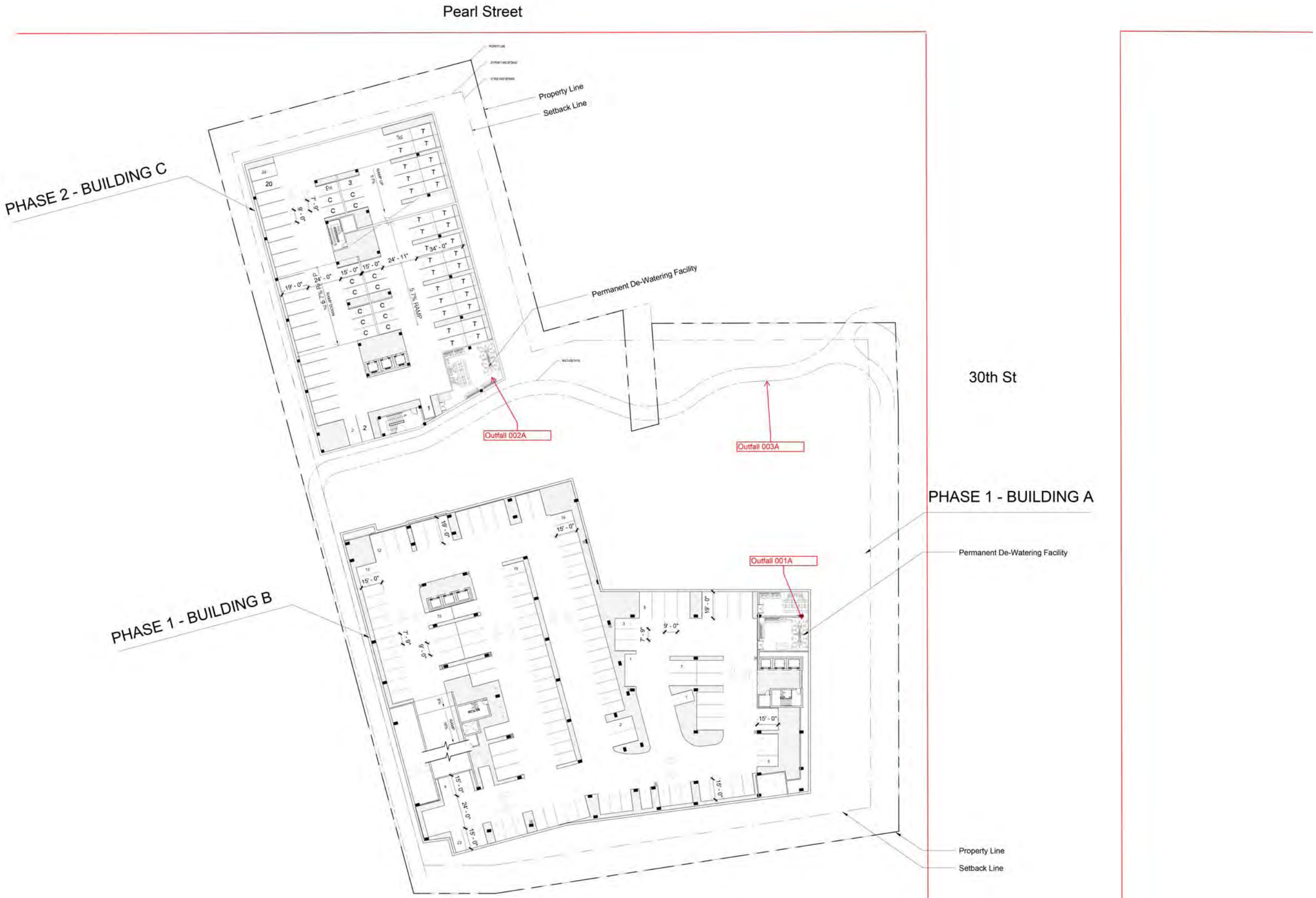
Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 02/23/2004
Version Number : 1.9

APPENDIX I

Outfall Drawing



1 LEVEL P3 - PARKING PLAN

1/32" = 1'-0"

APPENDIX J

Permit Application

COLORADO
Department of Public Health & Environment

Dedicated to protecting and improving the health and environment of the people of Colorado

For Agency Use Only:
Permit Number Assigned
COG07 - _____
COG315 -_____
COG316 -_____

Application for COLORADO DISCHARGE PERMIT SYSTEM (CDPS) General Permits:

- **Construction Dewatering** (COG070000)
- **Remediation Activities Discharging To Surface Water** (COG315000), or
- **Remediation Activities Discharging To Groundwater** (COG316000)

Please print or type. Original signatures are required. Photo, faxed, pdf or email copies will not be accepted.

