

INTERGOVERNMENTAL AGREEMENT

BETWEEN THE CITY AND COUNTY OF DENVER AND DENVER WATER REGARDING RECYCLED WATER PIPELINE CONSTRUCTION AT THE NATIONAL WESTERN CENTER

THIS INTERGOVERNMENTAL AGREEMENT is made and entered into between the CITY AND COUNTY OF DENVER, ACTING BY AND THROUGH ITS BOARD OF WATER COMMISSIONERS (“Denver Water”), a municipal corporation of the State of Colorado and the CITY AND COUNTY OF DENVER (“City”), a municipal corporation of the State of Colorado. Denver Water and the City are referred to collectively herein as the “Parties” and individually as a “Party.”

RECITALS

A. WHEREAS the City is undertaking the capital construction of the 250-acre National Western Center, including construction of the stockyards, the Livestock Center and Equestrian Center, and including the possibility of construction of an energy system utilizing sewer-heat recovery; and

B. WHEREAS Colorado State University (“CSU”) is building CSU-owned facilities on the site of the National Western Center, including the Animal Health facility and the [Water Resources building]; and

C. WHEREAS, the Western Stock Show Association (“WSSA”) is a Colorado nonprofit corporation that serves as the sponsor of the National Western Stock Show and is a funder and user of the National Western Center, including locating and owning their Legacy building at the National Western Center; and

D. WHEREAS the National Western Center Authority (the “Authority”) is a nonprofit corporation set up to control, operate, and manage the National Western Center; and

E. WHEREAS Denver Water is a 100-year-old municipal water provider serving 1.4 million people in its service area, including the City and County of Denver and surrounding suburbs, and Denver Water, a tenant at the National Western Center site, wishes to promote sustainable water use at the site; and

F. WHEREAS development of the NWC site is occurring rapidly, which requires the Parties to make significant financial and policy decisions and commitments in the very near future, and they each will require information from the other in order to make these decisions; and

G. WHEREAS based on the collective goals of the Parties to conserve potable water, the Parties have determined that it would be beneficial to extend a recycled water main through the NWC site (the “Project”). The general scope and nature of the Project is described in a memorandum titled “Technical Memorandum Non-Potable Water” dated April 10, 2019, attached hereto as **Exhibit A** (the “Technical Memorandum”); and

H. WHEREAS to facilitate the design and construction of infrastructure work at the National Western Center, the City currently has in place (i) the National Western Center

Horizontal Design Services On-Call Agreement, between the City and Merrick & Company (the “Design Consultant”), dated April 9, 2018 (the “Design Contract”), and (ii) the Horizontal Integrated Construction Services Contract between the City and Hensel Phelps Construction Co. (the “Contractor”), dated June 25, 2018 (the “HIC”). The Parties anticipate that the City will procure the full design of the Project under the Design Contract and that the City will procure the construction of the Project under the HIC.

NOW THEREFORE, in consideration of the commitments set forth herein, the Parties agree as follows.

AGREEMENT

1. Line of Authority for Contract Administration for the City. The Executive Director of the Mayor's Office of the National Western Center ("Executive Director"), or her designee or successor in function, hereby authorizes and directs all work performed under this Agreement. The Executive Director hereby designates the Office of the National Western Center's Program Director ("Project Manager") as the Executive Director's authorized representative for purposes of administering, coordinating and approving all work performed under this Agreement in connection with the Campus Project and to otherwise act on behalf of the City under this Agreement. The Executive Director expressly reserves the right to designate other authorized representative(s) to perform on the Executive Director's behalf by written notice to Denver Water. The Executive Director, or her designee or successor in function, shall have the right and authority on behalf of the City to (1) execute any notices, approvals, agreements, or other written communications or documents as may be necessary in the administration of this Agreement or otherwise in connection with the Project, (2) execute any amendments to this Agreement as may be necessary in connection with the design, construction, or funding for the Project, (3) take any other actions necessary to provide for the completion of the Project (and related activities) as contemplated under this Agreement.

2. Design of Recycled Water Infrastructure. The City, through the Design Contract, shall engage the Design Consultant to fully design the Project (the “Project Design”). The Project Design will be generally consistent with the descriptions and specifications set forth in the Technical Memorandum and Denver Water’s current Engineering Standards, available at www.denverwater.org, and it will be designed for adherence to Denver Water’s Engineering Standards, Denver Water’s Operating Rules, and any applicable regulations for recycled water (also known as reclaimed water). The Project Design shall be performed by the Design Consultant at the direction of the Project Manager pursuant to the terms and conditions set forth in the Design Contract; provided that the Project Design shall be in compliance with Denver Water’s Standards. The City shall provide for each Phase described in the Technical Memo, design and construction plans, specifications and cost estimates for review, comment, and approval to Denver Water in multiple submittals: thirty percent, sixty percent, just prior to final, and at contract award, or as otherwise consistent with Denver Water’s regulatory process for approval of construction of the Project. In no event shall the City have any responsibility or liability to Denver Water for any aspect of the Project Design, and Denver Water hereby waives and releases the City from and against any and all claims relating to the Project Design of any kind or nature whatsoever; nor shall Denver Water have any responsibility or liability to the City

for any aspect of the Project Design, and the City hereby waives and releases Denver Water from and against any and all claims relating to the Project Design of any kind or nature whatsoever. Notwithstanding the foregoing, the City shall (1) require the Design Consultant to include Denver Water as an additional insured party on all insurance coverages required to be maintained by the Design Consultant under the Design Contract and (2) cause the Design Consultant to provide proof of such insurance coverages to Denver Water prior to the commencement of design work.

3. Scope of Project. The City intends to design and build the National Western Center recycled water system consistent with the Technical Memorandum, on which its cost estimates for Denver Water's Contribution are based, including the "Base Design," the "Energy Partner Extension," and the "Triangle Extension" (together the "Scope of Project", each individually a "Phase"). The City will not build any Phase without the direction and approval of Denver Water. Denver Water cannot require the City to build any Phase or portion of a Phase unless Denver Water provides the funding required to fully fund such Phase. Denver Water shall pay for all work approved by Denver Water and undertaken by the City. If there is disagreement between the City and Denver Water regarding the likely cost of a Phase or portion of a Phase, the City reserves the right to modify the Scope of Project to reflect the City's estimate of construction costs covered by Denver Water's Contribution. The City shall notify Denver Water of its inability to construct the Scope of Project due to insufficient funding and shall consult with Denver Water regarding the elimination or modification of any part of the Scope of Project with due consideration to whether certain portions such as the Energy Partner and Triangle Extensions may be funded by other sources. The City acknowledges that in the event the City exercises its right to modify the Scope of Project in a way that increases Denver Water's recycled water supply development cost beyond \$20,000 per acre-foot (AF) of recycled water demand, which demand is currently estimated in the Technical Memo to be approximately 130 AF per year, then Denver Water, upon written notice to the City of this result, will be released from its payment obligations hereunder.

4. Construction of Recycled Water Infrastructure.

a. The City, through the HIC, shall engage the Contractor to complete all work necessary to complete the Project (the "Construction"). The Construction shall be performed by the Contractor at the direction of the Project Manager pursuant to all terms and conditions set forth in the HIC. Denver Water shall have the following rights:

i. To visit the construction site, with prior notice to the Project Manager (for safety reasons), to inspect and confirm the construction work was completed per the approved design and in compliance with Denver Water's Engineering Standards.

ii. To review and comment on all shop drawings and other contractor submittals.

iii. To, with the City, jointly accept the infrastructure upon completion of construction.

b. Except as specifically required by this Agreement, the City shall not have any responsibility or liability to Denver Water for any aspect of the Construction on the Project, and Denver Water hereby waives and releases the City from and against any and all claims relating to the Construction of any kind or nature whatsoever; nor shall Denver Water have any responsibility or liability

to the City for any aspect of the Project Design, and the City hereby waives and releases Denver Water from and against any and all claims relating to the Project Design of any kind or nature whatsoever. Notwithstanding the foregoing, the City shall (1) require the Contractor to include Denver Water as an additional insured party on all insurance coverages required to be maintained by the Contractor under the HIC, (2) cause the Contractor to provide proof of such insurance coverages to Denver Water prior to the commencement of Construction, and (3) provide a non-exclusive assignment to Denver Water of (a) all warranties set forth or provided for in the HIC relating to any and all Construction done on the Project under the HIC, and (b) any and all other contractual rights and claims arising under the HIC and relating to any and all Construction or Work done on the Project under the HIC.

5. Inspection and Acceptance. Denver Water will be allowed to and shall undertake such inspections as it deems necessary to verify that the Project is being constructed in accordance with the accepted plans. If Denver Water observes that the work is not being constructed in accordance with the accepted plans, then Denver Water shall provide timely notice of these observations to the City.

6. Use of Recycled Water. The Parties acknowledge that the Authority will be operating the City-owned facilities at the National Western Center. The Parties intend to work together with the Authority to establish the use of recycled water for long-term operations and maintenance of the site and encourage other users of the site to use recycled water, including CSU, WSSA, and as a part of the sewer-heat recovery energy system. In addition, the Parties acknowledge that Denver Water's timing and decision to bring recycled water to the NWC site is contingent upon an agreement with the City's Parks and Recreation Department to extend recycled water development and use to the Northside and Swansea Neighborhood Parks. Denver Water's goal for investment in recycled water development in this area is a cost of no more than \$20,000 per acre foot of recycled water use. Therefore, if, by 2030, such anticipated use does not materialize, the City acknowledges that Denver Water will seek to expand recycled water use at the National Western Center, continue to or revert back to charging potable water rates to users at the National Western Center even if recycled water is available at the site, and/or assess a rate surcharge to users at the National Western Center, all in order to compensate for oversized or stranded infrastructure.

7. Funding Obligations. All costs and expenses incurred in connection with the completion of all Project Design or Construction associated with the Project (under the Design Contract and the HIC), shall be funded as follows:

a. **Denver Water Contribution.** Denver Water shall pay to the City a maximum total contribution to the Project (the "Denver Water Contribution") of Two Million Six Hundred Thousand Dollars (\$2,600,000.00).

i. All sums payable by Denver Water to the City shall be made to the "Manager of Finance" at the following address: Denver Department of Finance, 201 West Colfax Avenue, Department 1010, Denver, CO 80202.

ii. The Denver Water Contribution shall be paid by Denver Water to the City at the milestones, in the manner, and in the amounts shown in "Denver Water Recycled Water Payment Schedule" attached as **Exhibit B** (the "Payment Schedule") and incorporated herein.

iii. Pursuant to the Payment Schedule and after receiving the Final Project Cost from the City (defined below), Denver Water shall pay or be reimbursed for the final milestone payment to the City. The City shall calculate the actual cost of the Project based on actual design and construction costs (“Final Project Cost”), shall provide appropriate documentation supporting such calculation, and Denver Water shall pay any amount remaining in the Denver Water Contribution up to the amount of the Final Project Cost.

iv. Denver Water’s Contribution shall be spent only for direct design and installation costs of the recycled water system. Denver Water will not pay for general site development expenses, including but not limited to environmental remediation and surface improvements. Cost information provided by the City to Denver Water hereunder should be specific enough to demonstrate this.

b. City Contribution. The City will fund, design and construct the recycled water distribution network connecting the recycled water main to appropriate NWC facilities and landscapes in the Scope of Project as agreed upon pursuant to the process in Section 3 above.

8. **Real Property and Asset Transfer.** Upon completion of the Project, the City shall provide to Denver Water easements in the form of the easement attached as **Exhibit C** for any infrastructure constructed as part of the Project that is located outside of the City’s dedicated right-of-way. In addition, upon completion of the Project, the City shall convey the Project infrastructure (but not the recycled water distribution system) to Denver Water pursuant to a Bill of Sale.

9. **Water Efficiency Standards.** As material consideration for this Agreement, the Parties agree that Denver Water’s Water Efficiency Standards will be applied to new construction on city-owned property at the NWC, as confirmed by City staff to Denver Water staff via email on June 5, 2019 attached as Exhibit D hereto. The Parties agree to cooperate to identify approaches to make existing buildings more efficient including efficiency audits and potential fixture retrofits.

10. **Release of Denver Water.** The City, its heirs, assignees, and successors in interest hereby waives any claims and releases Denver Water, its officers, employees, and agents for any claims by the City related to or as a result of (1) Denver Water releasing of an easement at the National Western Center at the request of the City, (2) all past uses by Denver Water of the released easement(s) at the National Western Center and (3) all potential future liabilities arising from the continued existence of any Denver Water structures in the released easement appurtenant to the burdened property at the National Western Center.

11. **Records and Audits.** All Parties shall at all times maintain a system of accounting records in accordance with its normal procedures, together with supporting documentation for all contractor work, purchases, and billings hereunder. They shall retain all such accounting records and documentation for at least two years after any payments by Denver Water hereunder. Denver Water has the right to audit the accounting records and documentation of either party related to the Project at any time during the period of this Agreement and for two years after final payment.

12. **Liability.** Each party shall be liable for the errors and omissions of its agents and employees to the extent provided by the Colorado Governmental Immunity Act. This obligation shall survive termination of the Agreement.

13. **Acceptance Not Waiver.** Denver Water's approval or acceptance of, or payment for, any invoice is not a waiver of any rights under this Agreement or of any cause of action arising out of the performance of this Agreement.

14. **Termination or Suspension.** The Parties shall have the right to terminate or suspend all or any portion of this Agreement by giving thirty days' written notice to the other party.

15. **Default.** Every term and condition of this Agreement is a material element of this Agreement. In the event either Party should fail or refuse perform according to the material terms of this Agreement, to such Party may be declared in default by the other Party by a written notice.

16. **Remedies.** In the event a Party has been declared in default, such defaulting Party shall be allowed a period of fifteen (15) days within which to correct, or commence correcting, the default. In the event that the default has not been corrected or begun to be corrected, or the defaulting Party has ceased to pursue the correction with due diligence, the party declaring default may elect to (a) terminate the Agreement and seek damages; (b) treat the Agreement as continuing and require specific performance; or (c) avail itself of any other remedy at law or equity.

17. **Force Majeure.** The Parties shall not be responsible for any failure or delay in the performance of any obligations under this Agreement caused by acts of God, flood, fire, war or public enemy. Any declared force majeure that remains in effect for longer than ninety (90) days entitles either party to unilaterally terminate this Agreement.

18. **Assignment and Subcontracts.** No party may assign this Agreement or any right or liability of this Agreement or enter into any subcontract or amend any subcontract related to this Agreement without prior written consent of the other parties, except that the Parties acknowledge that the City will be providing the Project design, construction, and related work through contractors and sub-contractors.

19. **No Third Party Beneficiary.** The Parties agree that enforcement of the terms and conditions of the Agreement, and all rights of action relating to enforcement, shall be strictly reserved to the Parties. Nothing contained in the Agreement shall give or allow any claim or right of action to any third person. The Parties intend that any person receiving services or benefits pursuant to the Agreement shall be deemed to be an incidental beneficiary only.

20. **Severability.** If any provision of this Agreement is determined by a court having jurisdiction to be unenforceable to any extent, the rest of that provision and the rest of this Agreement will remain enforceable to the fullest extent permitted by law.

21. **Conflict of Interest.** The Parties agree that no employee of the City shall have any personal or beneficial interest in the services or property described in the Agreement; and the Denver Water further agrees not to hire or contract for services any employee or officer of the City which would be in violation of the City's Code of Ethics, D.R.M.C. §2-51, *et seq.* or the Charter §§ 1.2.8, 1.2.9, and 1.2.12.

22. **Venue and Governing Law.** This Agreement shall be deemed performable in the City and County of Denver, notwithstanding that the parties may find it necessary to take some action outside the City and County. The sole venue for any dispute resulting in litigation

shall be in the District Court in and for the City and County of Denver. This Agreement shall be governed by and construed under the laws of the State of Colorado.

23. **Notice and Contact.** The Parties shall contact the persons listed below for all matters related to administration of this Agreement. All notices required or given under this Agreement shall be in writing and shall be deemed effective: (a) when delivered personally to the other party; or (b) seven (7) days after posting in the United States mail, first-class postage prepaid, properly addressed as follows; or (c) when sent by e-mail. If notice is provided by e-mail, the notifying Party must follow up with a hard copy of the notice sent by United States mail; however, the notice will be effective as of the original e-mail date.

If to Denver Water: Abigail Antolovich
Denver Water Department
1600 West 12th Avenue
Denver, Colorado 80204

If to the City: Executive Director
Mayor's Office of the National Western Center
5125 Race Court
Denver, Colorado 80216

or such other persons or addresses as the parties may have designated in writing.

24. **Charter of the City and County of Denver.** This Agreement is made under and conformable to Article X of the Charter of the City and County of Denver, which controls the operation of the Denver Municipal Water System. The Charter provisions are incorporated by this reference and supersede any apparently conflicting provisions otherwise contained in this Agreement.

25. **Governmental Immunity Act.** The Parties understand and agree that the Parties are each relying upon, and have not waived, the monetary limitations and all other rights, immunities and protections provided by the Colorado Governmental Immunity Act, C.R.S. § 24-10-101, et seq., as it may be amended from time to time.

26. **Entire Agreement.** This Agreement constitutes the entire agreement between Parties and replaces all prior written or oral agreements and understandings as to the subject matter identified herein. It may be altered, amended, or repealed only by a duly executed written instrument.

27. **Effective Date.** This Agreement shall become effective on the date it is fully signed by the Parties.

28. **Electronic Signatures and Records.** The Parties consent to the use of electronic signatures. The Parties agree not to deny the legal effect or enforceability of the Agreement solely because it is in electronic form or because an electronic record was used in its formation. The Parties agree not to object to the admissibility of the Agreement in the form of an electronic record, or a paper copy of an electronic document, or a paper copy of a document bearing an electronic signature, on the ground that it is an electronic record or electronic signature or that it is not in its original form or is not an original.

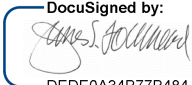
29. **Term.** The term of this Agreement shall extend from the effective date to December 31, 2021, except that this Agreement shall remain in effect through the period of construction, and unless the Parties agree in writing to extend the term beyond such date.


EXHIBIT A: TECHNICAL MEMORANDUM
EXHIBIT B: DENVER WATER RECYCLED WATER PAYMENT SCHEDULE
EXHIBIT C: FORM OF EASEMENT (FOR LOCATIONS OUTSIDE OF RIGHT-OF-WAY
EXHIBIT D: 6/5/2019 EMAIL

THEREFORE, the Parties have executed this Agreement below as of the dates set forth below.

ATTESTED:


**CITY AND COUNTY OF DENVER, acting
by and through its BOARD OF WATER
COMMISSIONERS**

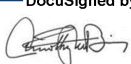
By: 
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Secretary

DocuSigned by:

By: A24AB640066F426...
President
DATE: 7/10/2019


APPROVED:

REGISTERED AND COUNTERSIGNED:
CITY AND COUNTY OF DENVER


By: 
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Chief of External Affairs

DocuSigned by:

By: DB0B7E01F4174C0...
Timothy M. O'Brien, CPA
Auditor

APPROVED:

By: 
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Chief of Operations and Maintenance

APPROVED AS TO FORM:

By: 
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Office of General Counsel



TECHNICAL MEMORANDUM

Non-Potable Water

Non-Potable Water – Denver
Water

PREPARED BY: S. Stevens – NWCO Horizontal Portfolio Manager
COPY TO: B. Frommell
PREPARED FOR NWCO Leadership
DATE: April 10th 2019
PROJECT NUMBER N/A
REVISION NO.: FINAL- VO
APPROVED BY: K. Lang

Purpose of this Memo

The purpose of this memo is to record the technical scope, schedule and cost elements that support the proposed National Western Center (NWC) - Denver Water Inter-Governmental Agreement (IGA) to provide non-potable infrastructure to the NWC Campus.

Non-Potable Scope

To support the One Water aspiration of the NWC Campus, NWCO and Denver Water have been working together toward agreement for delivery of a non-potable infrastructure system to the NWC Campus that comprises:

- Off-site extension of Denver Water's recycled water conduit to bring non-potable supply to the intersection of Franklin Street and Race Court at the northern boundary of the NWC Campus. This work will be funded, designed and delivered directly by Denver Water.
- On site recycled water main that is proposed to be funded by Denver Water via the proposed IGA and designed and constructed by the Mayor's Office of the National Western Center (NWCO) via their existing design and construct contracts.
- On site construction of recycled water distribution network (beyond the trunk lines) to appropriate NWC facilities and landscapes - per the final agreed-upon demand profile and project scope – to be funded by NWCO and/or individual property owners.

Status of Design

- A conceptual One Water study was completed as part of the ReNEWW strategy work by NWCO in collaboration with Denver Water – this looked at both the opportunities to use non-potable water throughout the campus, regulatory restrictions, and opportunities to minimize the use of all water across the site. This was developed into initial demand estimates by MIG. Demand estimates included all Phase 1 and 2 Capital Build facilities, CSU and WSSA owned facilities, and possible use by future Triangle development.
- Denver Water and the proposed Energy Partner, EAS, have been working to identify the potential use of non-potable water to support the proposed district energy system.

NON-POTABLE WATER

- The Horizontal Designer for NWCO has made provision for space in the proposed site wide infrastructure design development to include non-potable supply both along National Western Drive (North) and the central utility corridor.
- NWCO Horizontal Designer collated all the existing information from the different development efforts made to date and summarized the current water demand in one memo – reference Document 3. This included a 20 percent contingency on peak flows as outlined in the memo.
- The design of vertical facilities, riverfront open space, and the main plaza are all currently in concept. Refinement of the water demand will only progress once the design of the buildings, agreement on valued use, and potential agreement with Partners to use the non-potable water are finalized.
- The horizontal design requires a base recycled water infrastructure concept to enable delivery of the scope in phases as per the proposed delivery packages. This is driving the need to progress the design in such a way that it is ahead of finalizing to a high design confidence for the buildings and open space.