This combined permit application is designed to streamline the application process for the three types of discharge permits listed in Part A, and includes an *Application Guidance Document* to help applicants complete the application and select the right permit coverage for their activity. Please note that **one** application is intended to cover **one** project and **one** type of permit. Where multiple projects or types of permits are required, please submit an appropriate number of permit applications.

The application must be submitted to the Water Quality Control Division at least 30 days (for Construction Dewatering) or 45 days (for Remediation) prior to the anticipated date of discharge, and must be considered complete by the division before the review and approval process begins. The division will notify the applicant if additional information is needed to complete the application. If more space is required to answer any question, please attach additional sheets to the application form. Applications must be submitted by mail or hand delivered to:

Colorado Department of Public Health and Environment
Water Quality Control Division, WQCD-P-B2
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530

IMPORTANT: *Please read the Application Guidance Document (Guidance) for this permit application prior to completing this application. The Guidance provides specific and important instructions required for completing this application correctly.*

A. PERMIT INFORMATION

Reason for Application: ■ NEW CERT

□ RENEW CERT EXISTING CERT # _____

Applicant is: □ Property Owner ■ Contractor/Operator

Application is for the following discharge permit (select ONE). See Guidance.

○ Construction Dewatering (COG070000)
◉ Remediation Activities Discharging to Surface Water (COG315000)
○ Remediation Activities Discharging to Groundwater (COG316000)

Note: This application is designed for processing each of the three permit types listed above. The division may request additional characterization of the proposed discharge to ensure that the appropriate permit coverage is requested and the appropriate permit certification is issued. The division may deny or change the requested type of discharge permit after review of the submitted application and will notify the applicant of the changes. Coverage under the "Subterranean Dewatering or Well Development" General Permit COG6030000 is not available using this application form.

B. CONTACT INFORMATION

1. Permittee Information

Organization Formal Name: Saunders Construction Inc

Permittee Name: the person **authorized to sign and certify** the permit application. This person receives all permit correspondences and is **legally responsible** for compliance with the permit.

Responsible Position (Title): Vice President of Project Development

Currently Held By (Person): Jim Weber

Telephone No: 303-699-9000 Email address: j.weber@saundersci.com

Mailing Address: 6950 S Jordan Rd

City: Centennial State: CO Zip: 80112

This form must be signed by the permittee to be considered complete. **Per Regulation 61**, in all cases, it shall be signed as follows:

a) In the case of corporations, by a responsible corporate officer. For the purposes of this section, the responsible corporate officer is responsible for the overall operation of the facility from which the discharge described in the application originates.
b) In the case of a partnership, by a general partner.
c) In the case of a sole proprietorship, by the proprietor.
d) In the case of a municipal, state, or other public facility, by either a principal executive officer or ranking elected official.

2. DMR Cognizant Official (i.e. authorized agent) the person or position authorized to sign and certify reports required by permits including Discharge Monitoring Reports [DMR's], Annual Reports, Compliance Schedule submittals, and other information requested by the division. The division will transmit pre-printed DMR's to this person. If more than one, please add additional pages.

□ Same as 1) Permittee

Responsible Position (Title): ORC/Senior Facilities Operator

Currently Held By (Person): Gabrielle Begeman

Telephone No: 303-912-3769 Email address: gbegeman@orcwater.com

Organization: ORC Water Professionals

Mailing Address: 11919 W I-70 Frontage Rd #116A

City: Wheat Ridge State: CO Zip: 80033

Per Regulation 61: All reports required by permits, and other information requested by the Division shall be signed by the permittee or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a) The authorization is made in writing by the permittee
b) The authorization specifies either an individual or **a position having responsibility for the overall operation of the regulated facility or activity** such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position)
c) Submitted in writing to the Division

3. **Site/Local Contact (**contact for questions relating to the facility & discharge authorized by this permit.)

□ Same as 1) Permittee

Responsible Position (Title): Project Manager
Currently Held By (Person): David Weatherbie
Telephone No: 303-699-9000 Email address: d.weatherbie@saundersci.com
Organization: Saunders Construction Inc
Mailing Address: 6950 S Jordan Rd
City: Centennial State: CO Zip: 80112

4. **Operator in Responsible Charge Required for Groundwater Remediation COG315000 or COG316000**
□ Same as 1) Permittee □ Same as 3) Site/ Local Contact
**Note: Where the division determines that coverage under the construction dewatering permit is appropriate, an ORC is not required.*
Name: Gabrielle Begeman
Telephone No: 303-912-3769
Email address: gbegeman@orcwater.com
Company: ORC Water Professionals
Operator Number 10679

5. **Billing Contact** ■ Same as 1) Permittee
Responsible Position (Title): _____
Currently Held By (Person): _____
Telephone No: _____ Email address: _____
Organization: _____
Mailing Address: _____
City: _____ State: _____ Zip: _____

6. Other Contact Types (check below) Add pages if necessary:
Responsible Position (Title): _____
Currently Held By (Person): _____
Telephone No: _____ Email address: _____
Organization: _____
Mailing Address: _____
City: _____ State: _____ Zip: _____

□ Environmental Contact
□ Facility Inspection Contact
□ Consultant
□ Compliance Contact
□ Property Owner
□ Other _____

C. PERMITTED FACILITY INFORMATION

Facility or Project Name Pearl Place

Street Address (or cross streets) SW corner of 30th St and Pearl St

City Boulder Colorado, Zip Code 80301

County Boulder

Type of Facility Ownership

□ City Government □ Corporation ■ Private □ Municipal or Water District

□ State Government □ Mixed Ownership _____

Facility or Project Latitude/Longitude — List the latitude and longitude of the excavation resulting in the discharge(s). If the exact excavation location(s) are not known, list the latitude and longitude of the center point of the construction project. If using the center point, be sure to specify that it is the center point of construction activity.

Center point of construction activity

001A Latitude 40. 022070 Longitude -105. 254863 (e.g., 39.703°, 104.933°')
degrees (to 3 decimal places) degrees (to 3 decimal places)

Or

001A Latitude _____ ° ____' _____" Longitude _____ ° ____' _____" (e.g., 39°46'11"N, 104°53'11"W)
degrees minutes seconds degrees minutes seconds

Horizontal Collection Method: □ GPS Unspecified ■ Interpolation Map – Map Scale Number 200 Ft
Reference Point: □ Project/Facility Entrance □ Project/Facility Center/Centroid

Horizontal Reference Datum: WGS 84

Standard Industrial Classification (SIC) Code(s) for this FACILITY (include up to 4, in order of importance)

1 1799 2_____ 3_____ 4_____

D. PROJECT DESCRIPTION

D.1. Description of Activity:

a) Provide a brief overview of the project and dewatering activity (e.g., highway, bridge and tunnel construction, storm drain expansion, etc.).

Pearl Place is new construction consisting of two (2) office parks with underground parking structures. The site will be temporarily de-watered to construct foundation and permanently de-watered to rid the site of residual groundwater that may infiltrate the parking structures. Treatment of the groundwater will consist of coagulation/oxidation/filtration and will be metered prior to discharge into North Boulder Farmers Ditch, eventually entering Goose Creek, part of the South Platte River Basin, segment 2b. All treatment provided prior to discharge will meet or exceed stream standards for this segment.

b) Is the work only in-stream? (In-stream work is conducted on the bank of the stream and/or conducted within approximately the ordinary high water mark of the stream)

□ Yes * ■ No

**If yes, you must provide a description of how your project meets this definition in the box below. If no description is provided, the work will not be considered in-stream.*

c) Does the activity involve work on or near existing sanitary sewer lines or septic systems?

□ Yes ■ No

D.2 Description of Discharge:

a) Is the discharge to a ditch or storm sewer system? ■ Yes* □ No

**If yes, the applicant must contact the owner of the ditch or storm sewer system prior to discharging to address any local ordinances and to determine whether additional requirements will be imposed by the owner.*

b) Is the discharge to an impoundment? □ Yes* ■ No

**If yes, note that discharge of contaminated groundwater to impoundments are regulated by the Solid Waste Program in the Hazardous Materials and Waste Management Division (HMWMD), and cannot be covered under either the Construction Dewatering or the Remediation Activities Discharging to Surface Water or Groundwater permits.*

c) Discharge Frequency and Duration:

- Estimated discharge start date: Jan 2015
- Estimated discharge duration: Years _____ Months _____ Days Indefinite

d) Description of Best Management Practices:

Provide a narrative description of the type(s) of treatment used for each outfall in the box below.