Current Scope Assumptions

Scope assumptions are as laid out in the referenced documents. If there is any difference in assumptions or scope outlined in these documents, chronological order dictates.

Reference Documents

The following are the basis for this memo. Items:

1. NWCO letter to Denver Water, Dated October 16, 2018
2. Denver Water Board discussion, November 7, 2018
3. Attachment 1 - Merrick Memo – Titled MEMORANDUM – CAMPUS RECYCLED WATER HORIZONTAL DESIGN SUMMARY, Dated March 1, 2019
4. Attachment 2 - Denver Water – Confirmation of Onsite Pipe size assumptions, received on March 20, 2019
5. Attachment 3 - Hensel Phelps – NWC Cost Estimate Memo, dated March 21, 2019

Forecast Schedule Milestones

The following are the key forecast milestones for the implementation of the non-potable water scope.

Horizontal portfolio Delivery Package 3.07B. Note all dates are subject to change as preceding work dictates:

- Concept (30%) Design complete October 2019
- 60% Design complete – TBD – Assume November 2019
- 95% Design Complete – December 5, 2019
- 100% Design complete – March 30, 2020
- Construction Notice to Proceed – June 11, 2020
- Construction Complete – March 1, 2021 (four phases in construction if matches waterline)
 - Phase 1 – May 11, 2021
 - Phase 2 – September 23, 2021

- Phase 3 – November 5, 2021
- Phase 4 – February 1, 2022

Current Cost Estimate – On Site

The following tables provide the cost for each section of the current concept infrastructure using the pipe sizes provided by Denver Water. Where Denver Water supplied a pipe size range, the larger pipe size was used as the basis of the cost estimate. The costs presented are intended to represent the maximum contribution from Denver Water for the design and construction of various portions of the non-potable water main. Actual contribution may be lower based on refined design and construction knowns. Denver Water would review and approve final design and refined cost estimates prior to construction. Overall project costs such as providing a clean utility corridor and finished street improvements will be borne by others. Each section is described below:

- Base Design – Proposed non-potable water main line across the campus to support primary NWC facilities, including the potential to support WSSA legacy Building and CSU buildings
- Energy Partner Extension – Optional extension of non-potable supply to the Energy Partner Central Utility Plant (CUP)
- Triangle Extension – Optional extension of non-potable supply to the western Phase 1 and 2 Capital Build scope. Provision of this extension is to ensure that if the Triangle is to be provided with non-potable supply in the future the infrastructure is enabled for connection.

Table 1 – Base Design Breakdown

Item	HIC Cost*	Other Cost
Construction Cost (include Fees, Bonds, escalation etc.)	\$1,639,559	\$-
Design Cost (10% of total construction)	\$-	\$163,956
PM Cost (5% of total construction)	\$-	\$81,978
Sub Total	\$1,885,493	
Apply 10% contingency	\$188,549	
Grand Total for Scope	\$2,074,042	

Table 2 – Energy Partner Extension Breakdown

Item	HIC Cost*	Other Cost
Construction Cost (incl Fees, Bonds, escalation etc.)	\$ 269,706	\$-
Design Cost (10% of total construction)	\$-	\$26,971
PM Cost (5% of total construction)	\$-	\$13,485
Sub Total	\$310,162	
Apply 10% contingency	\$31,016	
Grand Total for Scope	\$341,178	

NON-POTABLE WATER

Table 3 – Triangle Extension Breakdown

Item	HIC Cost*	Other Cost
Construction Cost (incl Fees, Bonds, escalation etc.)	\$ 146,773	\$-
Design Cost (10% of total construction)	\$-	\$14,677
PM Cost (5% of total construction)	\$-	\$7,339
Sub Total	\$168,789	
Apply 10% contingency	\$16,879	
Grand Total for Scope	\$185,668	

*See Attachment 3 – Hensel Phelps Construction Cost Estimate

Proposed Next Steps

- Denver Water provides NWCO a response letter with their intention for a funding commitment.
- Once funding commitment is understood from Denver Water and evaluated to be aligned and beneficial to the project, the City and County of Denver and Denver Water enter into an Intergovernmental Agreement to memorialize the conceptual commitments included in these letters.
- The project team coordinates with the NWCO Horizontal Designer to progress the design and work with NWCO's vertical portfolio to develop proposed non-potable water usage to Capital Build facilities, using collaborative design approach with Denver Water.
- Denver Water, in coordination with NWCO, to confirm with WSSA and CSU intent to use non-potable water and provide updated water usage figures to feed into design.
- NWCO Horizontal Designer/Denver Water to develop Denver Water Standard compliant scope to reflect agreed usage in accordance with requirements of the IGA.

Attachments

1. Attachment 1 - Merrick Memo – Titled MEMORANDUM – CAMPUS RECYCLED WATER HORIZONTAL DESIGN SUMMARY, Dated March 1, 2019
2. Attachment 2 - Denver Water – Confirmation of Onsite Pipe size assumptions, received on March 20, 2019
3. Attachment 3 - Hensel Phelps – NWC Cost estimate Memo, dated March 21, 2019

Attachment 1: Campus Recycled Water-Horizontal Design Summary



**NATIONAL WESTERN CENTER
HORIZONTAL DESIGN TEAM**

MEMORANDUM – CAMPUS RECYCLED WATER HORIZONTAL DESIGN SUMMARY

DATE: MARCH 1 , 2019

TO: KRISTIN LANG, P.E., NWCO HORIZONTAL DESIGN MANAGER

FROM: JAMES COLBERT, P.E., HORIZONTAL DESIGN CONTRACT, DEPUTY CONTRACT MANAGER

CC: FILE – MERRICK PROJECT NO. 65119870

RE: NATIONAL WESTERN CENTER – CAMPUS RECYCLED WATER HORIZONTAL DESIGN SUMMARY

INTRODUCTION

Recycled water will be supplied to the National Western Center (NWC) campus by Denver Water from the north along Franklin Street through a pressurized recycled water pipeline (purple pipe) system, in conjunction with the Campus ReNEW Performance Management Framework of providing an inspiring “One Water” District. The recycled water system will support the One Water goal of “applying the right quality of water to the right use throughout the site; reduce the overall water consumption; and minimize municipal water use.”

This memorandum summarizes the requested recycled water demand alternatives based on the previous analyses completed by the Campus Place Making team.

DATA SOURCE DOCUMENTS - BY OTHERS

Merrick as part of the Horizontal Design Team conducted a review of the following source documents:

- Source 1 - Energy Partner Data emails dated 1/23/2019 and 2/26/2019
- Source 2 - Demand_Summary_For_DW-2018.0518.xlsx (CSU Water Model Summary)
- Source 3 - Water Demand Calculations.xlsx (Campus Place Making Calculations)

See Attachment B for the source documents.

Employee Owned



5970 Greenwood Plaza Blvd
Greenwood Village, CO 80111



Tel: +1 303-751-0741



hello@merrick.com
www.merrick.com

PROPOSED RECYCLED WATER OPTIONS

The options for recycled water use defined in the source documents are as follows:

- Base Design – supply NWC Phases 1 and 2 Facilities Only
- Option 1 – additional supply for Energy Partner demand
- Option 2 – additional supply for Triangle demand
- Option 3 – Limited Use Base Design, which excludes cooling water and other uses beyond toilet and irrigation

See Attachment A for an exhibit showing the location of the recycled water infrastructure and the approximate boundaries for each of the listed options as presented in the source documents.

Table 1 summarizes the estimated recycled water demand for each of the design options as were presented in the source documents and notes the primary source of the recycled water values. Table 1 estimates “peak” flow values from annual average flows that were provided in the source documents using broad assumptions.

Table 1:

Source Document – Recycled Water Demand Options	
Alternative	Peak Recycled Water Demand (gallons per minute, gpm)
Base Design (Source 3)	447.5
Option 1 – Energy Partner (Source 1)	252
Option 2 – Triangle (Source 2)	65.5
Option 3 – Limited Use Base (Source 3)	206.2

DATA REFINEMENT

The Horizontal Design Team understands the previous recycled water calculations include numerous and broad design and scope assumptions for the campus. Additionally, the campus concepts have continued to be refined since the previous iterations upon which the analyses were based.

At the time of this memorandum, Merrick did not have updated data regarding the proposed building water usage or many of the assumptions in the source documents. For this summary, the previous Source calculations were assumed to be correct except as noted. Merrick reviewed the calculations, and information in the Source Documents and updated the peak flows based on our current understanding of the NWC Phases 1 & 2 and assumed scope of the future Triangle project. For the revised recycled water demands noted on Table 2, Merrick considered the following (See Attachment C for revised summaries):



- Updated the NWC Phase 1 and 2 irrigation peak demand calculations based on the current landscape concept. The revised calculations consider a reasonably narrow irrigation window (which would occur during nighttime hours) during the summer irrigation season.
- Estimated the future Triangle project irrigation peak demand as a percentage of the overall project area.
- Peak demands for building toilet and urinal use were calculated based on assumed fixture numbers following the American Water Works Association M22 Tap Sizing methodology.
- Assumed that existing buildings and facilities would not include plumbing improvements to utilize recycled water (for example, the Armour Building and Livestock Exchange Buildings)
- Assumed a 20% contingency

Table 2:

Revised – Recycled Water Demand Options			
Alternative	Peak Recycled Water Demand (gpm)	Contingency (%)	Peak Recycled Water Demand With Contingency (gpm)
Base Design	1453	20	1744
Option 1 – Energy Partner	252	20	302
Option 2 – Triangle	415	20	497
Option 3 – Limited Use Base Design	1396	20	1675

Conclusion

The above Table 2 represents Merrick's current understanding of the campus recycled water demands based on the previous Campus Placemaking efforts. As design and scope of campus facilities are refined, it is anticipated the resulting peak recycled water demands may adjust. It should be noted that Table 2 presents the information in a conservative manner. Individual component peak flows are summed together, however they may not all occur simultaneously. For example, peak irrigation typically occurs at night, whereas peak domestic and cooling uses will occur during daytime hours.

The sizing of proposed recycled water system should consider additional factors such as, the pipeline routing, the location within the campus, the location of the feed to the Triangle and Energy Partner, and whether the pipelines are looped. These factors will be addressed during design. The pipeline sizing should also be reviewed with and confirmed by Denver Water as the design progresses.



Attachment A

Employee Owned



5970 Greenwood Plaza Blvd
Greenwood Village, CO 80111

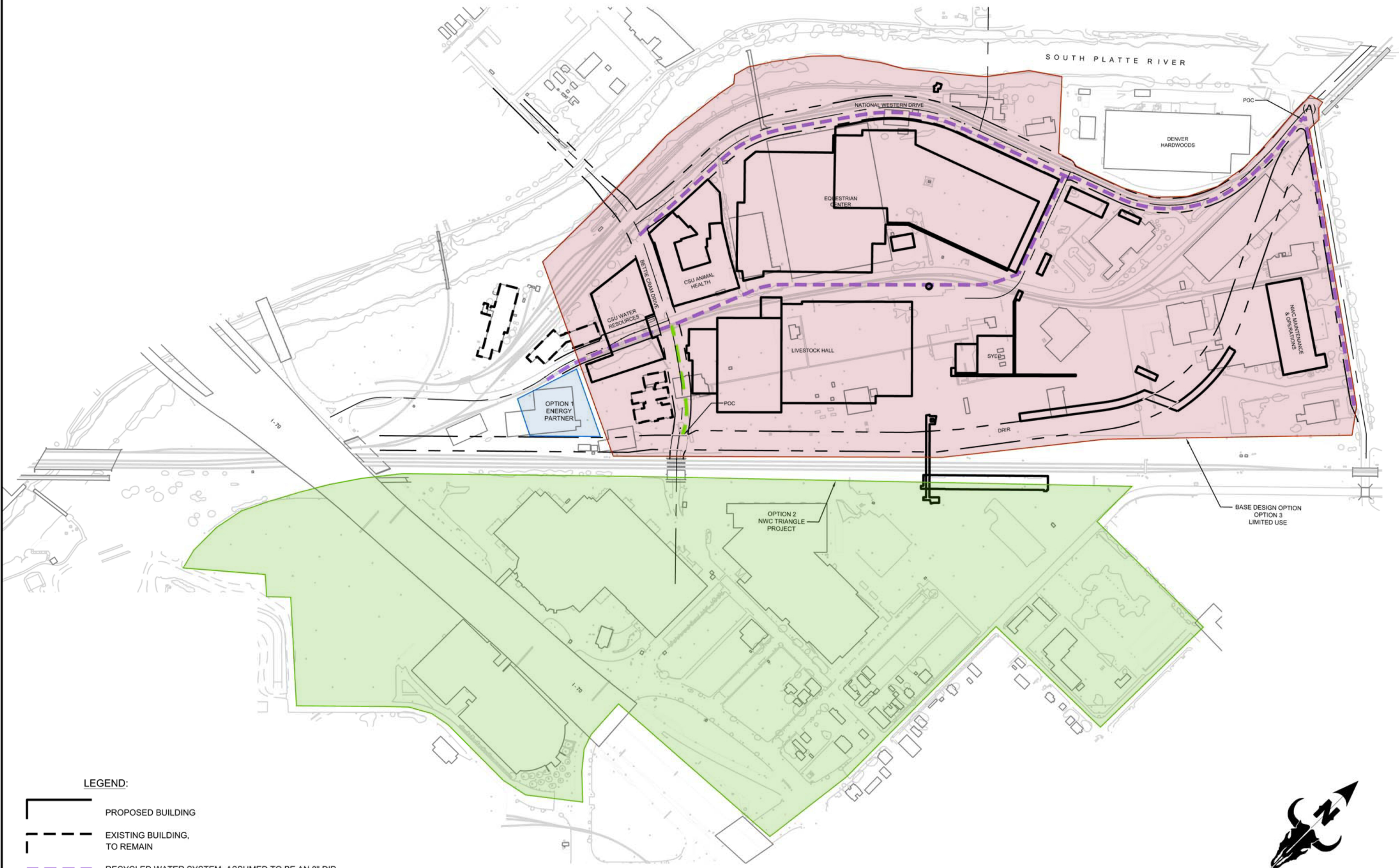


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LEGEND:

- PROPOSED BUILDING
- EXISTING BUILDING, TO REMAIN
- RECYCLED WATER SYSTEM, ASSUMED TO BE AN 8" DIP CONNECTED TO NEW CONNECTION AT RACE COURT (A). INFRASTRUCTURE TO (A) FROM NORTH DELIVERED BY DENVER WATER.
- POTENTIAL EXTENSION TO BETTIE CRAM DRIVE UNDERPASS TO SUPPORT FUTURE DEVELOPMENT SERVICES (TBD).

SCALE: 1" = 200'-0"
when printed at 24 x 36

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Denver, CO 80212
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REV	REVISION DESCRIPTION	DATE	CHANGED BY	CHECKED APPROVED BY

DESIGN BY:	
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	

NATIONAL WESTERN CENTER
PROJECT NO. 65119870
DENVER NO. 2018PM0000472

RECYCLED WATER GRAPHIC, DRAFT

DATE:	02/12/2019
SHEET:	
PAGE:	

Attachment B

Employee Owned



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James Colbert

From: Rip, Laura/DEN <Laura.Rip@jacobs.com>
Sent: Wednesday, January 23, 2019 10:20 AM
To: Lang, Kristin; Stevens, Samantha/MOO
Cc: Frommell, Barb - NWCO CA2758 Director
Subject: FW: EAS Project Non-Pot Water Use and Non-Official SKETCHES

Hi Kristin,

Below is a calculation on how much consumptive recycled water load that the energy partner would use at the CUP. 38,000kgal per year. However this is at average flows, not peak flows. Their design is still a bit in flux depending on their final technologies selected, so I will update you if this changes.

CEP Projected CONSUMPTIVE WATER USE

Screen Flushing Sluices	40-60	gpm	26,280,000	gallons
Screen Flushing Plates	20-25	gpm	11,826,000	gallons
CIP	2000	gal/month	24,000	gallons
Toilets	1.5	gal/flush, 2 flush/day	1,095	gallons
Floor Wash Down CUP	5	gal/min, 1 hr, each month	3,600	gallons
Floor Wash Down Wet Well	5	gal/min, 1 hr, each month	3,600	gallons
Total CEP Consumptive Use			38,138,295	gallons
Total CEP Consumptive Use			38,138	Kgal

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James Colbert

From: Rip, Laura/DEN <Laura.Rip@jacobs.com>
Sent: Tuesday, February 26, 2019 12:49 PM
To: Lang, Kristin
Cc: James Colbert; Brian Poling; Mark Schaefer; Moffet, Rene
Subject: RE: DW Recycle Water Need Quantification

Kristin, Rene updated the numbers. Adding the GPM of the systems, these rates equate to 252gpm peak flow for the Central Utility Plant.

Campus Energy Partner Recycled Water Loads

Equipment/Fixture			Annual Consumption		Peak Load		Notes
Screen Flushing Sluices	40-60	gpm	26,280,000	gallons	60	gpm	
Screen Flushing Plates	20-25	gpm	11,826,000	gallons	25	gpm	
Cleaning-In-Place (CIP) for HXers	2000	gal/month	24,000	gallons	125	gpm	(Assumes the m cleaning cycles; done when othe
Toilets	1.5	gal/flush, 2 flush/day	1,095	gallons	1.5	gpm	
Floor Wash Down CUP	5	gal/min, 1 hr, each month	3,600	gallons	5	gpm	
Floor Wash Down Wet Well	5	gal/min, 1 hr, each month	3,600	gallons	5	gpm	
Cooling Tower Make-up	30	gpm	17,474	gallons	30	gpm	
Total CEP			38,155,769	gallons			
Total CEP			38,156	kgal	252	gpm	

Thank you,

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From: Moffet, Rene [mailto:rene.moffet@aecom.com]
Sent: Tuesday, February 26, 2019 1:04 PM

To: Rip, Laura/DEN <Laura.Rip@jacobs.com>; Leslie Fangman <l.fangman@saundersinc.com>; 'catherine.thorn@enwave.com' <catherine.thorn@enwave.com>
Cc: Lang, Kristin <Kristin.Lang@jacobs.com>; Thompson, Calum <Calum.Thompson@aecom.com>; Mengual, Andrea <Andrea.Mengual@aecom.com>
Subject: [EXTERNAL] RE: DW Recycle Water Need Quantification

Laura

Here is an update that makes a lot more sense from my point of view:

Total peak flow for the cooling tower is 30GPM. Highlighted in yellow in your table below

Rene

René Moffet P Eng
 Project manager, Power and Industrial
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From: Moffet, Rene
Sent: Monday, February 25, 2019 12:59 PM
To: 'Rip, Laura/DEN'; Leslie Fangman; 'catherine.thorn@enwave.com'
Cc: Lang, Kristin; Thompson, Calum; Mengual, Andrea
Subject: RE: DW Recycle Water Need Quantification

Yes correct: see below

Projected CONSUMPTIVE WATER USE

Screen Flushing Sluices	40-60	gpm	26,280,000	gallons
Screen Flushing Plates	20-25	gpm	11,826,000	gallons
Cleaning-In-Place	2000	gal/month	24,000	gallons
Toilets	1.5	gal/flush, 2 flush/day	1,095	gallons
Floor Wash Down CUP	5	gal/min, 1 hr, each month	3,600	gallons
Floor Wash Down Wet Well	5	gal/min, 1 hr, each month	3,600	gallons
Cooling Tower	30	GPM	17,474	Gallons/year
Total CEP Consumptive Use			38,152,769	gallons

René Moffet P Eng
 Project manager, Power and Industrial
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rene.moffet@aecom.com

AECOM
 2020 L Street, Suite 400

Capital Build

Source information: CSU 3/15/18 IUWM modeling results, adjusted by BG for misattribution of all leak water to the potable supply only
Known uncertainties: cooling area underestimated for multi-story buildings, as building footprint was used to calculate cooling demands.

Building Description (# on site map)	Current State/High Inputs (kgal/yr)			Future State/High Inputs (kgal/yr)			
	Potable Demands	Non-potable demands w/ cooling	Non-potable demands w/o cooling	Potable Demands	Non-potable demands w/ cooling	Non-potable demands w/o cooling	Non-potable demands w/ cooling - delta
Underground Parking below Equestrian Center	6	-	-	6	-	-	-
Equestrian Center (9)	4,291	5,670	284	2,521	7,440	2,054	1,770
Livestock Center (8) & Livestock Auction Hall (17) & WSSA Legacy (14)	5,541	3,748	185	2,988	6,301	2,738	2,553
Livestock Exchange Area (on map not labeled)	558	99	99	261	397	397	298
Maintenance & Operations Facility (12)	235	216	216	121	331	331	115
Stock Yard/ Event Center Multi-use Space (5)	1,366	-	-	1,192	174	174	174
Riverfront	-	2,601	2,601	-	2,601	2,601	-
Rail Corridor	-	-	-	-	-	-	-
CSU/DW Parking/South Parking	-	55	55	-	55	55	-
Animal Health	140	54	54	73	120	120	66
CSU Water Resource Center (11)	1,193	40	40	1,128	105	105	65
New National Western Drive (4)	-	769	769	-	769	769	-
Brighton Blvd. - 47th to Race Ct. (2)	-	1,019	1,019	-	1,019	1,019	-
TOTAL	13,330	14,271	5,322	8,290	19,312	10,363	5,041

Future Phase

Source information: Varies by building. For Stadium Arena, 1909 Stadium Arena/Partners, and Event Center, used CSU 3/15/18 IUWM modeling results, adjusted by BG for misattribution of all leak water to the potable supply only. For Trade Show/Expo Hall, used historical water use data * projected growth factor supplied by CSU IUWM modeling * estimated non-potable demand fraction based on CSU IUWM modeling for buildings with similar uses **assuming building will be retro-fitted**. For Coliseum, will use historical data approach but data are not yet available.
Known uncertainties: CSU modeling does not include any employees, attendees, or animals in the triangle. Not all buildings in the triangle have been identified or modeled.
Recommendations: Apply a safety factor to estimated demands.