D.3 Discharge Outfalls Limit 20 outfalls:

- Total number of **defined** outfalls requested: 3
- Total number of **undefined** outfalls requested: 0 (allowable for construction dewatering only)
- Complete Table 2a (for discharges to surface water) and/or 2b (for discharges to land with percolation to groundwater) to identify your defined and undefined outfall locations. Attach additional pages as necessary.

Table 2a - Requested Outfalls for Discharges to Surface Water (Discharges that may reach surface water through direct discharge or through a conveyance such as a ditch or a storm sewer system)				
OUTFALL NUMBER[1]	**NAME OF RECEIVING STREAM(S)** (e.g., Cherry Creek, Boulder Creek, Arkansas River)	**ESTIMATED MAXIMUM FLOW RATE GPM[2]**	**DESCRIPTION OF DISCHARGE LOCATION[3]** (e.g., Discharge enters storm sewer located at the corner of Speer and 8th Ave. with flow to Cherry Creek)	**LATITUDE/LONGITUDE OF EACH DISCHARGE OUTFALL**
Defined Discharges to Surface Water				
001A	Goose Creek	100	Discharge directly into Farmers Ditch (Phase 1)	40.021996. -105.254069
002A	Goose Creek	75	Discharge directly into Farmers Ditch (Phase 2)	40.022480, -105.254873
003A	Goose Creek	400	Discharge Directly into Farmer Ditch (Temporary)	40.022349, -105.254777
004A				
Undefined Discharges to Surface Water *(Available for construction dewatering only) (Provide estimated lt/long only)*				
001AU				
002AU				
003AU				
004AU				

1 Identify up to 20 defined or undefined outfalls (undefined for construction dewatering only). Use additional pages as necessary.
2 For construction dewatering the maximum flow limit will be equal to twice the estimated maximum rate flow rate provided in the permit application. For groundwater remediation the 30-day average flow limit will be based on the design capacity of the treatment as provided in the permit application.
3 The discharge location is the point where effluent sampling will occur. This location must be at a point after treatment and before the effluent joins or is diluted by any other waste stream, body of water, or substance.

Table 2b – Requested Outfalls for Discharges to Land with the Potential to Percolate to Groundwater (These discharges do not have the potential to reach surface water either directly or through a conveyance.)			
OUTFALL NUMBER[1]	**ESTIMATED MAXIMUM FLOW RATE GPM[2]**	**DESCRIPTION OF DISCHARGE LOCATION[3]** (e.g., Discharge to a field south of project site and East of I-25)	**LATITUDE/LONGITUDE OF EACH DISCHARGE OUTFALL**
Defined Discharges to Land with Potential Percolation to Groundwater			
G001A			
G002A			
G003A			
G004A			
Undefined Discharges to Land with Potential Percolation to Groundwater *(Available for construction dewatering only) (Provide estimated lt/long only)*			
G001AU			
G002AU			
G003AU			
G004AU			

1 Identify up to 20 defined or undefined outfalls (undefined for construction dewatering only). Use additional pages as necessary.
2 For construction dewatering the maximum flow limit will be equal to twice the estimated maximum rate flow rate provided in the permit application. For groundwater remediation the 30-day average flow limit will be based on the design capacity of the treatment as provided in the permit application.
3 The discharge location is the point where effluent sampling will occur. This location must be at a point after treatment and before the effluent joins or is diluted by any other waste stream, body of water, or substance.

E. ADDITIONAL INFORMATION

E.1 Nearby Sources of Potential Groundwater Contamination:

a) Has the proposed dewatering area been reviewed for possible groundwater contamination, such as plumes from leaking underground storage tanks (LUSTs), hazardous waste sites, or additional sources other than what is normally encountered at excavation and construction sites? *Applicants are expected to exercise due diligence in evaluating their project sites prior to applying for a discharge permit.*

■ Yes □ No

b) Is an open LUST located within **one-half mile** of the site?

□ Yes* ■ No

**If yes, BTEX analytical data for a source water sample at the site must be included with the permit application. Failure to include this data may result in delays in processing the permit application until such data is submitted to the Division. See Guidance.*

c) Is a Superfund site or National Priorities List (NLP) site located within **one mile** of the site?