Building Description (# on site map)	Current State/High Inputs (kgal/yr)			Future State/High Inputs (kgal/yr)		
	Potable Demands	Non-potable demands w/ cooling	Non-potable demands w/o cooling	Potable Demands	Non-potable demands w/ cooling	Non-potable demands w/o cooling
Stadium Arena	105	2,836	697	<i>Not modeled</i>		
Trade Show/Expo Hall	246	1,509	1,509			
1909 Stadium Arena/Partners	55	1,728	1,728			
Event Center	199	5,404	1,382			
Coliseum	n/a	n/a	n/a			
TOTAL	605	11,477	5,316			

Building	Potable			Non-Potable				Total Non-Potable (gpm)	
	Employee Demand (gpm)	Visitor Demand (gpm)	Live Stock Demand (gpm)	Total Potable Average Max Day (gpm)	Total Potable Maximum Max Day (gpm)	Irrigation (gpm)	Process (gpm)		Future Use* (gpm)
New Arena	0.3	0.0	0.0	0.3	0.4	0.0	10.6	0.2	10.8
Trade Show / Expo Hall	0.1	0.0	0.0	0.1	0.2	0.0	19.9	0.1	20.0
1909 Stadium Arena / Partners	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DPS Parking Structure / 49th Ave Extension	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equestrian Center	16.7	166.0	69.4	252.1	378.1	19.5	30.1	73.8	123.3
Livestock Hall / Livestock Stadium Arena	23.6	234.6	113.7	371.9	557.9	19.5	19.9	118.4	157.7
Livestock Exchange Arena	2.1	20.5	11.0	33.6	50.4	8.3	0.1	11.3	19.7
Maintenance Facility & cattle tie area	1.0	10.1	5.9	17.0	25.5	18.0	0.0	6.0	24.0
MacDonald Farm	0.3	2.8	1.4	4.5	6.7	8.3	0.0	1.5	9.7
Yards / Event Pavilion	1.8	18.4	1.4	21.7	32.5	8.3	0.0	2.6	10.8
Riverfront	0.0	0.0	0.0	0.0	0.0	87.0	0.0	0.0	87.0
River Center	0.2	0.0	0.0	0.2	0.3	0.0	0.0	0.2	0.2
DRIR R/W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CSU/DW Parking	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
South Storage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Animal Health Building Parcel	1.1	6.3	4.8	12.1	18.2	4.5	0.0	4.7	9.2
CSU WRC / DW Building Parcels	1.1	6.3	0.0	7.3	11.0	7.9	7.0	0.8	15.6
Rights of way west of the railroad (DRIR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rights of way east of the railroad (DRIR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	48.2	464.9	207.7	720.8	1081.2	181.1	87.6	219.3	488.1

Note:

*Future use includes animal washdown and toilet flushing.

Attachment C

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National Western Campus
 Irrigation Water Budget
 Updated: 12/21/2018 (Triangle Added 2/26/2019)

Landscape Type	Bluegrass Turf, Irrigated, Mown (SF)	Alternative Turf, Irrigated, Unmown (SF)	Tree / Shrub / Perennial Beds (SF)	Native Planting, Unirrigated (SF)		AREA TOTALS			
						Irrigated Acres	Gallons / Year	AcreFeet / Year	Peak Season GPM
1 Race Court ROW	0	0	0	0	1	0.00	0	0.00	0
2 National Western Drive ROW	0	0	13,382	0	2	0.31	154,421	0.47	5
3 Bettie Cram Drive ROW	0	0	3,899	0	3	0.09	44,832	0.14	2
4 Riverfront Park	117,801	177,506	21,420	0	4	7.26	8,087,608	24.82	281
5 Maintenance & Operations Facility	28,064	29,180	17,804	0	5	1.72	1,738,177	5.33	60
6 Equestrian Center	0	0	23,546	0	6	0.54	268,992	0.83	9
7 CSU - Water Resources	0	0	1,893	0	7	0.04	19,925	0.06	1
8 CSU - Animal Health	0	0	6,167	0	8	0.14	69,739	0.21	2
9 Livestock Building	0	0	22,075	0	9	0.51	254,048	0.78	9
10 SYEC / Stockyards	0	0	17,399	0	10	0.40	199,253	0.61	7
TOTAL, square feet	145,865	206,686	127,586	0		11.01	10,836,995	33.25	376

Campus Area (SF): 4,690,504 107.68
 Campus Irrigated Area (SF): 480,137 11.02
 Irrigated Area, Percent of Campus: 10.24% 10.24%
 Gallons per Year per Square Foot: 2.3104

Triangle Irrigation Assumption
 Project Area 60 acres: 60 acres (2,613,600 SF)
 Assumed Irrigated Area, Percent of Project: 8%
 Estimated Peak Season GPM: 164

Revised Water Demand Calculations - 2/28/2019

Building	Non-Potable							Process (gpm)	Total Non-Potable (gpm)
	AWWA M22 Tap Sizing								
	Number of Toilets	Number of Urinals	Fixture Value	Flow	Peak Factor	Peak Flush Demand (gpm)			
New Arena (Triangle)	32.0	16.0	1376.0	135.0	0.8	110.0	10.6	120.6	
Trade Show / Expo Hall (Triangle)	32.0	16.0	1376.0	135.0	0.8	110.0	19.9	129.9	
Equestrian Center	64.0	24.0	2624.0	202.0	0.8	160.0	30.1	190.1	
Legacy Building	24.0	8.0	968.0	118.0	0.8	95.0	0.0	95.0	
Livestock Arena	56.0	20.0	2280.0	184.0	0.8	145.0	9.9	154.9	
Livestock Hall	56.0	20.0	2280.0	184.0	0.8	145.0	10.0	155.0	
Maintenance Facility & cattle tie area	17.0	4.0	659.0	102.0	0.8	80.0	0.0	80.0	
Stockyards Event Center	32.0	16.0	1376.0	135.0	0.8	110.0	0.0	110.0	
River Center Building	3.0	1.0	121.0	52.0	0.8	40.0	0.0	40.0	
Animal Health Building	36.0	18.0	1548.0	148.0	0.8	120.0	0.0	120.0	
CSU Water Building	40.0	18.0	1688.0	155.0	0.8	125.0	7.0	132.0	
Total									

NWC Phases 1 and 2 ~ 1077.0
 Triangle 250.6

Note:

Triangle Assumptions assume demands for Expo Hall and Areen similar to Stockyards Events Center
 Fixture counts were only available for the Stockyards Event Center and Maintenance Facility other fixture counts were estimated
 Campus Placemaking process peak estimates were assumed to be correct

James Colbert

From: Mark Schaefer
Sent: Tuesday, February 26, 2019 10:41 AM
To: James Colbert
Subject: Fwd: [EXTERNAL] Re: M and O fixture count

More exact counts if this is helpful.

Sent from my iPhone

Begin forwarded message:

From: "Anderson, Eric/MOO" <Eric.Anderson1@jacobs.com>
Date: February 26, 2019 at 10:10:02 AM MST
To: Mark Schaefer <mark.schaefer@merrick.com>
Subject: Fwd: [EXTERNAL] Re: M and O fixture count

Mark. Please see the fixture count for the Maintenance and operations facility.

Eric

Sent from my iPhone

Begin forwarded message:

From: Chris Sigit-Sidharta <csigit-sidharta@sehinc.com>
Date: February 26, 2019 at 10:02:46 AM MST
To: "Anderson, Eric/MOO" <Eric.Anderson1@jacobs.com>
Subject: [EXTERNAL] Re: M and O fixture count

Hi Eric,

Yes we have 17 Water Closets, 4 Urinals, 15 Lavatories, 3 Kitchen Sinks, 3 Service Sinks, 4 Drinking Fountains (2 Combo units). Currently we are showing 9 hose bibs around the building.

Thanks

Chris Sigit-Sidharta, AIA, LEED AP BD+C, GGP | Architect
2000 South Colorado Blvd. Tower One, Suite 6000 | Denver, CO 80222
720.540.6843 direct
[SEH](#) - Building a Better World for All of Us®

From: "Anderson, Eric/MOO" <Eric.Anderson1@jacobs.com>
To: "csigit-sidharta@sehinc.com" <csigit-sidharta@sehinc.com>

Date: 02/26/2019 09:31 AM
Subject: M and O fixture count

Chris, can you please send me the current fixture count for the Maintenance facility? We are trying to calculate our non potable water use age for the site.

Thanks

Eric

Sent from my iPhone

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James Colbert

From: Mark Schaefer
Sent: Wednesday, February 27, 2019 8:41 AM
To: Anderson, Eric/MOO
Cc: Lang, Kristin; James Colbert
Subject: RE: Water usage for Stockyards Events Center

Got it – thanks. Not sure we are using non-pot water for sinks and drinking fountains, however.

Mark C. Schaefer, PE, PTOE

Transportation Practice Leader, Infrastructure Engineering | Merrick & Company
5970 Greenwood Plaza Blvd. | Greenwood Village, CO 80111
T: +1 303-353-3928 | C: +1 303-881-3605 | www.merrick.com

From: Anderson, Eric/MOO <Eric.Anderson1@jacobs.com>
Sent: Wednesday, February 27, 2019 8:34 AM
To: Mark Schaefer <Mark.Schaefer@merrick.com>
Subject: Water usage for Stockyards Events Center

Mark,

For the Stockyards Events Center, here is the fixture count:

- Toilets-32
- Urinals-16
- Lavatories-24
- Service Sinks-2
- Drinking fountains-5

Eric J. Anderson | Design Manager

Office of the National Western Center, Mayor's Office | City and County of Denver
p: 720.865.2955 | c: 303.570.6442 | eric.anderson1@jacobs.com



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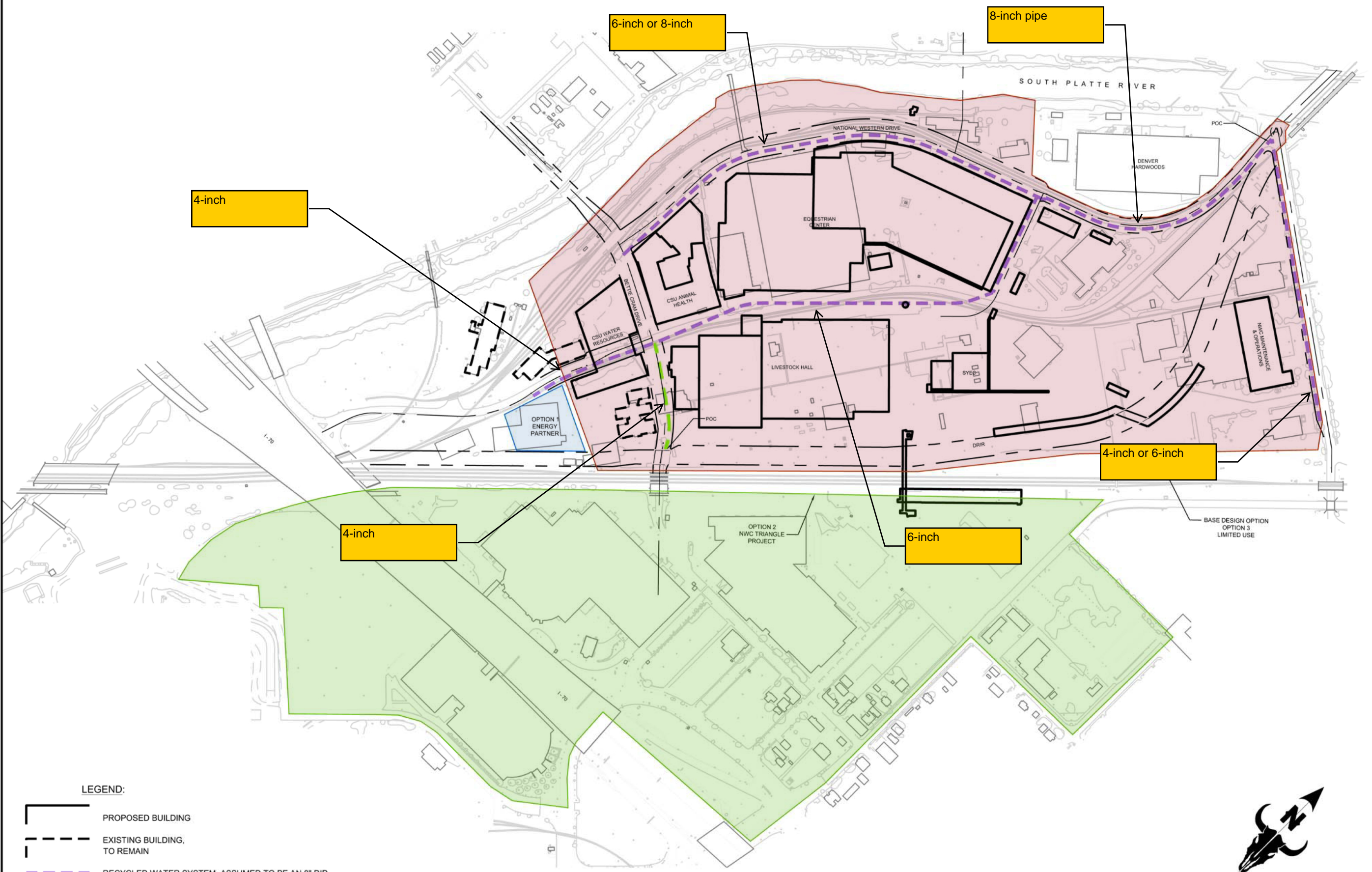


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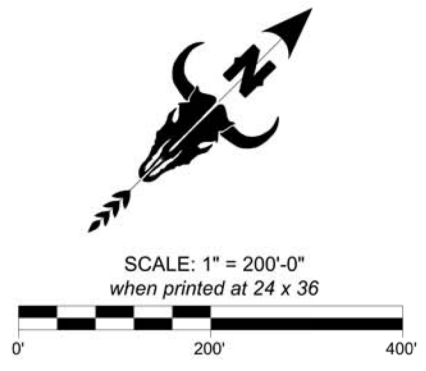
Attachment 2: Confirmation of Onsite Pipe Size Assumptions

Revised – Recycled Water Demand Options			
Alternative	Peak Recycled Water Demand (gpm)	Contingency (%)	Peak Recycled Water Demand With Contingency (gpm)
Base Design	1453	20	1744
Option 1 – Energy Partner	252	20	302
Option 2 – Triangle	415	20	497
Option 3 – Limited Use Base Design	1396	20	1675

File Location: \\SERVER\CPG\Projects\NWC\Horizontal\CAD\NWC-HRZ-L-BASE-GRP\HC.dwg Plot Date: 2/12/2019 12:45 PM Last Saved By: BRIAN



- LEGEND:**
- PROPOSED BUILDING
 - EXISTING BUILDING, TO REMAIN
 - RECYCLED WATER SYSTEM, ASSUMED TO BE AN 8" DIP CONNECTED TO NEW CONNECTION AT RACE COURT (A). INFRASTRUCTURE TO (A) FROM NORTH DELIVERED BY DENVER WATER.
 - POTENTIAL EXTENSION TO BETTIE CRAM DRIVE UNDERPASS TO SUPPORT FUTURE DEVELOPMENT SERVICES (TBD).



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DESIGN BY:	
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	

NATIONAL WESTERN CENTER
PROJECT NO. 65119870
DENVER NO. 2018PM0000472

RECYCLED WATER GRAPHIC, DRAFT

DATE:	02/12/2019
SHEET:	
PAGE:	

Attachment 3: NWC Cost Estimate Memo

National Western Center

Non-Potable Water Piping Cost Estimate

PREPARED BY: Jason Ingram and Kyle Bonde (Hensel Phelps)

PROJECT: National Western Center HIC

DATE: October 23, 2018. Revised March 21, 2019.

Memo

1. Purpose of this document:

- a. In conjunction with the Campus Recycled Water Horizontal Design Summary Memorandum dated March 01, 2019, this memo is to provide a progress cost update based on a set of assumptions outlined below for the Non-Potable Water Piping scope of work.

2. Clarifications and Assumptions for this scope of work:

- a. Piping and fitting types are based on City of Denver Water standard requirements.
- b. Costs include a clean corridor. If both a non-potable and potable waterline are running next to each other, only the costs for the additional 10' easement for the non-potable is reflected below, as the 30' easement zone for the potable is carried in a separate budget.
- c. Within the clean corridor it is assumed that 25% of the soil is solid waste to be removed.
- d. Costs do not include modifications to existing non-potable head-end systems as part of this additional piping being added to system.
- e. Cost do not include any laterals or taps.
- f. Tap and / or meter fees are not included. It is assumed that the vertical contractor will tap/valve the pipe at the ROW and pay any associated fees at that time.
- g. Permit fees are not included in this breakout but rather included in the overall work order that the work will be performed in.
- h. See attached Scope Baseline dated 3/21/2019 that the below costs are based on.

3. Cost Overview

Option:	Cost
Option #1 - Energy Partner	289,662
Option #2 - Triangle	157,633
Option #3 - Limited Use Base Design (Excludes Race)	1,760,873
Option #3 - Limited Use Base Design (Race Only)	639,138

4. Cost Breakdown (see next 2 pages)

NON-POTABLE WATER PIPING COST ESTIMATE

SEC. NO.	DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
					0
	Description				0
Option #1 - Energy Partner					
Non-Potable Waterlines					
	4" Water DIP - Under existing NWD near CSU-WRC	561	LF	195.00	109,395
Clean Corridor (30' wide x 5.5' deep)					
Full 30' width x 5.5' deep - Existing NWD near CSU-WRC					
	Unclassified Excavation	3,428	CY	7.00	23,998
	Fill - Placement and Compaction	3,428	CY	4.00	13,713
	Solid waste Removal, excavation hauling (25%)	857	CY	40.00	34,283
	Fill - Load from Stockpile	857	CY	8.00	6,857
	Landfill Tip Fees	857	CY	13.20	11,314
	Subtotal COW				199,560
	Prime Sub General Conditions, Fee, Bond	1	LS	41,908	41,908
	Contingency at 10%	1	LS	19,956	19,956
	Escalation at 5%	1	LS	9,978	9,978
	CM Fee	1	LS	18,260	18,260
	Design Costs			Not Included	0
	Program Management Costs			Not Included	0
	Grand Total				289,662

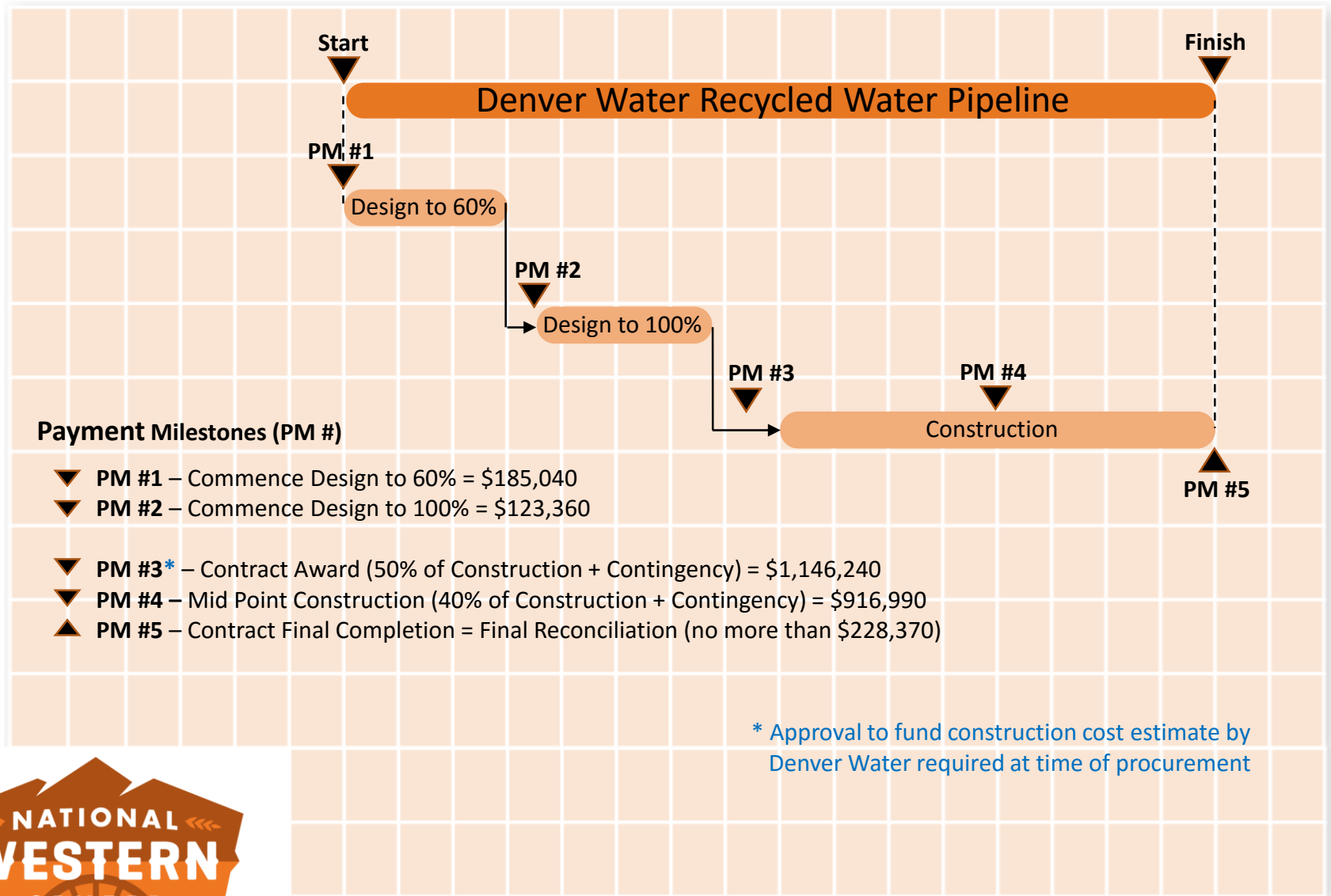
SEC. NO.	DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
					0
	Description				0
Option #2 - Triangle					
Non-Potable Waterlines					
	4" Water DIP - Future Development on Bettie Cram "Green"	476	LF	195.00	92,820
Clean Corridor (30' wide x 5.5' deep)					
Additional 10' wide zone if non-pot running adjacent to potable watermain					
	Unclassified Excavation	600	CY	7.00	4,200
	Fill - Placement and Compaction	600	CY	4.00	2,400
	Solid Waste Removal, Excavation and Hauling (25%)	150	CY	40.00	6,000
	Fill - Load from Stockpile	150	CY	8.00	1,200
	Landfill Tip Fees	150	CY	13.20	1,980
	Subtotal COW				108,600
	Prime Sub General Conditions, Fee, Bond	1	LS	22,806	22,806
	Contingency at 10%	1	LS	10,860	10,860
	Escalation at 5%	1	LS	5,430	5,430
	CM Fee	1	LS	9,937	9,937
	Design Costs			Not Included	0
	Program Management Costs			Not Included	0
	Grand Total				157,633