□ Yes* ■ No

**If yes, analytical data for a source water sample analyzed for the parameters shown in Table 1 of this application (or an alternate list of constituents approved by the division) must be included with the permit application. Failure to include this data may result in delays in processing the permit application until such data is submitted to the Division. See Guidance.*

d) Is any other (non-LUST, non-Superfund, non-NPL site) known source of contamination, such as a Voluntary Cleanup (VCUP), Environmental Covenant, or open Correct Action site, located within **one-half mile** of the site?

□ Yes* ■ No

**If yes, analytical data for a source water sample analyzed for the parameters shown in Table 1 of this application (or an alternate list of constituents approved by the division) must be included with the permit application. Failure to include this data may result in delays in processing the permit application until such data is submitted to the Division. See Guidance.*

e) If known sources of contamination are located near the site, provide an overview of the source and nature of contamination including:

- The nature of the contamination of the groundwater, alluvial water, stormwater, and/or surface water (the source water) for which treatment and/or remedial activities will occur,
- The primary industrial activities which resulted in the source water contamination,
- The source of the contamination (pipes, leaking underground storage tank, up gradient sources, etc.) or state "unknown."

Environmental assessments have been performed on the site. Conclusions suggest that there is currently no adverse impact from previous activities.

f) For contaminated discharges (remediation), provide a narrative description of the type(s) of treatment used for each identified outfall.

Outfalls 001A and 002A will be discharges from 2 permanent treatment facilities located in each of the office park buildings. Treatment includes oxidation via sodium hypochlorite, filtration via greensand pressure filters, final filtration with granular activated carbon, dechlorination with sodium bi-sulfite. All treated water will be measured with a totalizing flow meter prior to discharge. Outfall 003A will be discharges from the temporary treatment for initial draw-down of the groundwater table during construction. Temporary treatment will include the following equipment:
(1) 21,000 gallon Frac type holding tank
(1) Process pump & Control panel; Performance 400 GPM at 50-60 psi
(1) Sand filter Unit
(1) Chemical Injection
(2) 4-chamber Bag filters
(2) IXR Media Vessels – 2 x PEL10,000 in parallel flow. Anti-siphon loop Flow Meter/Totalizer

E.2 Chemical Additions

List any chemical additives or other materials to be used in the water or to treat water prior to discharge. Include the Material Safety Data Sheet (MSDS) for each chemical with the application.

CHEMICAL NAME	MANUFACTURER	PURPOSE	DOSAGE
Sodium Hypochlorite	DPC Industries	Oxidation	TBD based on calculations for complete oxidation
Sodium Bisulfite	Univar USA	De-chlorination	TBD based on chlorine residual and permitted requirement
Polymer-M	Pure Effect Inc	Coagulation	TBD based on concentration of TSS

E.3 Site Maps and Schematics

Are required maps and schematics attached? ■ Yes □ No

- ✓ **A Location Map for Defined Outfalls** – Application must include a location map that shows the location of the project/facility, the location of the defined discharge point(s)/outfalls, and any receiving water(s). A north arrow must be shown. **This map must be on paper that can be folded to 8 ½ x 11 inches.**

- ✓ **A Legible Site Sketch** must be submitted that includes detailed site boundary information including street names or mile markers, the location of dewatering or remediation activities, all defined discharge points, and sampling locations. For undefined discharges (allowed for construction dewatering projects only), the site sketch must include the limits of the construction site boundary and the location of potential receiving waters. **This map must be on paper that can be folded to 8 ½ x 11 inches.**

- ✓ **Does the applicant have a Stormwater Permit for Construction Activities?** □ YES ■ NO □ PENDING
  If Yes, Stormwater Construction Permit Number: COR-_____

WATER RIGHTS

The State Engineers Office (SEO) has indicated that any discharge that does not return water directly to surface waters (i.e. land application, rapid infiltration basins, etc.) has the potential for material injury to a water right. As a result, the SEO needs to determine that material injury to a water right will not occur from such activities. To make this judgment, the SEO requests that a copy of all documentation demonstrating that the requirements of Colorado water law have been met, be submitted to their office for review. The submittal should be made as soon as possible to the following address:

Colorado Division of Water Resources ● 1313 Sherman Street, Room 818 ● Denver, Colorado 80203

Should there be any questions on the issue of water rights; the SEO can be contacted at (303) 866-3581. It is important to understand that any CDPS permit issued by the division does not constitute a water right. Issuance of a CDPS permit does not negate the need to also have the necessary water rights in place. It is also important to understand that even if the activity has an existing CDPS permit, there is no guarantee that the proper water rights are in place.