NON-POTABLE WATER PIPING COST ESTIMATE

SEC. NO.	DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
					0
	Description				0
Option #3 - Limited Use Base Design (Excludes Race)					
Non-Potable Waterlines					
	6" Water DIP - Under Plaza	1,914	LF	205.00	392,370
	8" Water DIP - Under Proposed NWD	3,192	LF	225.00	718,200
Clean Corridor (30' wide x 5.5' deep)					
	Additional 10' wide zone if non-pot running adjacent to potable watermain		CY		0
	Unclassified Excavation	3,900	CY	7.00	27,300
	Fill - Placement and Compaction	3,900	CY	4.00	15,600
	Solid Waste Removal, Excavation and Hauling (25%)	975	CY	40.00	39,000
	Fill - Load from Stockpile	975	CY	8.00	7,800
	Landfill Tip Fees	975	CY	13.20	12,870
	Subtotal COW				1,213,140
	Prime Sub General Conditions, Fee, Bond	1	LS	254,759	254,759
	Contingency at 10%	1	LS	121,314	121,314
	Escalation at 5%	1	LS	60,657	60,657
	CM Fee	1	LS	111,002	111,002
	Design Costs			Not Included	0
	Program Management Costs			Not Included	0
	Race Court non-Potable waterline			Not Included	
	Grand Total				1,760,873

SEC. NO.	DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
					0
	Description				0
Option #3 - Limited Use Base Design (Race Only)					
Non-Potable Waterlines					
	6" Water Line - Race Court	1,204	LF	205.00	246,820
Clean Corridor					
	Full 30' width x 5.5' deep - RACE		CY		0
	Unclassified Excavation	7,358	CY	7.00	51,504
	Fill - Placement and Compaction	7,358	CY	4.00	29,431
	Solid waste Removal, excavation hauling (25%)	1,839	CY	40.00	73,578
	Fill - Load from Stockpile	1,839	CY	8.00	14,716
	Landfill Tip Fees	1,839	CY	13.20	24,281
	Subtotal COW				440,330
	Prime Sub General Conditions, Fee, Bond	1	LS	92,469	92,469
	Contingency at 10%	1	LS	44,033	44,033
	Escalation at 5%	1	LS	22,016	22,016
	CM Fee	1	LS	40,290	40,290
	Design Costs			Not Included	0
	Program Management Costs			Not Included	0
	Grand Total				639,138

Denver Water Recycled Water Payment Schedule



AGREEMENT DATE: _____
(TO BE COMPLETED BY DENVER WATER – PROPERTY MANAGEMENT)

EASEMENT AGREEMENT

Strike inapplicable language; modify the highlighted as needed

THIS EASEMENT AGREEMENT (“**Agreement**”) is made between [REDACTED] (“**Grantor**”) and the CITY AND COUNTY OF DENVER, acting by and through its BOARD OF WATER COMMISSIONERS (“**Board**”), a municipal corporation of the State of Colorado. Each party to this Agreement may be referred to individually as “**Party**,” and collectively as “**Parties**.” The Parties agree as follows:

1. **GRANT OF EASEMENT:** For and in consideration of the sum of **TEN AND NO/100 DOLLARS (\$10.00)** and other good and valuable consideration, the receipt and sufficiency whereof is acknowledged by the Grantor, the Grantor grants to the Board, its successors and assigns, the permanent, non-exclusive right to enter, re-enter, occupy, and use the property located in the County of [REDACTED] and State of Colorado described in the attached **Exhibit A** (hereinafter referred to as the “**Easement**”) to construct, install, inspect, monitor, maintain, repair, substitute, change the size of, replace, remove, enlarge, and operate one or more water pipelines and all underground and surface appurtenances, collectively “**Facilities**,” in, through, over, and across the Easement. By way of example and not by way of limitation, the parties intend to include (i) mains and conduits within the term “**pipeline(s)**,” and (ii) valves, vaults, manholes, hydrants, electric or other related control systems, underground cables, wires, connections, ventilators, and the like within the term “**appurtenance(s)**.”

2. **EXHIBITS:** The following Exhibits are attached to and incorporated in this Agreement:
Exhibit A – Legal Description and Parcel Map (CAD drawing No. [REDACTED]) of the Easement
Exhibit B – [REDACTED]
Exhibit C – [REDACTED]

In the event the survey, the legal description in Exhibit A, and/or the drawing attached to Exhibit A are found to be inaccurate, the Grantor will comply with the Board’s request to execute, acknowledge, initial, and/or deliver to the Board any documentation the Board deems necessary to correct such inaccurate documents to fulfill the purposes of this Agreement.

3. **BOARD’S RIGHT OF ACCESS:** The Board shall have the right of ingress and egress in, through, over, and across the Easement in any manner and for any purpose necessary for the full enjoyment of the right of occupancy and use provided in this Agreement. In addition, the Board shall have the right to access the Easement through the adjoining land of the Grantor; however, the Board’s use of the adjoining land shall not interfere unreasonably with the Grantor’s use and enjoyment of it. The Board shall have the right to construct and maintain a roadway, as needed in the opinion of the Board, along the Easement to allow the Board, its agents, contractors, invitees, and anyone else authorized by the Board, vehicular, equipment, and other access.

4. **NO DEDICATION:** No right of access by the general public to any portion of the Easement is conveyed by this Agreement.

5. **SLOPE:** Due to variations in topography, the Easement and the pipe(s) may take on an uphill or downhill direction having a slope of greater than 4 percent; however, sloping within the Easement across its width may not exceed 4 percent in any direction to ensure stability of maintenance equipment and vehicles.

6. **PROHIBITED OBSTRUCTIONS:** Except as expressly identified in this Agreement, the Easement shall be free of obstacles throughout the Easement. The Grantor shall not construct, place, plant, or allow any of the following, whether temporary or permanent, on any part of the Easement: structure, building, fence, retaining wall, overhang, street light, power pole, yard light, mail box, sign, or trash receptacle; shrub, tree, woody plant, or nursery stock; or any other obstruction of any kind (collectively referred to as “**Prohibited Obstructions**”). The Board may, without notice to Grantor, remove any Prohibited Obstructions situated on the Easement without liability for damages and at the sole expense of the Grantor.

7. **PROHIBITED ACTIONS:** The Grantor shall not stop, limit, hinder, or interfere with the construction, maintenance, repair, replacement, removal, enlargement, or operation of the Facilities within the Easement.

8. **ENVIRONMENTAL CONTAMINATION:**

8.1. **Corrective Action:** The Grantor, for itself, its successors and assigns, shall provide to the Board any information within its possession or control about past and currently existing Environmental Contamination in the Easement. Such information shall include, but not be limited to, environmental studies, reports, samples, agreements, liens, letters, citations, notices, and any remediation work that has been done or is ongoing to clean the area or is planned to occur. If contaminated soils, for which the Grantor or its successors or assigns may be responsible under applicable state or federal laws, exist in the Easement on the effective date of this Agreement, then the Grantor, at Grantor’s sole expense, shall take Corrective Action to clean the contamination to the full width of the Easement and to (i) a depth of at least 12 feet from the finished grade or (ii) 2 feet below the bottom of the water pipeline(s), as may be determined by the Board. Contamination shall be cleaned to the appropriate state and federal standards set forth by the U.S. Environmental Protection Agency and Colorado Department of Public Health and Environment or to the standards of Corrective Action plans for the property currently approved by the U.S. Environmental Protection Agency and Colorado Department of Public Health and Environment. The Grantor shall provide documents verifying Corrective Action to the Board prior to the installation of Facilities.

8.2. **Release:** To the extent it legally may, and as long as the Board did not cause Environmental Contamination, the Grantor, for itself, its successors and assigns, shall release the Board from any liability, damages, costs, expenses, causes of action, claims, losses, settlements, fines and penalties, and reasonable attorneys’ fees claimed against the Board relating to (1) the existence, mitigation, or remediation of Environmental Contamination in the Easement; (2) any Corrective Action in the Easement; (3) any Environmental Contamination in the Easement that occurs or is discovered after conveyance of the Easement; or (4) the occurrence, disturbance, or movement of existing contaminated soils resulting directly or indirectly from any work conducted by the Board in exercise of the Board’s functions.

8.3. **Definitions:**

i. **“Corrective Action”** means risk assessment, active remediation, passive remediation, voluntary cleanup, investigation, and/or monitoring of Environmental Contamination.

ii. **“Environmental Contamination”** means the presence within the Easement of any hazardous material, including, but not limited to, any substances defined as or included in the definition of **“hazardous substance,” “hazardous material”** or **“toxic substances”** in the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. § 9601, *et seq.*, the Hazardous Materials Transportation Act, 49 U.S.C. § 5101, *et seq.*, the Resource Conservation and Recovery Act, 42 U.S.C. § 6901, *et seq.*, or any other federal, state or local

statute, law, ordinance, code, rule, regulation, order, decree or other requirement of governmental authority regulating, relating to or imposing liability or standard of conduct concerning any hazardous, toxic or dangerous substance or material, as now or at any time hereafter in effect, and in the regulations adopted, published, and/or promulgated pursuant to said laws.

9. **INSTALLATION:** The Grantor shall be responsible for the initial installation of the water pipeline(s) within the Easement. The water pipeline(s) shall be installed in accordance with the Board's then-current Engineering Standards.

10. **SURFACE RESTORATION:**

10.1. After construction of any water pipeline(s) by the Board, the general surface of the ground, except as it may have been necessarily modified to accommodate the appurtenances, shall be restored, as nearly as reasonable, to the grade and condition existing immediately prior to construction. Topsoil shall be replaced in cultivated and agricultural areas, and any excess earth resulting from installations by the Board shall be removed from the Easement at the sole expense of the Board.

10.2. For a period of one year following completion of construction by the Board that involves disturbance of the surface of the ground, the Board shall maintain the surface elevation and quality of the soil by correcting any settling or subsiding that occurs as a result of the work done by the Board.

10.3. If the Board or the Board's agents disturb or destroy any fencing existing at the time of this Agreement's execution, then the Board shall repair or replace such fencing as nearly as reasonable to its original condition. However, the Grantor shall not construct any new fencing across or within the Easement.

11. **SUBJACENT AND LATERAL SUPPORT; EARTH COVER:**

11.1. The Board shall have the right of subjacent and lateral support to whatever extent is necessary or desirable for the full, complete and undisturbed enjoyment of the rights described in this Agreement. The Grantor shall take no action that would impair the earth cover over, or the lateral or subjacent support for, any of the Facilities within the Easement.

11.2. The Board's Engineering Standards require no less than 4½ feet and no more than 10 feet of earth cover, measured vertically from the top of any pipeline(s). Deviation from this requirement shall be permitted only upon prior, written permission from the Board. If such permitted deviation undertaken by the Grantor requires any alterations, repairs or replacements to any pipeline(s), such alteration, repair or replacement shall be at the Grantor's expense.

12. **PUBLIC UTILITIES:**

12.1. **Crossings:** Other public utilities such as sanitary sewer, storm sewer, gas, electric, and cable lines may be installed in the Easement as long as they do not interfere with the Board's rights and as long as the utilities are crossing the pipeline(s) at right angles, or at substantially right angles. Any gas, electric, or cable line that crosses the pipeline(s) and is not metallic or concrete shall be encased within steel conduit and/or concrete ducts.

12.2. Parallel: In order to reserve to the Board’s pipeline(s) at least 20 feet of the Easement width, any and all utilities that parallel the Facilities shall not be permitted within 10 feet of the Facilities without prior express and written permission of the Board.

13. GRANTOR’S RETAINED INTERESTS: The Grantor has retained the right to the undisturbed use and occupancy of the Easement insofar as such use and occupancy is consistent with and does not impair any grant contained in this Agreement.

14. DOMINANT EASEMENT: The Board shall have a dominant right of occupancy of the Easement for the exercise of the Board’s functions, and the exercise of any rights in the Easement other than those retained by the Grantor shall be within the discretion of the Board.

15. ABANDONMENT:

15.1. The Board may commence the exercise of its rights to use the Easement immediately, or it may postpone the exercise of all or some part of its rights under this Agreement to some future time, which shall not constitute abandonment.

15.2. If the Board abandons use and operation of the Facilities laid pursuant to this Agreement, such abandonment shall not constitute abandonment of the Board’s rights under this Agreement.

16. WARRANTY OF TITLE: The Grantor represents and warrants that the Grantor has full right and lawful authority to make the grant contained in this Agreement. The Grantor shall defend the Board in the exercise of the Board’s rights under this Agreement against any defect in the Grantor’s title to the land involved or the Grantor’s right to make the grant contained in this Agreement.

17. NOTICES: The Parties shall contact the persons listed below, or other persons that may be designated by the Board in writing from time to time, for all matters related to administration of this Agreement. All notices, requests, demands, information and other communications required or permitted to be provided under this Agreement shall be in writing and shall be deemed to have been given and effective: (a) when delivered personally to the other party or (b) seven days after posting in the United States mail, first-class postage prepaid, properly addressed as follows.

If to the Board:

with a copy to:

City and County of Denver, acting by and through its Board of Water Commissioners
Attention: Chief Engineering Officer
1600 W. 12th Avenue
Denver, CO 80204

City and County of Denver, acting by and through its Board of Water Commissioners
Attention: Director of Engineering-Property
1600 W. 12th Avenue
Denver, CO 80204

If to the Grantor:

with a copy to:

18. GENERAL PROVISIONS:

18.1. Successors and Assigns: This Easement and each and every one of the benefits and burdens of this Agreement are covenants running with the land and shall inure to the benefit and be binding upon the respective legal representatives, heirs, devisees, executors, administrators, successors and assigns of the Parties, and any subsequent owners of title to any part of the land upon which the Easement is located. The Board may transfer and delegate any or all of the rights granted and obligations imposed by this Agreement without any prior consent of or notice to the Grantor.

18.2. Perpetual Duration – No Merger: No merger of title, estate or interest shall be deemed effected by any previous, contemporaneous, or subsequent deed, grant, or assignment of an interest or estate in any portion of the property upon which the Easement is located to the Board, or its successors or assigns. It is the express intent of the Parties that this Easement not be extinguished by, merged into, modified, or otherwise deemed affected by any other interest or estate in any portion of the property upon which the Easement is located now or hereafter held by the Board or its successors or assigns.

18.3. Construction: This Agreement shall not be construed more strictly against one Party than another merely because it may have been prepared by counsel for one of the Parties.

18.4. Venue and Governing Law: For the resolution of any dispute arising from this Agreement, venue shall be in the courts of the City and County of Denver, State of Colorado. This Agreement shall be governed by and construed under the laws of the State of Colorado, without regard to its conflict of laws principles.

18.5. No Attorneys' Fees and Costs: Except as otherwise specifically provided in this Agreement, if there is any litigation, mediation, arbitration or other dispute resolution proceedings arising out of or related to this Agreement, each Party shall pay for its own attorney(s)' and other professional(s)' fees, costs and expenses.

18.6. Severability: If any provision of this Agreement is determined by a court having jurisdiction to be unenforceable to any extent, the rest of that provision and the rest of this Agreement shall remain in full force and effect.

18.7. No Waiver: The failure by any Party to insist upon the strict performance by any other Party of any of the provisions of this Agreement shall not be deemed a waiver of any of the Agreement's provisions, and, notwithstanding such failure, no Party shall be thereby released from any obligations under the Agreement.

18.8. Non-Business Days: Except as otherwise specifically provided in this Agreement, all periods of time set forth in this Agreement shall be calendar days, not business days. If any date for any obligation under this Agreement falls on a Saturday, Sunday or a day that is a "holiday" as such term is defined in Colorado Rule of Civil Procedure 6, then the relevant date shall be extended automatically until the next business day.

18.9. Headings: The headings contained in this Agreement are included solely for convenience, are not intended to be full or accurate descriptions of the content thereof, and shall not be considered part of this Agreement or affect its interpretation.

18.10. Governmental Immunity Act: The parties understand and agree that the both parties are relying upon, and have not waived, the monetary limitations of \$350,000 per person, \$990,000 per occurrence, and all other rights, immunities and protections provided by the Colorado Governmental Immunity Act, C.R.S. § 24-10-101, *et seq.*, as it may be amended from time to time.

18.11. Article X of the Charter: This Agreement is made under and conformable to the provisions of the Charter of the City and County of Denver, which control the operation of the Denver Municipal Water System, consisting of Article X of the Charter. Insofar as applicable, the Charter provisions are incorporated herein and made a part hereof and shall supersede any apparently conflicting provision otherwise contained in this Agreement.

18.12. Entire Agreement: This Agreement constitutes the entire agreement between the Board and the Grantor and replaces all prior written or oral agreements and understandings. The terms of this Agreement may not be changed, waived, modified or varied in any manner whatsoever unless in writing signed by all Parties.

18.13. Counterparts and Originals: A copy of the Agreement may be executed by each Party, separately, and may be delivered by mail or electronic copy, each of which shall be deemed an original and all of which, when taken together, shall constitute one and the same instrument.

Representation of Authority of Signatories:. Each individual executing this Agreement on behalf of the Grantor represents and warrants that the execution and delivery of this Agreement and all related documents have been duly authorized by the Grantor for which the individual is signing and that the individual has the legal capacity to execute and deliver this Agreement and thereby bind the Grantor.

18.14. Effective Date: This Agreement shall become effective on the date it is signed by the Board's Chief Engineering Officer.

SIGNATURES FOLLOW ON THE NEXT PAGE

APPROVED AS TO FORM:

CITY AND COUNTY OF DENVER,
acting by and through its
BOARD OF WATER COMMISSIONERS

Office of General Counsel

By: _____
Robert J. Mahoney
Chief Engineering Officer

Date: _____

The undersigned verifies that he/she has read the foregoing Agreement and agrees to accept and abide by all of its terms and conditions.

GRANTOR'S NAME HERE

By: _____
Name

Title: _____

STATE OF COLORADO)
) ss.
_____ COUNTY OF **_____**)

The foregoing instrument was acknowledged before me this ____ day of _____ 20__, by _____ as _____ for _____.

Witness my hand and official seal.

My commission expires: _____

{ S E A L }

Notary Public

AGREEMENT DATE: _____
(TO BE COMPLETED BY DENVER WATER – PROPERTY MANAGEMENT)

EASEMENT AGREEMENT

Strike inapplicable language; modify the highlighted as needed

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1. **GRANT OF EASEMENT:** For and in consideration of the sum of **TEN AND NO/100 DOLLARS (\$10.00)** and other good and valuable consideration, the receipt and sufficiency whereof is acknowledged by the Grantor, the Grantor grants to the Board, its successors and assigns, the permanent, non-exclusive right to enter, re-enter, occupy, and use the property located in the County of [REDACTED] and State of Colorado described in the attached **Exhibit A** (hereinafter referred to as the “**Easement**”) to construct, install, inspect, monitor, maintain, repair, substitute, change the size of, replace, remove, enlarge, and operate one or more water pipelines and all underground and surface appurtenances, collectively “**Facilities**,” in, through, over, and across the Easement. By way of example and not by way of limitation, the parties intend to include (i) mains and conduits within the term “**pipeline(s)**,” and (ii) valves, vaults, manholes, hydrants, electric and other related control systems, underground cables, wires and connections, ventilators, and the like within the term “**appurtenance(s)**.”

2. **EXHIBITS:** The following Exhibits are attached to and incorporated in this Agreement:
Exhibit A – Legal Description and Parcel Map (CAD drawing No. [REDACTED]) of the Easement
Exhibit B – [REDACTED]
Exhibit C – [REDACTED]

In the event the survey, the legal description in Exhibit A, and/or the drawing attached to Exhibit A are found to be inaccurate, the Grantor will comply with the Board’s request to execute, acknowledge, initial, and deliver to the Board any documentation the Board deems necessary to correct such inaccurate documents to fulfill the purposes of this Agreement.

3. **BOARD’S RIGHT OF ACCESS:** The Board shall have the right of ingress and egress in, through, over, and across the Easement in any manner and for any purpose necessary for the full enjoyment of the right of occupancy and use provided in this Agreement. In addition, the Board shall have the right to access the Easement through the adjoining land of the Grantor; however, the Board’s use of the adjoining land shall not interfere unreasonably with the Grantor’s use and enjoyment of it.

4. **NO DEDICATION:** No right of access by the general public to any portion of the Easement is conveyed by this Agreement.

5. **ROADWAY:** The Grantor, at the Grantor’s sole expense, shall construct and maintain a private roadway over the entire Easement and shall surface such private roadway with the materials selected and approved by the Board in its sole discretion. The Parties agree, however, that the portions of the Easement upon which any fire hydrants and/or fire hydrant branch lines are located shall not be included in such private surfaced roadway. Planters, islands, or medians shall not be permitted within the Easement, except as specified by the Board’s then-current Engineering Standards.

6. **SLOPE**: Due to variations in topography, the Easement and the pipe(s) may take on an uphill or downhill direction having a slope of greater than 4 percent; however, sloping within the Easement across its width may not exceed 4 percent in any direction to ensure stability of maintenance equipment and vehicles.

7. **GRANTOR'S RETAINED INTERESTS**: The Grantor shall retain the right to use and occupy the Easement for ingress and egress, including vehicular traffic, insofar as such use and occupancy is consistent with and does not impair any grant contained in this Agreement.

8. **PROHIBITED OBSTRUCTIONS**: Except as expressly identified in this Agreement, the Easement shall be free of obstacles throughout the Easement. Except as otherwise provided in this Agreement, the Grantor shall not construct, place, plant, or allow any of the following, whether temporary or permanent, on any part of the Easement: structure, building, fence, retaining wall, overhang, street light, power pole, yard light, mail box, sign, or trash receptacle; parking or storage of vehicles, goods, or equipment; shrub, tree, woody plant, or nursery stock; or any other obstruction of any kind (collectively referred to as "**Prohibited Obstructions**"). The Board may, without notice to Grantor, remove any Prohibited Obstructions situated on the Easement without liability for damages and at the sole expense of the Grantor.

9. **PROHIBITED ACTIONS**: The Grantor shall not stop, limit, hinder, or interfere with the construction, maintenance, repair, replacement, removal, enlargement, or operation of the Facilities within the Easement.

10. **ENVIRONMENTAL CONTAMINATION**:

10.1. **Corrective Action**: The Grantor, for itself, its successors and assigns, shall provide to the Board any information within its possession or control about past and currently existing Environmental Contamination in the Easement. Such information shall include, but not be limited to, environmental studies, reports, samples, agreements, liens, letters, citations, notices, and any remediation work that has been done or is ongoing to clean the area or is planned to occur. If contaminated soils, for which the Grantor or its successors or assigns may be responsible under applicable state or federal laws, exist in the Easement on the effective date of this Agreement, then the Grantor, at Grantor's sole expense, shall take Corrective Action to clean the contamination to the full width of the Easement and to (i) a depth of at least 12 feet from the finished grade or (ii) 2 feet below the bottom of the water pipeline(s) as may be determined by the Board. Contamination shall be cleaned to the appropriate state and federal standards set forth by the U.S. Environmental Protection Agency and Colorado Department of Public Health and Environment or to the standards of Corrective Action plans for the property currently approved by the U.S. Environmental Protection Agency and Colorado Department of Public Health and Environment. The Grantor shall provide documents verifying Corrective Action to the Board prior to the installation of the Facilities.

10.2. **Release**: To the extent it legally may, and as long as the Board did not cause Environmental Contamination, the Grantor, for itself, its successors and assigns, shall release the Board from any liability, damages, costs, expenses, causes of action, claims, losses, settlements, fines and penalties, and reasonable attorneys' fees claimed against the Board relating to (1) the existence, mitigation, or remediation of Environmental Contamination in the Easement; (2) any Corrective Action in the Easement; (3) any Environmental Contamination in the Easement that occurs or is discovered after conveyance of the Easement; or (4) the occurrence, disturbance, or movement of existing contaminated soils resulting directly or indirectly from any work conducted by the Board in exercise of the Board's functions.

10.3. Definitions:

i. “**Corrective Action**” means risk assessment, active remediation, passive remediation, voluntary cleanup, investigation, and/or monitoring of Environmental Contamination.

ii. “**Environmental Contamination**” means the presence within the Easement of any hazardous material, including, but not limited to, any substances defined as or included in the definition of “**hazardous substance**,” “**hazardous material**” or “**toxic substances**” in the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. § 9601, *et seq.*, the Hazardous Materials Transportation Act, 49 U.S.C. § 5101, *et seq.*, the Resource Conservation and Recovery Act, 42 U.S.C. § 6901, *et seq.*, or any other federal, state or local statute, law, ordinance, code, rule, regulation, order, decree or other requirement of governmental authority regulating, relating to or imposing liability or standard of conduct concerning any hazardous, toxic or dangerous substance or material, as now or at any time hereafter in effect, and in the regulations adopted, published, and/or promulgated pursuant to said laws.

11. INSTALLATION: The Grantor shall be responsible for the initial installation of the water pipeline(s) within the Easement. The water pipeline(s) shall be installed in accordance with the Board’s then-current Engineering Standards.

12. SUBJACENT AND LATERAL SUPPORT; EARTH COVER:

12.1. The Board shall have the right of subjacent and lateral support to whatever extent is necessary or desirable for the full, complete and undisturbed enjoyment of the rights described in this Agreement. The Grantor shall take no action that would impair the earth cover over, or the lateral or subjacent support for, any of the Facilities within the Easement.

12.2. The Board’s Engineering Standards require no less than 4½ feet and no more than 10 feet of earth cover, measured vertically from the top of any pipeline(s). Deviation from this requirement shall be permitted only upon prior, written permission from the Board. If such permitted deviation undertaken by the Grantor requires any alterations, repairs or replacements to any pipeline(s), such alteration, repair or replacement shall be at the Grantor’s expense.

13. PUBLIC UTILITIES:

13.1. Crossings: Other public utilities such as sanitary sewer, storm sewer, gas, electric, and cable lines may be installed in the Easement as long as they do not interfere with the Board’s rights and as long as the utilities are crossing the water pipeline(s) at right angles, or at substantially right angles. Any gas or electric, or cable line that crosses the water pipeline(s) and is not metallic or concrete shall be encased within steel conduit and/or concrete ducts.

13.2. Parallel: In order to reserve to the Board’s pipeline(s) at least 20 feet of the Easement width, any and all utilities that parallel the Facilities shall not be permitted within 10 feet of the Facilities without prior written permission of the Board.

14. RESTORATION: The Grantor, at the Grantor’s expense, shall be solely responsible for the maintenance of streets, surfacing, curbs and gutters within the Easement, except as specified in this paragraph. When the Board deems it necessary to reconstruct, repair, relocate, remove, replace, enlarge, operate or in any way maintain any of the Facilities, the Board will backfill, compact and resurface the area of excavation, to include replacement of asphalt and/or concrete pavement, curbs and gutters, damaged by the Board’s activity, to the grade and condition existing immediately prior to excavation, as nearly as

reasonable. The Board will exercise all reasonable means to prevent damage to pavement, curbs and gutters which are situated within the Easement but outside of the immediate area of excavation. The Board shall repair and/or replace, as nearly as reasonable to the original condition, any pavement, curbs and/or gutters that are damaged solely as a result of the Board’s negligence.

15. DOMINANT EASEMENT: The Board shall have a dominant right of occupancy of the Easement for the exercise of the Board’s functions. The exercise of any rights in the Easement other than those retained by the Grantor shall be within the discretion of the Board. The Board may permit such other uses of the Easement not retained by the Grantor, as long as they do not impair the Board’s dominant rights, upon the payment of reasonable compensation to the Board and upon such terms, limitations, and conditions as the Board may find reasonably necessary.

16. ABANDONMENT:

16.1. The Board may commence the exercise of its rights to use the Easement immediately, or it may postpone the exercise of all or some part of its rights under this Agreement to some future time, which shall not constitute abandonment.

16.2. If the Board abandons use and operation of the Facilities laid pursuant to this Agreement, such abandonment shall not constitute abandonment of the Board’s rights under this Agreement.

17. WARRANTY OF TITLE: The Grantor represents and warrants that the Grantor has full right and lawful authority to make the grant contained in this Agreement. The Grantor shall defend the Board in the exercise of the Board’s rights under this Agreement against any defect in the Grantor’s title to the land involved or the Grantor’s right to make the grant contained in this Agreement.

18. NOTICES: The Parties shall contact the persons listed below, or other persons that may be designated by the Board in writing from time to time, for all matters related to administration of this Agreement. All notices, requests, demands, information and other communications required or permitted to be provided under this Agreement shall be in writing and shall be deemed to have been given and effective: (a) when delivered personally to the other party or (b) seven days after posting in the United States mail, first-class postage prepaid, properly addressed as follows.

If to the Board:
City and County of Denver, acting by and through
its Board of Water Commissioners
Attention: Chief Engineering Officer
1600 W. 12th Avenue
Denver, CO 80204

with a copy to:
City and County of Denver, acting by and through
its Board of Water Commissioners
Attention: Director of Engineering-Property
1600 W. 12th Avenue
Denver, CO 80204

If to the Grantor:

with a copy to:

19. GENERAL PROVISIONS:

19.1. Successors and Assigns: This Easement and each and every one of the benefits and burdens of this Agreement are covenants running with the land and shall inure to the benefit and be binding upon the respective legal representatives, heirs, devisees, executors, administrators, successors and assigns of the Parties, and any subsequent owners of title to any part of the land upon which the Easement is located. The Board may transfer and delegate any or all of the rights granted and obligations imposed by this Agreement without any prior consent of or notice to the Grantor.

19.2. Perpetual Duration – No Merger: No merger of title, estate or interest shall be deemed effected by any previous, contemporaneous, or subsequent deed, grant, or assignment of an interest or estate in any portion of the property upon which the Easement is located to the Board, or its successors or assigns. It is the express intent of the Parties that this Easement not be extinguished by, merged into, modified, or otherwise deemed affected by any other interest or estate in any portion of the property upon which the Easement is located now or hereafter held by the Board or its successors or assigns.

19.3. Construction: This Agreement shall not be construed more strictly against one Party than another merely because it may have been prepared by counsel for one of the Parties.

19.4. Venue and Governing Law: For the resolution of any dispute arising from this Agreement, venue shall be in the courts of the City and County of Denver, State of Colorado. This Agreement shall be governed by and construed under the laws of the State of Colorado, without regard to its conflict of laws principles.

19.5. No Attorneys' Fees and Costs: Except as otherwise specifically provided in this Agreement, if there is any litigation, mediation, arbitration or other dispute resolution proceedings arising out of or related to this Agreement, each Party shall pay for its own attorney(s)' and other professional(s)' fees, costs and expenses.

19.6. Severability: If any provision of this Agreement is determined by a court having jurisdiction to be unenforceable to any extent, the rest of that provision and the rest of this Agreement shall remain in full force and effect.

19.7. No Waiver: The failure by any Party to insist upon the strict performance by any other Party of any of the provisions of this Agreement shall not be deemed a waiver of any of the Agreement's provisions, and, notwithstanding such failure, no Party shall be thereby released from any obligations under the Agreement.

19.8. Non-Business Days: Except as otherwise specifically provided in this Agreement, all periods of time set forth in this Agreement shall be calendar days, not business days. If any date for any obligation under this Agreement falls on a Saturday, Sunday or a day that is a "holiday" as such term is defined in Colorado Rule of Civil Procedure 6, then the relevant date shall be extended automatically until the next business day.

19.9. Headings: The headings contained in this Agreement are included solely for convenience, are not intended to be full or accurate descriptions of the content thereof, and shall not be considered part of this Agreement or affect its interpretation.

19.10. Governmental Immunity Act: The parties understand and agree that both parties are relying upon, and have not waived, the monetary limitations of \$350,000 per person, \$990,000 per occurrence, and all other rights, immunities and protections provided by the Colorado Governmental Immunity Act, C.R.S. § 24-10-101, *et seq.*, as it may be amended from time to time.

19.11. Article X of the Charter: This Agreement is made under and conformable to the provisions of the Charter of the City and County of Denver, which control the operation of the Denver Municipal Water System, consisting of Article X of the Charter. Insofar as applicable, the Charter provisions are incorporated herein and made a part hereof and shall supersede any apparently conflicting provision otherwise contained in this Agreement.

19.12. Entire Agreement: This Agreement constitutes the entire agreement between the Board and the Grantor and replaces all prior written or oral agreements and understandings. The terms of this Agreement may not be changed, waived, modified or varied in any manner whatsoever unless in writing signed by all Parties.

19.13. Counterparts and Originals: A copy of the Agreement may be executed by each Party, separately, and may be delivered by mail or electronic copy, each of which shall be deemed an original and all of which, when taken together, shall constitute one and the same instrument.

Representation of Authority of Signatories: Each individual executing this Agreement on behalf of the Grantor represents and warrants that the execution and delivery of this Agreement and all related documents have been duly authorized by the Grantor for which the individual is signing and that the individual has the legal capacity to execute and deliver this Agreement and thereby bind the Grantor.

19.14. Effective Date: This Agreement shall become effective on the date it is signed by the Board's Chief Engineering Officer.

SIGNATURES FOLLOW ON THE NEXT PAGE

APPROVED AS TO FORM:

CITY AND COUNTY OF DENVER,
acting by and through its
BOARD OF WATER COMMISSIONERS

Office of General Counsel

By: _____
Robert J. Mahoney
Chief Engineering Officer

Date: _____

The undersigned verifies that he/she has read the foregoing Agreement and agrees to accept and abide by all of its terms and conditions.

GRANTOR'S NAME HERE

By: _____
Name

Title: _____

STATE OF COLORADO)
) ss.
_____ COUNTY OF **_____**)

The foregoing instrument was acknowledged before me this ____ day of _____ 20__, by _____ as _____ for _____.

Witness my hand and official seal.

My commission expires: _____

{ S E A L }

Notary Public

Frommell, Barb - NWCO Director of Strategic Partnerships

From: Frommell, Barb - NWCO Director of Strategic Partnerships
Sent: Wednesday, June 5, 2019 2:18 PM
To: Antolovich, Abigail; Turney, Amy S.; Riegler, Kristi K.
Cc: Welborn, Jennifer M. - CAO Asst City Attorney - Sr; Lang, Kristin; Mack, Jeff/MOO
Subject: FW: 06.05.19 - Denver Water, Water Efficiency Credit Pilot Program

Hi Abbey and Amy,

The email below comes from our Commissioning Agent for our city-owned buildings, Steve Peterson. He has reviewed the Water Efficiency Pilot Program standards and confirmed that the fixtures going into our buildings meet or exceed our standards. I believe that the Water Efficiency Standards mentioned in the IGA are those from the Water Efficiency Pilot Program, so just a heads up that we are already well on our way! Steve has confirmed that this will be the case for the Equestrian Center and Livestock Center as well.

Please let me know if you have any questions.

Barb Frommell | Strategic Partnerships Director
Mayor's Office of the National Western Center | City & County of Denver
201 W. Colfax Ave., Dept 205, Denver, CO 80202
p: (720) 913-4024 | m: (303) 325-1216 | barbara.frommell@denvergov.org



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From: Peterson, Steven - NWCO WW1111 Contingent Worker
Sent: Wednesday, June 5, 2019 2:09 PM
To: Frommell, Barb - NWCO Director of Strategic Partnerships <Barbara.Frommell@denvergov.org>
Cc: James.Slaughter1@jacobs.com; Rountree, Charles - NWCO WW1111 Contingent Worker <Charles.Rountree@denvergov.org>; Mack, Jeff - NWCO WW1111 Contingent Worker <Jeff.Mack@denvergov.org>
Subject: 06.05.19 - Denver Water, Water Efficiency Credit Pilot Program

Barb,

Per our conversation I have researched our design documents from the Stockyards Event Center and the M&O facility and the findings are listed below.

SYEC:

- Water Closets / Toilets - WC-1 and WC-2 are 1.1 GPM per flush. This meets the standard.
- Urinals on the Men's restrooms are 0.125 GPM Per Flush. This meets the standard.

- Kitchen Faucets S-1 are 1.5 GPM. This meets the standard.
- Lavatory Faucets L-1, L-2 and L-3 are 0.35 GPM. This exceeds the standard 0.5 GPM.
- Shower Heads there are no shower facilities in this building.

Maintenance & Operations Building:

- Water Closets / Toilets - WC-1 and WC-2 are 1.1 GPM per flush. This meets the standard.
- Urinals on the Men's restrooms are 0.125 GPM Per Flush. This meets the standard.
- Kitchen Faucets S-1 are 1.5 GPM. This meets the standard.
- Lavatory Faucets L-1, L-2 and L-3 are 0.375 GPM. This exceeds the standard 0.5 GPM.
- Shower Heads SH-1 is 1.5 GPM. This exceeds the standard of 1.75 GPM

I feel we meet the Denver Water Efficiency standard quite readily.

If you should have any further questions please feel free to contact me at your convenience.

Respectfully,

Steven Peterson | Mechanical, Electrical & Plumbing Coordinator

Office of the National Western Center, Mayor's Office | City and County of Denver
c: 970.213.6359 | Steven.Peterson@DenverGov.Org



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TECHNICAL MEMORANDUM

Non-Potable Water

Non-Potable Water – Denver
Water

PREPARED BY: S. Stevens – NWCO Horizontal Portfolio Manager
COPY TO: B. Frommell
PREPARED FOR: NWCO Leadership
DATE: April 10th 2019
PROJECT NUMBER: N/A
REVISION NO.: FINAL- VO
APPROVED BY: K. Lang

Purpose of this Memo

The purpose of this memo is to record the technical scope, schedule and cost elements that support the proposed National Western Center (NWC) - Denver Water Inter-Governmental Agreement (IGA) to provide non-potable infrastructure to the NWC Campus.

Non-Potable Scope

To support the One Water aspiration of the NWC Campus, NWCO and Denver Water have been working together toward agreement for delivery of a non-potable infrastructure system to the NWC Campus that comprises:

- Off-site extension of Denver Water's recycled water conduit to bring non-potable supply to the intersection of Franklin Street and Race Court at the northern boundary of the NWC Campus. This work will be funded, designed and delivered directly by Denver Water.
- On site recycled water main that is proposed to be funded by Denver Water via the proposed IGA and designed and constructed by the Mayor's Office of the National Western Center (NWCO) via their existing design and construct contracts.
- On site construction of recycled water distribution network (beyond the trunk lines) to appropriate NWC facilities and landscapes - per the final agreed-upon demand profile and project scope – to be funded by NWCO and/or individual property owners.

Status of Design

- A conceptual One Water study was completed as part of the ReNEWW strategy work by NWCO in collaboration with Denver Water – this looked at both the opportunities to use non-potable water throughout the campus, regulatory restrictions, and opportunities to minimize the use of all water across the site. This was developed into initial demand estimates by MIG. Demand estimates included all Phase 1 and 2 Capital Build facilities, CSU and WSSA owned facilities, and possible use by future Triangle development.
- Denver Water and the proposed Energy Partner, EAS, have been working to identify the potential use of non-potable water to support the proposed district energy system.

NON-POTABLE WATER

- The Horizontal Designer for NWCO has made provision for space in the proposed site wide infrastructure design development to include non-potable supply both along National Western Drive (North) and the central utility corridor.
- NWCO Horizontal Designer collated all the existing information from the different development efforts made to date and summarized the current water demand in one memo – reference Document 3. This included a 20 percent contingency on peak flows as outlined in the memo.
- The design of vertical facilities, riverfront open space, and the main plaza are all currently in concept. Refinement of the water demand will only progress once the design of the buildings, agreement on valued use, and potential agreement with Partners to use the non-potable water are finalized.
- The horizontal design requires a base recycled water infrastructure concept to enable delivery of the scope in phases as per the proposed delivery packages. This is driving the need to progress the design in such a way that it is ahead of finalizing to a high design confidence for the buildings and open space.

Current Scope Assumptions

Scope assumptions are as laid out in the referenced documents. If there is any difference in assumptions or scope outlined in these documents, chronological order dictates.

Reference Documents

The following are the basis for this memo. Items:

1. NWCO letter to Denver Water, Dated October 16, 2018
2. Denver Water Board discussion, November 7, 2018
3. Attachment 1 - Merrick Memo – Titled MEMORANDUM – CAMPUS RECYCLED WATER HORIZONTAL DESIGN SUMMARY, Dated March 1, 2019
4. Attachment 2 - Denver Water – Confirmation of Onsite Pipe size assumptions, received on March 20, 2019
5. Attachment 3 - Hensel Phelps – NWC Cost Estimate Memo, dated March 21, 2019

Forecast Schedule Milestones

The following are the key forecast milestones for the implementation of the non-potable water scope.

Horizontal portfolio Delivery Package 3.07B. Note all dates are subject to change as preceding work dictates:

- Concept (30%) Design complete October 2019
- 60% Design complete – TBD – Assume November 2019
- 95% Design Complete – December 5, 2019
- 100% Design complete – March 30, 2020
- Construction Notice to Proceed – June 11, 2020
- Construction Complete – March 1, 2021 (four phases in construction if matches waterline)
 - Phase 1 – May 11, 2021
 - Phase 2 – September 23, 2021

- Phase 3 – November 5, 2021
- Phase 4 – February 1, 2022

Current Cost Estimate – On Site

The following tables provide the cost for each section of the current concept infrastructure using the pipe sizes provided by Denver Water. Where Denver Water supplied a pipe size range, the larger pipe size was used as the basis of the cost estimate. The costs presented are intended to represent the maximum contribution from Denver Water for the design and construction of various portions of the non-potable water main. Actual contribution may be lower based on refined design and construction knowns. Denver Water would review and approve final design and refined cost estimates prior to construction. Overall project costs such as providing a clean utility corridor and finished street improvements will be borne by others. Each section is described below:

- Base Design – Proposed non-potable water main line across the campus to support primary NWC facilities, including the potential to support WSSA legacy Building and CSU buildings
- Energy Partner Extension – Optional extension of non-potable supply to the Energy Partner Central Utility Plant (CUP)
- Triangle Extension – Optional extension of non-potable supply to the western Phase 1 and 2 Capital Build scope. Provision of this extension is to ensure that if the Triangle is to be provided with non-potable supply in the future the infrastructure is enabled for connection.