F. REQUIRED CERTIFICATION SIGNATURE [Reg 61.4(1)(h)]

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

Signature (Legally Responsible Party) _____Date _____

Name (printed) Jim Weber Title Vice President of Project Development

ATTACHMENT 1
Required Analytical Data for Dewatering and/or Remediation Projects
Located Within the Vicinity of Known Sources of Groundwater Contamination [1]

Required Water Quality Data					
Metals	**PQL**	**Maximum Result**	**Metals**	**PQL**	**Maximum Result**
Aluminum-Trec	50 ug/l		Lead-PD	1 ug/l	1.93
Antimony-Trec	NA	2.03	Manganese-Trec	2 ug/l	1590
Arsenic-Trec	1 ug/l	1.44	Manganese-Diss	2 ug/l	1790
Arsenic-PD	1 ug/l	0.9	Molybdenum-Trec	NA	ND
Barium-Trec	5 ug/l	157	Nickel-Trec	50 ug/l	11.5
Beryllium-Trec	1 ug/l		Nickel-PD	50 ug/l	7.06
Cadmium-Trec	1 ug/l	ND	Selenium-Trec	1 ug/l	ND
Cadmium-PD	1 ug/l	ND	Selenium-PD	1 ug/l	ND
Chromium III-Trec	20 ug/l	ND	Silver-Trec	0.5 ug/l	
Chromium III-PD	20 ug/l	ND	Silver-PD	0.5 ug/l	
Chromium VI-Trec	20 ug/l	ND	Thallium-Trec	1 ug/l	
Chromium VI-Diss	20 ug/l	ND	Thallium-PD	1 ug/l	
Copper-Trec and PD		1.28	Uranium-PD	1 ug/l	
Iron-Trec	10 ug/l	3280	Uranium-Trec	1 ug/l	
Iron-Diss	10 ug/l	2090	Zinc-Trec	10 ug/l	177
Lead-Trec	1 ug/l	7.92	Zinc-PD	10 ug/l	
Volatiles	**PQL**	**Maximum Result**	**Volatiles**	**PQL**	**Maximum Result**
acrolein	15 ug/l		**ethylbenzene**	75 ug/l	ND
benzene	3 ug/l	1.4	methyl bromide	5 ug/l	
bromoform	3 ug/l	ND	methyl chloride	4.5 ug/l	
carbon tetrachloride	3 ug/l	ND	1,1,2,2-tetrachloroethane	2 ug/l	ND
chlorobenzene	60 ug/l	220	tetrachloroethylene	2.3 ug/l	ND
chlorodibromomethane	3 ug/l	ND	**toluene**	60 ug/l	ND
2-chloroethylvinyl ether	NA		1,2-trans-dichloroethylene	TBD	
chloroform	3 ug/l	ND	1,1,1-trichloroethane	5 ug/l	ND
1,2-dichlorethane	3 ug/l	ND	1,1,2-trichloroethane	2.0 ug/l	ND
1,1-dichlorethylene	5 ug/l	ND	trichloroethylene	2.5 ug/l	
1,2-dichlorpropane	2 ug/l	ND	vinyl chloride	3 ug/l	ND
1,3-dichlorpropylene	TBD	ND	1,4-Dioxane	TBD	
Semi-Volatile Organic Compounds	**PQL**	**Maximum Result**	**Semi-Volatile Organic Compounds**	**PQL**	**Maximum Result**
acenaphthene	20 ug/l		1,2-diphenylhydrazine (as azobenzene)	TBD	
acenaphthylene	30 ug/l		fluorene	20 ug/l	