Table 1 – Base Design Breakdown

Item	HIC Cost*	Other Cost
Construction Cost (include Fees, Bonds, escalation etc.)	\$1,639,559	\$-
Design Cost (10% of total construction)	\$-	\$163,956
PM Cost (5% of total construction)	\$-	\$81,978
Sub Total	\$1,885,493	
Apply 10% contingency	\$188,549	
Grand Total for Scope	\$2,074,042	

Table 2 – Energy Partner Extension Breakdown

Item	HIC Cost*	Other Cost
Construction Cost (incl Fees, Bonds, escalation etc.)	\$ 269,706	\$-
Design Cost (10% of total construction)	\$-	\$26,971
PM Cost (5% of total construction)	\$-	\$13,485
Sub Total	\$310,162	
Apply 10% contingency	\$31,016	
Grand Total for Scope	\$341,178	

NON-POTABLE WATER

Table 3 – Triangle Extension Breakdown

Item	HIC Cost*	Other Cost
Construction Cost (incl Fees, Bonds, escalation etc.)	\$ 146,773	\$-
Design Cost (10% of total construction)	\$-	\$14,677
PM Cost (5% of total construction)	\$-	\$7,339
Sub Total	\$168,789	
Apply 10% contingency	\$16,879	
Grand Total for Scope	\$185,668	

*See Attachment 3 – Hensel Phelps Construction Cost Estimate

Proposed Next Steps

- Denver Water provides NWCO a response letter with their intention for a funding commitment.
- Once funding commitment is understood from Denver Water and evaluated to be aligned and beneficial to the project, the City and County of Denver and Denver Water enter into an Intergovernmental Agreement to memorialize the conceptual commitments included in these letters.
- The project team coordinates with the NWCO Horizontal Designer to progress the design and work with NWCO's vertical portfolio to develop proposed non-potable water usage to Capital Build facilities, using collaborative design approach with Denver Water.
- Denver Water, in coordination with NWCO, to confirm with WSSA and CSU intent to use non-potable water and provide updated water usage figures to feed into design.
- NWCO Horizontal Designer/Denver Water to develop Denver Water Standard compliant scope to reflect agreed usage in accordance with requirements of the IGA.

Attachments

1. Attachment 1 - Merrick Memo – Titled MEMORANDUM – CAMPUS RECYCLED WATER HORIZONTAL DESIGN SUMMARY, Dated March 1, 2019
2. Attachment 2 - Denver Water – Confirmation of Onsite Pipe size assumptions, received on March 20, 2019
3. Attachment 3 - Hensel Phelps – NWC Cost estimate Memo, dated March 21, 2019

Attachment 1:
Campus Recycled Water-Horizontal
Design Summary

MEMORANDUM – CAMPUS RECYCLED WATER HORIZONTAL DESIGN SUMMARY

DATE: MARCH 1 , 2019

TO: KRISTIN LANG, P.E., NWCO HORIZONTAL DESIGN MANAGER

FROM: JAMES COLBERT, P.E., HORIZONTAL DESIGN CONTRACT, DEPUTY CONTRACT MANAGER

CC: FILE – MERRICK PROJECT NO. 65119870

RE: NATIONAL WESTERN CENTER – CAMPUS RECYCLED WATER HORIZONTAL DESIGN SUMMARY

INTRODUCTION

Recycled water will be supplied to the National Western Center (NWC) campus by Denver Water from the north along Franklin Street through a pressurized recycled water pipeline (purple pipe) system, in conjunction with the Campus ReNEWW Performance Management Framework of providing an inspiring “One Water” District. The recycled water system will support the One Water goal of “applying the right quality of water to the right use throughout the site; reduce the overall water consumption; and minimize municipal water use.”

This memorandum summarizes the requested recycled water demand alternatives based on the previous analyses completed by the Campus Place Making team.

DATA SOURCE DOCUMENTS - BY OTHERS

Merrick as part of the Horizontal Design Team conducted a review of the following source documents:

- Source 1 - Energy Partner Data emails dated 1/23/2019 and 2/26/2019
- Source 2 - Demand_Summary_For_DW-2018.0518.xlsx (CSU Water Model Summary)
- Source 3 - Water Demand Calculations.xlsx (Campus Place Making Calculations)

See Attachment B for the source documents.



PROPOSED RECYCLED WATER OPTIONS

The options for recycled water use defined in the source documents are as follows:

- Base Design – supply NWC Phases 1 and 2 Facilities Only
- Option 1 – additional supply for Energy Partner demand
- Option 2 – additional supply for Triangle demand
- Option 3 – Limited Use Base Design, which excludes cooling water and other uses beyond toilet and irrigation

See Attachment A for an exhibit showing the location of the recycled water infrastructure and the approximate boundaries for each of the listed options as presented in the source documents.

Table 1 summarizes the estimated recycled water demand for each of the design options as were presented in the source documents and notes the primary source of the recycled water values. Table 1 estimates “peak” flow values from annual average flows that were provided in the source documents using broad assumptions.

Table 1:

Source Document – Recycled Water Demand Options	
Alternative	Peak Recycled Water Demand (gallons per minute, gpm)
Base Design (Source 3)	447.5
Option 1 – Energy Partner (Source 1)	252
Option 2 – Triangle (Source 2)	65.5
Option 3 – Limited Use Base (Source 3)	206.2

DATA REFINEMENT

The Horizontal Design Team understands the previous recycled water calculations include numerous and broad design and scope assumptions for the campus. Additionally, the campus concepts have continued to be refined since the previous iterations upon which the analyses were based.

At the time of this memorandum, Merrick did not have updated data regarding the proposed building water usage or many of the assumptions in the source documents. For this summary, the previous Source calculations were assumed to be correct except as noted. Merrick reviewed the calculations, and information in the Source Documents and updated the peak flows based on our current understanding of the NWC Phases 1 & 2 and assumed scope of the future Triangle project. For the revised recycled water demands noted on Table 2, Merrick considered the following (See Attachment C for revised summaries):



- Updated the NWC Phase 1 and 2 irrigation peak demand calculations based on the current landscape concept. The revised calculations consider a reasonably narrow irrigation window (which would occur during nighttime hours) during the summer irrigation season.
- Estimated the future Triangle project irrigation peak demand as a percentage of the overall project area.
- Peak demands for building toilet and urinal use were calculated based on assumed fixture numbers following the American Water Works Association M22 Tap Sizing methodology.
- Assumed that existing buildings and facilities would not include plumbing improvements to utilize recycled water (for example, the Armour Building and Livestock Exchange Buildings)
- Assumed a 20% contingency

Table 2:

Revised – Recycled Water Demand Options			
Alternative	Peak Recycled Water Demand (gpm)	Contingency (%)	Peak Recycled Water Demand With Contingency (gpm)
Base Design	1453	20	1744
Option 1 – Energy Partner	252	20	302
Option 2 – Triangle	415	20	497
Option 3 – Limited Use Base Design	1396	20	1675

Conclusion

The above Table 2 represents Merrick’s current understanding of the campus recycled water demands based on the previous Campus Placemaking efforts. As design and scope of campus facilities are refined, it is anticipated the resulting peak recycled water demands may adjust. It should be noted that Table 2 presents the information in a conservative manner. Individual component peak flows are summed together, however they may not all occur simultaneously. For example, peak irrigation typically occurs at night, whereas peak domestic and cooling uses will occur during daytime hours.

The sizing of proposed recycled water system should consider additional factors such as, the pipeline routing, the location within the campus, the location of the feed to the Triangle and Energy Partner, and whether the pipelines are looped. These factors will be addressed during design. The pipeline sizing should also be reviewed with and confirmed by Denver Water as the design progresses.





NATIONAL WESTERN CENTER
HORIZONTAL DESIGN TEAM

Attachment A

Employee Owned



5970 Greenwood Plaza Blvd
Greenwood Village, CO 80111

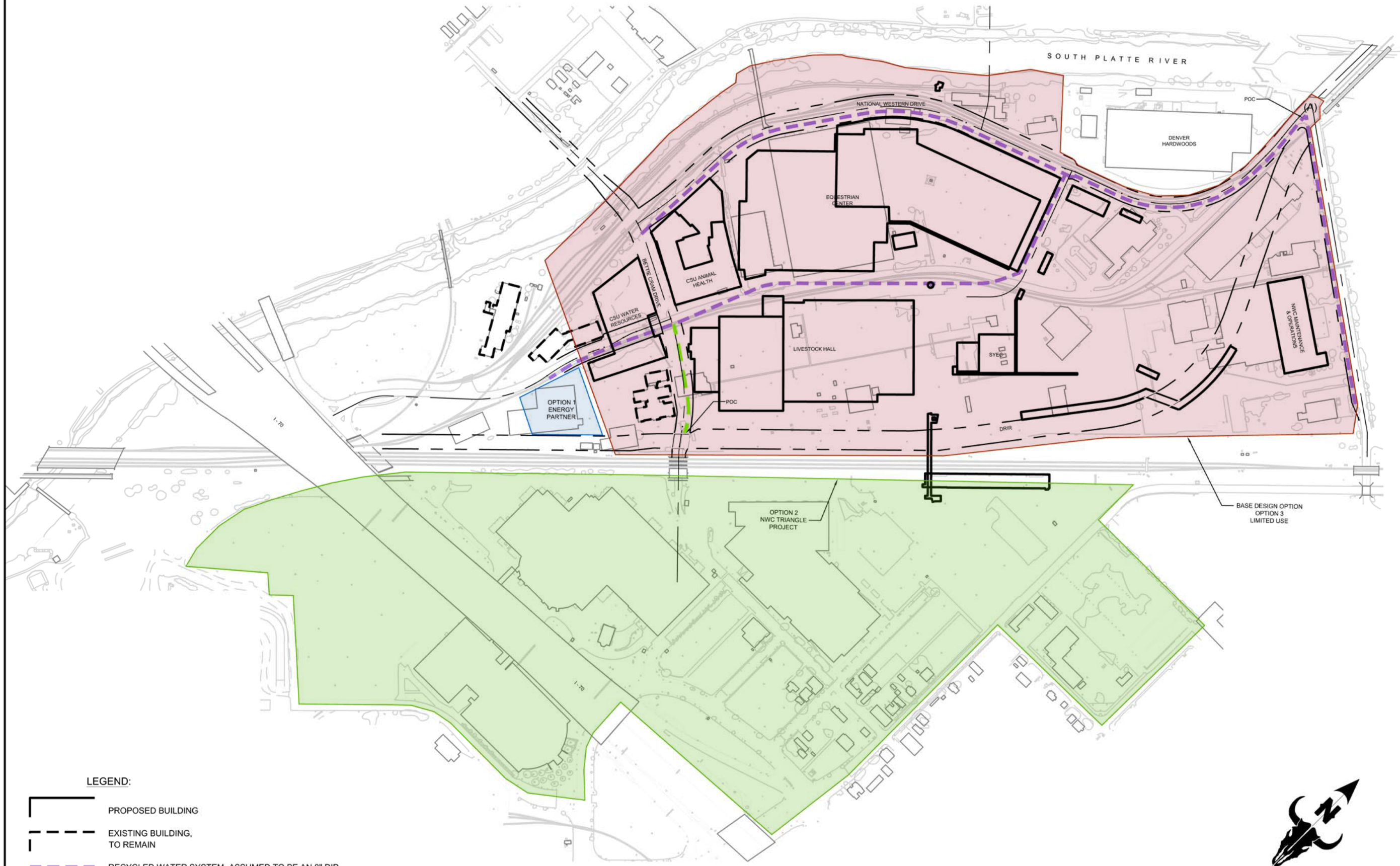


Tel: +1 303-751-0741



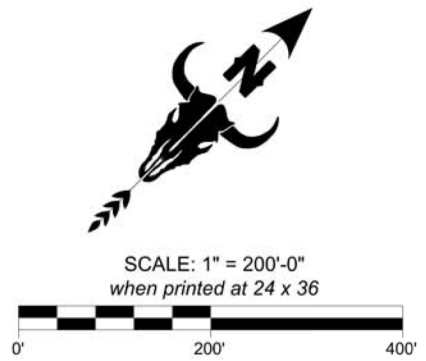
hello@merrick.com
www.merrick.com

File Location: \\SERVER\CPG Projects\NWC Horizontal\CAD\NWC-HRZ-L-BASE-GRP\HC.dwg Plot Date: 2/12/2019 12:45 PM Last Saved By: BRIAN



LEGEND:

- PROPOSED BUILDING
- EXISTING BUILDING, TO REMAIN
- RECYCLED WATER SYSTEM, ASSUMED TO BE AN 8" DIP CONNECTED TO NEW CONNECTION AT RACE COURT (A). INFRASTRUCTURE TO (A) FROM NORTH DELIVERED BY DENVER WATER.
- POTENTIAL EXTENSION TO BETTIE CRAM DRIVE UNDERPASS TO SUPPORT FUTURE DEVELOPMENT SERVICES (TBD).



STUDIO CPG
Landscape Architecture & Planning
4383 Tennyson Street, #1A
Denver, CO 80212
PH: (303) 455-3779

811
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REV	REVISION DESCRIPTION	DATE	CHANGED BY	CHECKED BY	APPROVED BY

DESIGN BY:	
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	

NATIONAL WESTERN CENTER
PROJECT NO. 65119870
DENVER NO. 2018PM0000472
RECYCLED WATER GRAPHIC, DRAFT

DATE:	02/12/2019
SHEET:	
PAGE:	



NATIONAL WESTERN CENTER
HORIZONTAL DESIGN TEAM

Attachment B

Employee Owned



5970 Greenwood Plaza Blvd
Greenwood Village, CO 80111



Tel: +1 303-751-0741



hello@merrick.com
www.merrick.com

James Colbert

From: Rip, Laura/DEN <Laura.Rip@jacobs.com>
Sent: Wednesday, January 23, 2019 10:20 AM
To: Lang, Kristin; Stevens, Samantha/MOO
Cc: Frommell, Barb - NWCO CA2758 Director
Subject: FW: EAS Project Non-Pot Water Use and Non-Official SKETCHES

Hi Kristin,

Below is a calculation on how much consumptive recycled water load that the energy partner would use at the CUP. 38,000kgal per year. However this is at average flows, not peak flows. Their design is still a bit in flux depending on their final technologies selected, so I will update you if this changes.

CEP Projected CONSUMPTIVE WATER USE

Screen Flushing Sluices	40-60	gpm	26,280,000	gallons
Screen Flushing Plates	20-25	gpm	11,826,000	gallons
CIP	2000	gal/month	24,000	gallons
Toilets	1.5	gal/flush, 2 flush/day	1,095	gallons
Floor Wash Down CUP	5	gal/min, 1 hr, each month	3,600	gallons
Floor Wash Down Wet Well	5	gal/min, 1 hr, each month	3,600	gallons
Total CEP Consumptive Use			38,138,295	gallons
Total CEP Consumptive Use			38,138	Kgal

Laura Rip
PE, CEM, LEED AP O+M
Jacobs
Project Manager, Energy Engineer
Buildings, Infrastructure & Advanced Facilities
+ 303.358.6890 mobile
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James Colbert

From: Rip, Laura/DEN <Laura.Rip@jacobs.com>
Sent: Tuesday, February 26, 2019 12:49 PM
To: Lang, Kristin
Cc: James Colbert; Brian Poling; Mark Schaefer; Moffet, Rene
Subject: RE: DW Recycle Water Need Quantification

Kristin, Rene updated the numbers. Adding the GPM of the systems, these rates equate to 252gpm peak flow for the Central Utility Plant.

Campus Energy Partner Recycled Water Loads

Equipment/Fixture			Annual Consumption		Peak Load		Notes
Screen Flushing Sluices	40-60	gpm	26,280,000	gallons	60	gpm	
Screen Flushing Plates	20-25	gpm	11,826,000	gallons	25	gpm	
Cleaning-In-Place (CIP) for HXers	2000	gal/month	24,000	gallons	125	gpm	(Assumes the m cleaning cycles; done when othe
Toilets	1.5	gal/flush, 2 flush/day	1,095	gallons	1.5	gpm	
Floor Wash Down CUP	5	gal/min, 1 hr, each month	3,600	gallons	5	gpm	
Floor Wash Down Wet Well	5	gal/min, 1 hr, each month	3,600	gallons	5	gpm	
Cooling Tower Make-up	30	gpm	17,474	gallons	30	gpm	
Total CEP			38,155,769	gallons			
Total CEP			38,156	kgal	252	gpm	

Thank you,

Laura Rip
PE, CEM, LEED AP O+M
Jacobs
Project Manager, Energy Engineer
Buildings, Infrastructure & Advanced Facilities
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From: Moffet, Rene [mailto:rene.moffet@aecom.com]
Sent: Tuesday, February 26, 2019 1:04 PM

To: Rip, Laura/DEN <Laura.Rip@jacobs.com>; Leslie Fangman <l.fangman@saundersinc.com>; 'catherine.thorn@enwave.com' <catherine.thorn@enwave.com>

Cc: Lang, Kristin <Kristin.Lang@jacobs.com>; Thompson, Calum <Calum.Thompson@aecom.com>; Mengual, Andrea <Andrea.Mengual@aecom.com>

Subject: [EXTERNAL] RE: DW Recycle Water Need Quantification

Laura

Here is an update that makes a lot more sense from my point of view:

Total peak flow for the cooling tower is 30GPM. Highlighted in yellow in your table below

Rene

René Moffet P Eng

Project manager, Power and Industrial
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rene.moffet@aecom.com

AECOM

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Sacramento, CA 95811, USA
T +1-916-414-5800

www.aecom.com

From: Moffet, Rene

Sent: Monday, February 25, 2019 12:59 PM

To: 'Rip, Laura/DEN'; Leslie Fangman; 'catherine.thorn@enwave.com'

Cc: Lang, Kristin; Thompson, Calum; Mengual, Andrea

Subject: RE: DW Recycle Water Need Quantification

Yes correct: see below

Projected CONSUMPTIVE WATER USE

Screen Flushing Sluices	40-60	gpm	26,280,000	gallons
Screen Flushing Plates	20-25	gpm	11,826,000	gallons
Cleaning-In-Place	2000	gal/month	24,000	gallons
Toilets	1.5	gal/flush, 2 flush/day	1,095	gallons
Floor Wash Down CUP	5	gal/min, 1 hr, each month	3,600	gallons
Floor Wash Down Wet Well	5	gal/min, 1 hr, each month	3,600	gallons
Cooling Tower	30	GPM	17,474	Gallons/year
Total CEP Consumptive Use			38,152,769	gallons

René Moffet P Eng

Project manager, Power and Industrial
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AECOM

2020 L Street, Suite 400

Capital Build

Source information: CSU 3/15/18 IUWM modeling results, adjusted by BG for misattribution of all leak water to the potable supply only
Known uncertainties: cooling area underestimated for multi-story buildings, as building footprint was used to calculate cooling demands.

Building Description (# on site map)	Current State/High Inputs (kgal/yr)			Future State/High Inputs (kgal/yr)			
	Potable Demands	Non-potable demands w/ cooling	Non-potable demands w/o cooling	Potable Demands	Non-potable demands w/ cooling	Non-potable demands w/o cooling	Non-potable demands w/ cooling - delta
Underground Parking below Equestrian Center	6	-	-	6	-	-	-
Equestrian Center (9)	4,291	5,670	284	2,521	7,440	2,054	1,770
Livestock Center (8) & Livestock Auction Hall (17) & WSSA Legacy (14)	5,541	3,748	185	2,988	6,301	2,738	2,553
Livestock Exchange Area (on map not labeled)	558	99	99	261	397	397	298
Maintenance & Operations Facility (12)	235	216	216	121	331	331	115
Stock Yard/ Event Center Multi-use Space (5)	1,366	-	-	1,192	174	174	174
Riverfront	-	2,601	2,601	-	2,601	2,601	-
Rail Corridor	-	-	-	-	-	-	-
CSU/DW Parking/South Parking	-	55	55	-	55	55	-
Animal Health	140	54	54	73	120	120	66
CSU Water Resource Center (11)	1,193	40	40	1,128	105	105	65
New National Western Drive (4)	-	769	769	-	769	769	-
Brighton Blvd. - 47th to Race Ct. (2)	-	1,019	1,019	-	1,019	1,019	-
TOTAL	13,330	14,271	5,322	8,290	19,312	10,363	5,041

Future Phase

Source information: Varies by building. For Stadium Arena, 1909 Stadium Arena/Partners, and Event Center, used CSU 3/15/18 IUWM modeling results, adjusted by BG for misattribution of all leak water to the potable supply only. For Trade Show/Expo Hall, used historical water use data * projected growth factor supplied by CSU IUWM modeling * estimated non-potable demand fraction based on CSU IUWM modeling for buildings with similar uses **assuming building will be retro-fitted**. For Coliseum, will use historical data approach but data are not yet available.

Known uncertainties: CSU modeling does not include any employees, attendees, or animals in the triangle. Not all buildings in the triangle have been identified or modeled.

Recommendations: Apply a safety factor to estimated demands.