Required Water Quality Data					
anthracene	20 ug/l		fluoranthene	25 ug/l	
benzidine	170 ug/l		hexachlorobenzene	16 ug/l	
benzo(a)anthracene	12 ug/l		hexachlorobutadiene	9 ug/l	ND
benzo(a)pyrene	20 ug/l		hexachlorcyclopentadiene	50 ug/l	
3,4-benzofluoranthene	25 ug/l		hexachloroethane	16 ug/l	
benzo(ghi)perylene	20 ug/l		indeno(1,2,3-cd)pyrene	20 ug/l	
benzo(k)fluoranthene	25 ug/l		isophorone	25 ug/l	
bis(2-chloroethyl)ether	15 ug/l		naphthalene	20 ug/l	ND
bis(2-chloroisopropyl)ether	NA		nitrobenzene	19 ug/l	
bis(2-ethylhexyl)phthalate	25 ug/l		N-nitrosodimethylamine	30 ug/l	
Butyl benzyl phthalate	25 ug/l		N-nitrosodi-n-propylamine	30 ug/l	
2-chloronaphthalene	20 ug/l		N-nitrosodiphenylamine	19 ug/l	
chrysene	18 ug/l		pyrene	10 ug/l	
dibenzo(a,h)anthracene	20 ug/l		1,2,4-trichlorobenzene	20 ug/l	ND
1,2-dichlorobenzene	2.5 ug/l		2-chlorophenol	35 ug/l	
1,3-dichlorobenzene	2.5 ug/l	ND	2,4-dichlorophenol	30 ug/l	
1,4-dichlorobenzene	3.5 ug/l	ND	2,4,-dimethylphenol	30 ug/l	
3,3-dichlorobenzidine	18 ug/l		4,6-dinitro-o-cresol	17 ug/l	
diethyl phthalate	20 ug/l		2,4-dinitrophenol	100 ug/l	
dimethyl phthalate	20 ug/l		4-nitrophenol	25 ug/l	
di-n-butyl phthalate	25 ug/l		pentachorophenol	36 ug/l	
2,4-dinitrotoluene	100 ug/l		phenol	15 ug/l	
2,6-dinitrotoluene	20 ug/l		2,4,6-trichlorophenol	25 ug/l	
xylene	TBD	ND	1,4-Dioxane	TBD	

Important table notes:

1) Please refer to the permit application Guidance to determine whether analytical data is required with the permit application, and if so, what specific type of data is required.

2) Abbreviations: **Trec** = Total Recoverable; **PD** = Potentially Dissolved, **Diss** = Dissolved

3) Parameter names match the names as they appear in the general permit. The parameter may have a different name in some regulations or the PQL guidance.

4) The division may require analytical data for additional parameters where the project site is located in close proximity to potential sources of contamination for parameters not include in this Attachment 1, including but not limited to pesticide, PCB, radionuclide contamination.

5) Benzene, toluene, ethylbenzene, and xylene are highlighted to show that they are often grouped as "BTEX" and that data for BTEX is more commonly required than data for other parameters.

APPENDIX K

Vested Rights Option Form

Vested Rights Option Form and/or Waiver

Submit with application.

Site Review	Kevin Foltz
Ty e of Review	Property Owner's Name
12065-2121 30th St. & 2920-2930 Pearl St.	Collin Kemberlin
Address of Property	Applicant's Name

OPTION #1

I Kevin Foltz -intend to pursue the creation of a vested property right as provided for in Section 9-2-19, B.RC. 1981. In order to accomplish that, I am requesting that my application be referred to the Planning Board for a public hearing pursuant to Section 9-2-7(b)(1), B.RC. 1981 . I understand that if my development is approved by the Board, I shall cause a notice advising the general public of the Planning Board's approval and the creation of a vested property right to be published in a newspaper of general circulation no later than fourteen days following final approval and shall provide the Planning Director with the newspaper's official notice of publication no later than ten days following the date of publication, in order to perfect my vested right. Said right will be vested for three years from the date of final approval and will cover the following elements of the approval:

[type of use; number of units; building footprint; building square footage; etc.]

New 4-story office campus on below grade structured parking, 330,000 gross square feet on 4.29 acres, constructed in 2 phases, both of similar architecture and office uses. The first phase (south) is one office building of approximately 220,000 gross square feet completing in early 2017. The second phase (north) is one office building of approximately 110,000 gross square feet, anticipated to start construction in early 2017 and complete at the end of 2019.

I understand and acknowledge that certain delays in my project's approval time may result in order to meet the hearing and notice requirements of state law for the creation of a vested property right.

Property Owner

By: _____ 9/9/2014 Witness: _____

Date Date

I, _____, understand that I may pursue the creation of a vested property right as provided for in Section 9-2-19, B.R,C, 1981. and Section 24-68-103, CR.S. 1973, and I choose to voluntarily waive this right. I have been advised by the City to consult an attorney prior to signing this waiver. Further, I understand that this waiver does not abridge any common law vested rights which I may acquire nor does it diminish any right which may exist under the City's land use regulations, except for Section 9-2-19, B,RC, 1981,

Property Owner

By: _____ Witness: _____

_____ Date Date

Section VII:
Supplemental Reports