Building Description (# on site map)	Current State/High Inputs (kgal/yr)			Future State/High Inputs (kgal/yr)		
	Potable Demands	Non-potable demands w/ cooling	Non-potable demands w/o cooling	Potable Demands	Non-potable demands w/ cooling	Non-potable demands w/o cooling
Stadium Arena	105	2,836	697	<i>Not modeled</i>		
Trade Show/Expo Hall	246	1,509	1,509			
1909 Stadium Arena/Partners	55	1,728	1,728			
Event Center	199	5,404	1,382			
Coliseum	n/a	n/a	n/a			
TOTAL	605	11,477	5,316			

Building	Potable			Non-Potable					
	Employee Demand (gpm)	Visitor Demand (gpm)	Live Stock Demand (gpm)	Total Potable Average Max Day (gpm)	Total Potable Maximum Max Day (gpm)	Irrigation (gpm)	Process (gpm)	Future Use* (gpm)	Total Non-Potable (gpm)
New Arena	0.3	0.0	0.0	0.3	0.4	0.0	10.6	0.2	10.8
Trade Show / Expo Hall	0.1	0.0	0.0	0.1	0.2	0.0	19.9	0.1	20.0
1909 Stadium Arena / Partners	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DPS Parking Structure / 49th Ave Extension	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equestrian Center	16.7	166.0	69.4	252.1	378.1	19.5	30.1	73.8	123.3
Livestock Hall / Livestock Stadium Arena	23.6	234.6	113.7	371.9	557.9	19.5	19.9	118.4	157.7
Livestock Exchange Arena	2.1	20.5	11.0	33.6	50.4	8.3	0.1	11.3	19.7
Maintenance Facility & cattle tie area	1.0	10.1	5.9	17.0	25.5	18.0	0.0	6.0	24.0
MacDonald Farm	0.3	2.8	1.4	4.5	6.7	8.3	0.0	1.5	9.7
Yards / Event Pavilion	1.8	18.4	1.4	21.7	32.5	8.3	0.0	2.6	10.8
Riverfront	0.0	0.0	0.0	0.0	0.0	87.0	0.0	0.0	87.0
River Center	0.2	0.0	0.0	0.2	0.3	0.0	0.0	0.2	0.2
DRIR R/W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CSU/DW Parking	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
South Storage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Animal Health Building Parcel	1.1	6.3	4.8	12.1	18.2	4.5	0.0	4.7	9.2
CSU WRC / DW Building Parcels	1.1	6.3	0.0	7.3	11.0	7.9	7.0	0.8	15.6
Rights of way west of the railroad (DRIR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rights of way east of the railroad (DRIR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	48.2	464.9	207.7	720.8	1081.2	181.1	87.6	219.3	488.1

Note:

*Future use includes animal washdown and toilet flushing.



NATIONAL WESTERN CENTER
HORIZONTAL DESIGN TEAM

Attachment C

Employee Owned



5970 Greenwood Plaza Blvd
Greenwood Village, CO 80111



Tel: +1 303-751-0741



hello@merrick.com
www.merrick.com

National Western Campus
 Irrigation Water Budget
 Updated: 12/21/2018 (Triangle Added 2/26/2019)

Landscape Type	Bluegrass Turf, Irrigated, Mown (SF)	Alternative Turf, Irrigated, Unmown (SF)	Tree / Shrub / Perennial Beds (SF)	Native Planting, Unirrigated (SF)		AREA TOTALS			
						Irrigated Acres	Gallons / Year	AcreFeet / Year	Peak Season GPM
1 Race Court ROW	0	0	0	0	1	0.00	0	0.00	0
2 National Western Drive ROW	0	0	13,382	0	2	0.31	154,421	0.47	5
3 Bettie Cram Drive ROW	0	0	3,899	0	3	0.09	44,832	0.14	2
4 Riverfront Park	117,801	177,506	21,420	0	4	7.26	8,087,608	24.82	281
5 Maintenance & Operations Facility	28,064	29,180	17,804	0	5	1.72	1,738,177	5.33	60
6 Equestrian Center	0	0	23,546	0	6	0.54	268,992	0.83	9
7 CSU - Water Resources	0	0	1,893	0	7	0.04	19,925	0.06	1
8 CSU - Animal Health	0	0	6,167	0	8	0.14	69,739	0.21	2
9 Livestock Building	0	0	22,075	0	9	0.51	254,048	0.78	9
10 SYEC / Stockyards	0	0	17,399	0	10	0.40	199,253	0.61	7
TOTAL, square feet	145,865	206,686	127,586	0		11.01	10,836,995	33.25	376

Campus Area (SF): 4,690,504 107.68
 Campus Irrigated Area (SF): 480,137 11.02
 Irrigated Area, Percent of Campus: 10.24% 10.24%
 Gallons per Year per Square Foot: 2.3104

Triangle Irrigation Assumption
 Project Area 60 acres: 60 acres (2,613,600 SF)
 Assumed Irrigated Area, Percent of Project: 8%
 Estimated Peak Season GPM: 164

Revised Water Demand Calculations - 2/28/2019

Building	Non-Potable						Process (gpm)	Total Non-Potable (gpm)
	AWWA M22 Tap Sizing							
	Number of Toilets	Number of Urinals	Fixture Value	Flow	Peak Factor	Peak Flush Demand (gpm)		
New Arena (Triangle)	32.0	16.0	1376.0	135.0	0.8	110.0	10.6	120.6
Trade Show / Expo Hall (Triangle)	32.0	16.0	1376.0	135.0	0.8	110.0	19.9	129.9
Equestrian Center	64.0	24.0	2624.0	202.0	0.8	160.0	30.1	190.1
Legacy Building	24.0	8.0	968.0	118.0	0.8	95.0	0.0	95.0
Livestock Arena	56.0	20.0	2280.0	184.0	0.8	145.0	9.9	154.9
Livestock Hall	56.0	20.0	2280.0	184.0	0.8	145.0	10.0	155.0
Maintenance Facility & cattle tie area	17.0	4.0	659.0	102.0	0.8	80.0	0.0	80.0
Stockyards Event Center	32.0	16.0	1376.0	135.0	0.8	110.0	0.0	110.0
River Center Building	3.0	1.0	121.0	52.0	0.8	40.0	0.0	40.0
Animal Health Building	36.0	18.0	1548.0	148.0	0.8	120.0	0.0	120.0
CSU Water Building	40.0	18.0	1688.0	155.0	0.8	125.0	7.0	132.0
Total								

NWC Phases 1 and 2 ~ 1077.0
 Triangle 250.6

Note:

Triangle Assumptions assume demands for Expo Hall and Areen similar to Stockyards Events Center

Fixture counts were only available for the Stockyards Event Center and Maintenance Facility other fixture counts were estimated

Campus Placemaking process peak estimates were assumed to be correct

James Colbert

From: Mark Schaefer
Sent: Tuesday, February 26, 2019 10:41 AM
To: James Colbert
Subject: Fwd: [EXTERNAL] Re: M and O fixture count

More exact counts if this is helpful.

Sent from my iPhone

Begin forwarded message:

From: "Anderson, Eric/MOO" <Eric.Anderson1@jacobs.com>
Date: February 26, 2019 at 10:10:02 AM MST
To: Mark Schaefer <mark.schaefer@merrick.com>
Subject: Fwd: [EXTERNAL] Re: M and O fixture count

Mark. Please see the fixture count for the Maintenance and operations facility.

Eric

Sent from my iPhone

Begin forwarded message:

From: Chris Sigit-Sidharta <csigit-sidharta@sehinc.com>
Date: February 26, 2019 at 10:02:46 AM MST
To: "Anderson, Eric/MOO" <Eric.Anderson1@jacobs.com>
Subject: [EXTERNAL] Re: M and O fixture count

Hi Eric,

Yes we have 17 Water Closets, 4 Urinals, 15 Lavatories, 3 Kitchen Sinks, 3 Service Sinks, 4 Drinking Fountains (2 Combo units). Currently we are showing 9 hose bibs around the building.

Thanks

Chris Sigit-Sidharta, AIA, LEED AP BD+C, GGP | Architect
2000 South Colorado Blvd. Tower One, Suite 6000 | Denver, CO 80222
720.540.6843 direct
[SEH](#) - Building a Better World for All of Us®

From: "Anderson, Eric/MOO" <Eric.Anderson1@jacobs.com>
To: "csigit-sidharta@sehinc.com" <csigit-sidharta@sehinc.com>

Date: 02/26/2019 09:31 AM
Subject: M and O fixture count

Chris, can you please send me the current fixture count for the Maintenance facility? We are trying to calculate our non potable water use age for the site.

Thanks

Eric

Sent from my iPhone

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James Colbert

From: Mark Schaefer
Sent: Wednesday, February 27, 2019 8:41 AM
To: Anderson, Eric/MOO
Cc: Lang, Kristin; James Colbert
Subject: RE: Water usage for Stockyards Events Center

Got it – thanks. Not sure we are using non-pot water for sinks and drinking fountains, however.

Mark C. Schaefer, PE, PTOE

Transportation Practice Leader, Infrastructure Engineering | Merrick & Company
5970 Greenwood Plaza Blvd. | Greenwood Village, CO 80111
T: +1 303-353-3928 | C: +1 303-881-3605 | www.merrick.com

From: Anderson, Eric/MOO <Eric.Anderson1@jacobs.com>
Sent: Wednesday, February 27, 2019 8:34 AM
To: Mark Schaefer <Mark.Schaefer@merrick.com>
Subject: Water usage for Stockyards Events Center

Mark,

For the Stockyards Events Center, here is the fixture count:

- Toilets-32
- Urinals-16
- Lavatories-24
- Service Sinks-2
- Drinking fountains-5

Eric J. Anderson | Design Manager

Office of the National Western Center, Mayor's Office | City and County of Denver
p: 720.865.2955 | c: 303.570.6442 | eric.anderson1@jacobs.com



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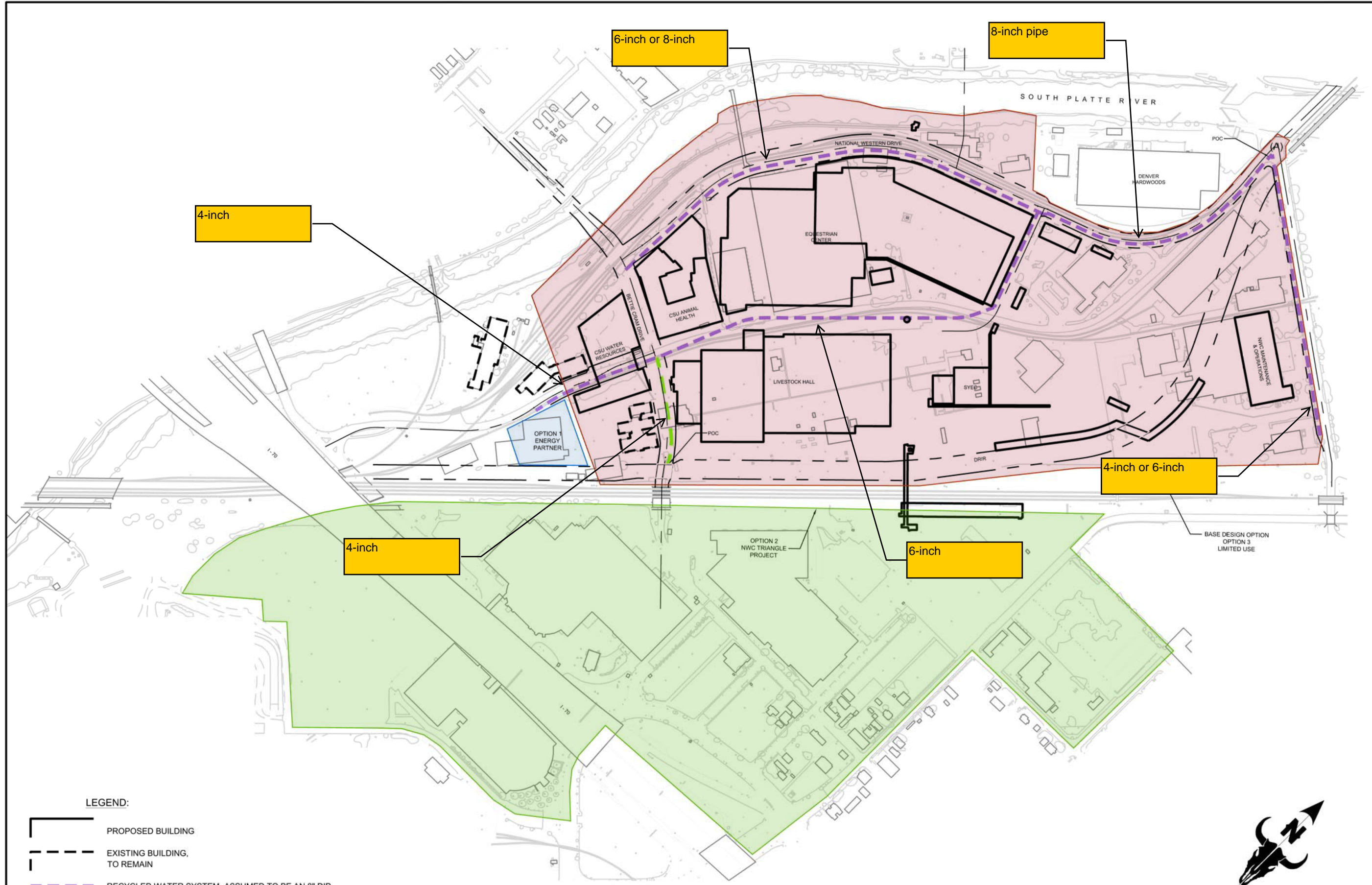


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Attachment 2:
Confirmation of Onsite Pipe Size
Assumptions

Revised – Recycled Water Demand Options			
Alternative	Peak Recycled Water Demand (gpm)	Contingency (%)	Peak Recycled Water Demand With Contingency (gpm)
Base Design	1453	20	1744
Option 1 – Energy Partner	252	20	302
Option 2 – Triangle	415	20	497
Option 3 – Limited Use Base Design	1396	20	1675

File Location: \\SERVER\CPG Projects\NWC Horizontal\CAD\NWC-HRZ-L-BASE-GRP\HC.dwg Plot Date: 2/12/2019 12:45 PM Last Saved By: BRIAN



LEGEND:

- PROPOSED BUILDING
- EXISTING BUILDING, TO REMAIN
- RECYCLED WATER SYSTEM, ASSUMED TO BE AN 8" DIP CONNECTED TO NEW CONNECTION AT RACE COURT (A). INFRASTRUCTURE TO (A) FROM NORTH DELIVERED BY DENVER WATER.
- POTENTIAL EXTENSION TO BETTIE CRAM DRIVE UNDERPASS TO SUPPORT FUTURE DEVELOPMENT SERVICES (TBD).



SCALE: 1" = 200'-0"
when printed at 24 x 36

STUDIO CPG
Landscape Architecture & Planning
4383 Tennyson Street, #1A
Denver, CO 80212
PH: (303) 455-3779

811
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REV	REVISION DESCRIPTION	DATE	CHANGED BY	CHECKED BY	APPROVED BY

DESIGN BY:	
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	

NATIONAL WESTERN CENTER
PROJECT NO. 65119870
DENVER NO. 2018PM0000472

**RECYCLED WATER
GRAPHIC, DRAFT**

DATE:	02/12/2019
SHEET:	
PAGE:	

Attachment 3:
NWC Cost Estimate Memo

National Western Center

Non-Potable Water Piping Cost Estimate

PREPARED BY: Jason Ingram and Kyle Bonde (Hensel Phelps)

PROJECT: National Western Center HIC

DATE: October 23, 2018. Revised March 21, 2019.

Memo

1. Purpose of this document:

- a. In conjunction with the Campus Recycled Water Horizontal Design Summary Memorandum dated March 01, 2019, this memo is to provide a progress cost update based on a set of assumptions outlined below for the Non-Potable Water Piping scope of work.

2. Clarifications and Assumptions for this scope of work:

- a. Piping and fitting types are based on City of Denver Water standard requirements.
- b. Costs include a clean corridor. If both a non-potable and potable waterline are running next to each other, only the costs for the additional 10' easement for the non-potable is reflected below, as the 30' easement zone for the potable is carried in a separate budget.
- c. Within the clean corridor it is assumed that 25% of the soil is solid waste to be removed.
- d. Costs do not include modifications to existing non-potable head-end systems as part of this additional piping being added to system.
- e. Cost do not include any laterals or taps.
- f. Tap and / or meter fees are not included. It is assumed that the vertical contractor will tap/valve the pipe at the ROW and pay any associated fees at that time.
- g. Permit fees are not included in this breakout but rather included in the overall work order that the work will be performed in.
- h. See attached Scope Baseline dated 3/21/2019 that the below costs are based on.

3. Cost Overview

Option:	Cost
Option #1 - Energy Partner	289,662
Option #2 - Triangle	157,633
Option #3 - Limited Use Base Design (Excludes Race)	1,760,873
Option #3 - Limited Use Base Design (Race Only)	639,138

4. Cost Breakdown (see next 2 pages)

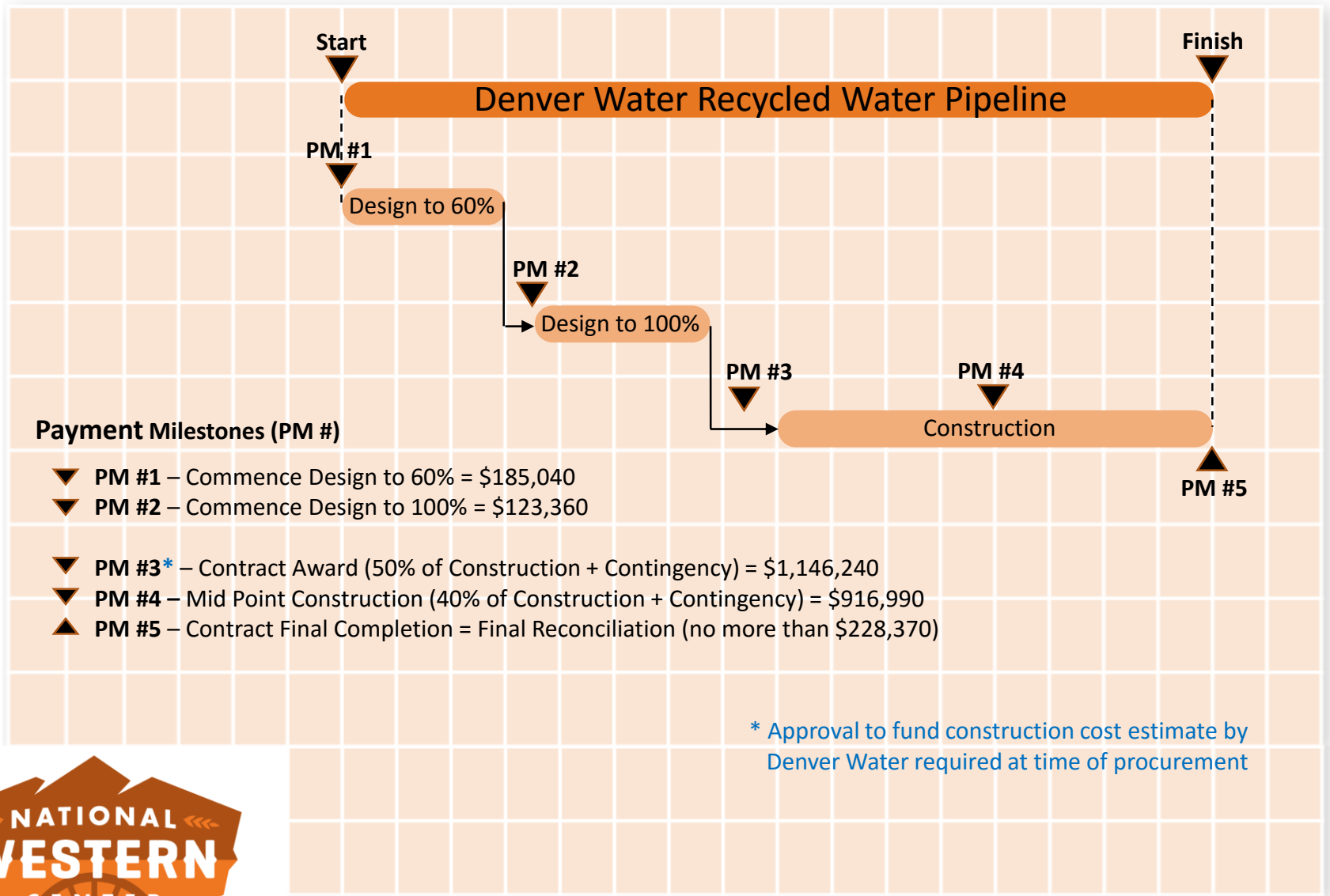
SEC. NO.	DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
					0
	Description				0
	Option #1 - Energy Partner				
	Non-Potable Waterlines				
	4" Water DIP - Under existing NWD near CSU-WRC	561	LF	195.00	109,395
	Clean Corridor (30' wide x 5.5' deep)				
	Full 30' width x 5.5' deep - Existing NWD near CSU-WRC				
	Unclassified Excavation	3,428	CY	7.00	23,998
	Fill - Placement and Compaction	3,428	CY	4.00	13,713
	Solid waste Removal, excavation hauling (25%)	857	CY	40.00	34,283
	Fill - Load from Stockpile	857	CY	8.00	6,857
	Landfill Tip Fees	857	CY	13.20	11,314
	Subtotal COW				199,560
	Prime Sub General Conditions, Fee, Bond	1	LS	41,908	41,908
	Contingency at 10%	1	LS	19,956	19,956
	Escalation at 5%	1	LS	9,978	9,978
	CM Fee	1	LS	18,260	18,260
	Design Costs			Not Included	0
	Program Management Costs			Not Included	0
	Grand Total				289,662

SEC. NO.	DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
					0
	Description				0
	Option #2 - Triangle				
	Non-Potable Waterlines				
	4" Water DIP - Future Development on Bettie Cram "Green"	476	LF	195.00	92,820
	Clean Corridor (30' wide x 5.5' deep)				
	Additional 10' wide zone if non-pot running adjacent to potable watermain				
	Unclassified Excavation	600	CY	7.00	4,200
	Fill - Placement and Compaction	600	CY	4.00	2,400
	Solid Waste Removal, Excavation and Hauling (25%)	150	CY	40.00	6,000
	Fill - Load from Stockpile	150	CY	8.00	1,200
	Landfill Tip Fees	150	CY	13.20	1,980
	Subtotal COW				108,600
	Prime Sub General Conditions, Fee, Bond	1	LS	22,806	22,806
	Contingency at 10%	1	LS	10,860	10,860
	Escalation at 5%	1	LS	5,430	5,430
	CM Fee	1	LS	9,937	9,937
	Design Costs			Not Included	0
	Program Management Costs			Not Included	0
	Grand Total				157,633

SEC. NO.	DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
					0
	Description				0
Option #3 - Limited Use Base Design (Excludes Race)					
Non-Potable Waterlines					
	6" Water DIP - Under Plaza	1,914	LF	205.00	392,370
	8" Water DIP - Under Proposed NWD	3,192	LF	225.00	718,200
Clean Corridor (30' wide x 5.5' deep)					
	Additional 10' wide zone if non-pot running adjacent to potable watermain		CY		0
	Unclassified Excavation	3,900	CY	7.00	27,300
	Fill - Placement and Compaction	3,900	CY	4.00	15,600
	Solid Waste Removal, Excavation and Hauling (25%)	975	CY	40.00	39,000
	Fill - Load from Stockpile	975	CY	8.00	7,800
	Landfill Tip Fees	975	CY	13.20	12,870
	Subtotal COW				1,213,140
	Prime Sub General Conditions, Fee, Bond	1	LS	254,759	254,759
	Contingency at 10%	1	LS	121,314	121,314
	Escalation at 5%	1	LS	60,657	60,657
	CM Fee	1	LS	111,002	111,002
	Design Costs			Not Included	0
	Program Management Costs			Not Included	0
	Race Court non-Potable waterline			Not Included	
	Grand Total				1,760,873

SEC. NO.	DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
					0
	Description				0
Option #3 - Limited Use Base Design (Race Only)					
Non-Potable Waterlines					
	6" Water Line - Race Court	1,204	LF	205.00	246,820
Clean Corridor					
	Full 30' width x 5.5' deep - RACE		CY		0
	Unclassified Excavation	7,358	CY	7.00	51,504
	Fill - Placement and Compaction	7,358	CY	4.00	29,431
	Solid waste Removal, excavation hauling (25%)	1,839	CY	40.00	73,578
	Fill - Load from Stockpile	1,839	CY	8.00	14,716
	Landfill Tip Fees	1,839	CY	13.20	24,281
	Subtotal COW				440,330
	Prime Sub General Conditions, Fee, Bond	1	LS	92,469	92,469
	Contingency at 10%	1	LS	44,033	44,033
	Escalation at 5%	1	LS	22,016	22,016
	CM Fee	1	LS	40,290	40,290
	Design Costs			Not Included	0
	Program Management Costs			Not Included	0
	Grand Total				639,138

Denver Water Recycled Water Payment Schedule



AGREEMENT DATE: _____
(TO BE COMPLETED BY DENVER WATER – PROPERTY MANAGEMENT)

EASEMENT AGREEMENT

THIS EASEMENT AGREEMENT (“**Agreement**”) is made between CITY AND COUNTY OF DENVER, a municipal corporation of the State of Colorado (“**Grantor**”) and the CITY AND COUNTY OF DENVER, acting by and through its BOARD OF WATER COMMISSIONERS (“**Board**”), a municipal corporation of the State of Colorado. Each party to this Agreement may be referred to individually as “**Party**,” and collectively as “**Parties**.” The Parties agree as follows:

1. **GRANT OF EASEMENT:** For and in consideration of the sum of TEN AND NO/100 DOLLARS (\$10.00) and other good and valuable consideration, the receipt and sufficiency whereof is acknowledged by the Grantor, the Grantor grants to the Board, its successors and assigns, the permanent, non-exclusive right to enter, re-enter, occupy, and use the property located in the County of DENVER and State of Colorado described in the attached **Exhibit A** (hereinafter referred to as the “**Easement**”) to construct, install, inspect, monitor, maintain, repair, substitute, change the size of, replace, remove, enlarge, and operate one or more water pipelines and all underground and surface appurtenances, collectively “**Facilities**,” in, through, over, and across the Easement. By way of example and not by way of limitation, the parties intend to include (i) mains and conduits within the term “**pipeline(s)**,” and (ii) valves, vaults, manholes, hydrants, electric or other related control systems, underground cables, wires, connections, ventilators, and the like within the term “**appurtenance(s)**.”

2. **EXHIBITS:** The following Exhibits are attached to and incorporated in this Agreement:
Exhibit A – Legal Description and Parcel Map (CAD drawing No. ____) of the Easement

In the event the survey, the legal description in Exhibit A, and/or the drawing attached to Exhibit A are found to be inaccurate, the Grantor will comply with the Board’s request to execute, acknowledge, initial, and/or deliver to the Board any documentation the Board deems necessary to correct such inaccurate documents to fulfill the purposes of this Agreement.

3. **BOARD’S RIGHT OF ACCESS:** The Board shall have the right of ingress and egress in, through, over, and across the Easement in any manner and for any purpose necessary for the full enjoyment of the right of occupancy and use provided in this Agreement. In addition, the Board shall have the right to access the Easement through the adjoining land of the Grantor; however, the Board’s use of the adjoining land shall not interfere unreasonably with the Grantor’s use and enjoyment of it. The Board shall have the right to construct and maintain a roadway, as needed in the opinion of the Board, along the Easement to allow the Board, its agents, contractors, invitees, and anyone else authorized by the Board, vehicular, equipment, and other access.

4. **NO DEDICATION:** No right of access by the general public to any portion of the Easement is conveyed by this Agreement.

5. **SLOPE:** Due to variations in topography, the Easement and the pipe(s) may take on an uphill or downhill direction having a slope of greater than 4 percent; however, sloping within the Easement across its width may not exceed 4 percent in any direction to ensure stability of maintenance equipment and vehicles.

6. **PROHIBITED OBSTRUCTIONS:** Except as expressly identified in this Agreement, the Easement shall be free of obstacles throughout the Easement. The Grantor shall not construct, place, plant, or allow

any of the following, whether temporary or permanent, on any part of the Easement: structure, building, fence, retaining wall, overhang, street light, power pole, yard light, mail box, sign, or trash receptacle; shrub, tree, woody plant, or nursery stock; or any other obstruction of any kind (collectively referred to as “**Prohibited Obstructions**”). The Board may, without notice to Grantor, remove any Prohibited Obstructions situated on the Easement without liability for damages and at the sole expense of the Grantor.

7. PROHIBITED ACTIONS: The Grantor shall not stop, limit, hinder, or interfere with the construction, maintenance, repair, replacement, removal, enlargement, or operation of the Facilities within the Easement.

8. ENVIRONMENTAL CONTAMINATION:

8.1. Corrective Action: The Grantor, for itself, its successors and assigns, shall provide to the Board any information within its possession or control about past and currently existing Environmental Contamination in the Easement. Such information shall include, but not be limited to, environmental studies, reports, samples, agreements, liens, letters, citations, notices, and any remediation work that has been done or is ongoing to clean the area or is planned to occur. If contaminated soils, for which the Grantor or its successors or assigns may be responsible under applicable state or federal laws, exist in the Easement on the effective date of this Agreement, then the Grantor, at Grantor’s sole expense, shall take Corrective Action to clean the contamination to the full width of the Easement and to (i) a depth of at least 12 feet from the finished grade or (ii) 2 feet below the bottom of the water pipeline(s), as may be determined by the Board. Contamination shall be cleaned to the appropriate state and federal standards set forth by the U.S. Environmental Protection Agency and Colorado Department of Public Health and Environment or to the standards of Corrective Action plans for the property currently approved by the U.S. Environmental Protection Agency and Colorado Department of Public Health and Environment. The Grantor shall provide documents verifying Corrective Action to the Board prior to the installation of Facilities.

8.2. Release: To the extent it legally may, and as long as the Board did not cause Environmental Contamination, the Grantor, for itself, its successors and assigns, shall release the Board from any liability, damages, costs, expenses, causes of action, claims, losses, settlements, fines and penalties, and reasonable attorneys’ fees claimed against the Board relating to (1) the existence, mitigation, or remediation of Environmental Contamination in the Easement; (2) any Corrective Action in the Easement; (3) any Environmental Contamination in the Easement that occurs or is discovered after conveyance of the Easement; or (4) the occurrence, disturbance, or movement of existing contaminated soils resulting directly or indirectly from any work conducted by the Board in exercise of the Board’s functions.

8.3. Definitions:

i. “**Corrective Action**” means risk assessment, active remediation, passive remediation, voluntary cleanup, investigation, and/or monitoring of Environmental Contamination.

ii. “**Environmental Contamination**” means the presence within the Easement of any hazardous material, including, but not limited to, any substances defined as or included in the definition of “**hazardous substance**,” “**hazardous material**” or “**toxic substances**” in the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. § 9601, *et seq.*, the Hazardous Materials Transportation Act, 49 U.S.C. § 5101, *et seq.*, the Resource Conservation and Recovery Act, 42 U.S.C. § 6901, *et seq.*, or any other federal, state or local statute, law, ordinance, code, rule, regulation, order, decree or other requirement of governmental authority regulating, relating to or imposing liability or standard of conduct concerning any

hazardous, toxic or dangerous substance or material, as now or at any time hereafter in effect, and in the regulations adopted, published, and/or promulgated pursuant to said laws.

9. INSTALLATION: The Grantor shall be responsible for the initial installation of the water pipeline(s) within the Easement. The water pipeline(s) shall be installed in accordance with the Board's then-current Engineering Standards.

10. SURFACE RESTORATION:

10.1. After construction of any water pipeline(s) by the Board, the general surface of the ground, except as it may have been necessarily modified to accommodate the appurtenances, shall be restored, as nearly as reasonable, to the grade and condition existing immediately prior to construction. Topsoil shall be replaced in cultivated and agricultural areas, and any excess earth resulting from installations by the Board shall be removed from the Easement at the sole expense of the Board.

10.2. For a period of one year following completion of construction by the Board that involves disturbance of the surface of the ground, the Board shall maintain the surface elevation and quality of the soil by correcting any settling or subsiding that occurs as a result of the work done by the Board.

10.3. If the Board or the Board's agents disturb or destroy any fencing existing at the time of this Agreement's execution, then the Board shall repair or replace such fencing as nearly as reasonable to its original condition. However, the Grantor shall not construct any new fencing across or within the Easement.

11. SUBJACENT AND LATERAL SUPPORT; EARTH COVER:

11.1. The Board shall have the right of subjacent and lateral support to whatever extent is necessary or desirable for the full, complete and undisturbed enjoyment of the rights described in this Agreement. The Grantor shall take no action that would impair the earth cover over, or the lateral or subjacent support for, any of the Facilities within the Easement.

11.2. The Board's Engineering Standards require no less than 4½ feet and no more than 10 feet of earth cover, measured vertically from the top of any pipeline(s). Deviation from this requirement shall be permitted only upon prior, written permission from the Board. If such permitted deviation undertaken by the Grantor requires any alterations, repairs or replacements to any pipeline(s), such alteration, repair or replacement shall be at the Grantor's expense.

12. PUBLIC UTILITIES:

12.1. Crossings: Other public utilities such as sanitary sewer, storm sewer, gas, electric, and cable lines may be installed in the Easement as long as they do not interfere with the Board's rights and as long as the utilities are crossing the pipeline(s) at right angles, or at substantially right angles. Any gas, electric, or cable line that crosses the pipeline(s) and is not metallic or concrete shall be encased within steel conduit and/or concrete ducts.

12.2. Parallel: In order to reserve to the Board's pipeline(s) at least 20 feet of the Easement width, any and all utilities that parallel the Facilities shall not be permitted within 10 feet of the Facilities without prior express and written permission of the Board.

13. GRANTOR'S RETAINED INTERESTS: The Grantor has retained the right to the undisturbed use and occupancy of the Easement insofar as such use and occupancy is consistent with and does not impair any grant contained in this Agreement.

14. DOMINANT EASEMENT: The Board shall have a dominant right of occupancy of the Easement for the exercise of the Board's functions, and the exercise of any rights in the Easement other than those retained by the Grantor shall be within the discretion of the Board.

15. ABANDONMENT:

15.1. The Board may commence the exercise of its rights to use the Easement immediately, or it may postpone the exercise of all or some part of its rights under this Agreement to some future time, which shall not constitute abandonment.

15.2. If the Board abandons use and operation of the Facilities laid pursuant to this Agreement, such abandonment shall not constitute abandonment of the Board's rights under this Agreement.

16. WARRANTY OF TITLE: The Grantor represents and warrants that the Grantor has full right and lawful authority to make the grant contained in this Agreement. The Grantor shall defend the Board in the exercise of the Board's rights under this Agreement against any defect in the Grantor's title to the land involved or the Grantor's right to make the grant contained in this Agreement.

17. NOTICES: The Parties shall contact the persons listed below, or other persons that may be designated by the Board in writing from time to time, for all matters related to administration of this Agreement. All notices, requests, demands, information and other communications required or permitted to be provided under this Agreement shall be in writing and shall be deemed to have been given and effective: (a) when delivered personally to the other party or (b) seven days after posting in the United States mail, first-class postage prepaid, properly addressed as follows.

If to the Board:

City and County of Denver, acting by and through
its Board of Water Commissioners
Attention: Chief Engineering Officer
1600 W. 12th Avenue
Denver, CO 80204

with a copy to:

City and County of Denver, acting by and through
its Board of Water Commissioners
Attention: Director of Engineering-Property
1600 W. 12th Avenue
Denver, CO 80204

If to the Grantor:

City and County of Denver
Mayor's Office of the National Western Center
201 W. Colfax Ave., 1207
Denver, CO 80202

with a copy to:

City and County of Denver
City Attorney's Office – Municipal Operations
201 W. Colfax Ave., 1207
Denver, CO 80202

18. GENERAL PROVISIONS:

18.1. Successors and Assigns: This Easement and each and every one of the benefits and burdens of this Agreement are covenants running with the land and shall inure to the benefit and be binding upon the respective legal representatives, heirs, devisees, executors, administrators, successors and assigns of the Parties, and any subsequent owners of title to any part of the land upon which the

Easement is located. The Board may transfer and delegate any or all of the rights granted and obligations imposed by this Agreement without any prior consent of or notice to the Grantor.

18.2. Perpetual Duration – No Merger: No merger of title, estate or interest shall be deemed effected by any previous, contemporaneous, or subsequent deed, grant, or assignment of an interest or estate in any portion of the property upon which the Easement is located to the Board, or its successors or assigns. It is the express intent of the Parties that this Easement not be extinguished by, merged into, modified, or otherwise deemed affected by any other interest or estate in any portion of the property upon which the Easement is located now or hereafter held by the Board or its successors or assigns.

18.3. Construction: This Agreement shall not be construed more strictly against one Party than another merely because it may have been prepared by counsel for one of the Parties.

18.4. Venue and Governing Law: For the resolution of any dispute arising from this Agreement, venue shall be in the courts of the City and County of Denver, State of Colorado. This Agreement shall be governed by and construed under the laws of the State of Colorado, without regard to its conflict of laws principles.

18.5. No Attorneys' Fees and Costs: Except as otherwise specifically provided in this Agreement, if there is any litigation, mediation, arbitration or other dispute resolution proceedings arising out of or related to this Agreement, each Party shall pay for its own attorney(s)' and other professional(s)' fees, costs and expenses.

18.6. Severability: If any provision of this Agreement is determined by a court having jurisdiction to be unenforceable to any extent, the rest of that provision and the rest of this Agreement shall remain in full force and effect.

18.7. No Waiver: The failure by any Party to insist upon the strict performance by any other Party of any of the provisions of this Agreement shall not be deemed a waiver of any of the Agreement's provisions, and, notwithstanding such failure, no Party shall be thereby released from any obligations under the Agreement.

18.8. Non-Business Days: Except as otherwise specifically provided in this Agreement, all periods of time set forth in this Agreement shall be calendar days, not business days. If any date for any obligation under this Agreement falls on a Saturday, Sunday or a day that is a "holiday" as such term is defined in Colorado Rule of Civil Procedure 6, then the relevant date shall be extended automatically until the next business day.

18.9. Headings: The headings contained in this Agreement are included solely for convenience, are not intended to be full or accurate descriptions of the content thereof, and shall not be considered part of this Agreement or affect its interpretation.

18.10. Governmental Immunity Act: The parties understand and agree that the both parties are relying upon, and have not waived, the monetary limitations of \$350,000 per person, \$990,000 per occurrence, and all other rights, immunities and protections provided by the Colorado Governmental Immunity Act, C.R.S. § 24-10-101, *et seq.*, as it may be amended from time to time.

18.11. Article X of the Charter: This Agreement is made under and conformable to the provisions of the Charter of the City and County of Denver, which control the operation of the Denver Municipal Water System, consisting of Article X of the Charter. Insofar as applicable, the Charter

provisions are incorporated herein and made a part hereof and shall supersede any apparently conflicting provision otherwise contained in this Agreement.

18.12. Entire Agreement: This Agreement constitutes the entire agreement between the Board and the Grantor and replaces all prior written or oral agreements and understandings. The terms of this Agreement may not be changed, waived, modified or varied in any manner whatsoever unless in writing signed by all Parties.

18.13. Counterparts and Originals: A copy of the Agreement may be executed by each Party, separately, and may be delivered by mail or electronic copy, each of which shall be deemed an original and all of which, when taken together, shall constitute one and the same instrument.

18.14. Effective Date: This Agreement shall become effective on the date it is signed by the Board's Chief Engineering Officer.

SIGNATURES FOLLOW ON THE NEXT PAGE

APPROVED AS TO FORM:

CITY AND COUNTY OF DENVER,
acting by and through its
BOARD OF WATER COMMISSIONERS

Office of General Counsel

By: _____
Robert J. Mahoney
Chief Engineering Officer

Date: _____

The undersigned verifies that he/she has read the foregoing Agreement and agrees to accept and abide by all of its terms and conditions.

GRANTOR'S NAME HERE

By: _____
Name

Title: _____

STATE OF COLORADO)
) ss.
_____ COUNTY OF **_____**)

The foregoing instrument was acknowledged before me this _____ day of _____ 20__, by _____ as _____ for _____.

Witness my hand and official seal.

My commission expires: _____

{S E A L}

Notary Public

Frommell, Barb - NWCO Director of Strategic Partnerships

From: Frommell, Barb - NWCO Director of Strategic Partnerships
Sent: Wednesday, June 5, 2019 2:18 PM
To: Antolovich, Abigail; Turney, Amy S.; Riegler, Kristi K.
Cc: Welborn, Jennifer M. - CAO Asst City Attorney - Sr; Lang, Kristin; Mack, Jeff/MOO
Subject: FW: 06.05.19 - Denver Water, Water Efficiency Credit Pilot Program

Hi Abbey and Amy,

The email below comes from our Commissioning Agent for our city-owned buildings, Steve Peterson. He has reviewed the Water Efficiency Pilot Program standards and confirmed that the fixtures going into our buildings meet or exceed our standards. I believe that the Water Efficiency Standards mentioned in the IGA are those from the Water Efficiency Pilot Program, so just a heads up that we are already well on our way! Steve has confirmed that this will be the case for the Equestrian Center and Livestock Center as well.

Please let me know if you have any questions.

Barb Frommell | Strategic Partnerships Director
Mayor's Office of the National Western Center | City & County of Denver
201 W. Colfax Ave., Dept 205, Denver, CO 80202
p: (720) 913-4024 | m: (303) 325-1216 | barbara.frommell@denvergov.org



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From: Peterson, Steven - NWCO WW1111 Contingent Worker
Sent: Wednesday, June 5, 2019 2:09 PM
To: Frommell, Barb - NWCO Director of Strategic Partnerships <Barbara.Frommell@denvergov.org>
Cc: James.Slaughter1@jacobs.com; Rountree, Charles - NWCO WW1111 Contingent Worker <Charles.Rountree@denvergov.org>; Mack, Jeff - NWCO WW1111 Contingent Worker <Jeff.Mack@denvergov.org>
Subject: 06.05.19 - Denver Water, Water Efficiency Credit Pilot Program

Barb,

Per our conversation I have researched our design documents from the Stockyards Event Center and the M&O facility and the findings are listed below.

SYEC:

- Water Closets / Toilets - WC-1 and WC-2 are 1.1 GPM per flush. This meets the standard.
- Urinals on the Men's restrooms are 0.125 GPM Per Flush. This meets the standard.

- Kitchen Faucets S-1 are 1.5 GPM. This meets the standard.
- Lavatory Faucets L-1, L-2 and L-3 are 0.35 GPM. This exceeds the standard 0.5 GPM.
- Shower Heads there are no shower facilities in this building.

Maintenance & Operations Building:

- Water Closets / Toilets - WC-1 and WC-2 are 1.1 GPM per flush. This meets the standard.
- Urinals on the Men's restrooms are 0.125 GPM Per Flush. This meets the standard.
- Kitchen Faucets S-1 are 1.5 GPM. This meets the standard.
- Lavatory Faucets L-1, L-2 and L-3 are 0.375 GPM. This exceeds the standard 0.5 GPM.
- Shower Heads SH-1 is 1.5 GPM. This exceeds the standard of 1.75 GPM

I feel we meet the Denver Water Efficiency standard quite readily.

If you should have any further questions please feel free to contact me at your convenience.

Respectfully,

Steven Peterson | Mechanical, Electrical & Plumbing Coordinator

Office of the National Western Center, Mayor's Office | City and County of Denver
c: 970.213.6359 | Steven.Peterson@DenverGov.Org



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Contract Control Number:
Contractor Name:

PWADM-201951213-00
BOARD OF WATER COMMISSIONERS

IN WITNESS WHEREOF, the parties have set their hands and affixed their seals at Denver, Colorado as of:

SEAL

CITY AND COUNTY OF DENVER:

ATTEST:

By:

APPROVED AS TO FORM:

REGISTERED AND COUNTERSIGNED:

Attorney for the City and County of Denver

By:

By:

By:

Contract Control Number:
Contractor Name:

PWADM-201951213-00
BOARD OF WATER COMMISSIONERS

By: See attached vendor signature page

Name: _____
(please print)

Title: _____
(please print)

ATTEST: [if required]

By: _____

Name: _____
(please print)

Title: _____
(please print)