City Council
October 7, 2024
Newberg Public Safety Building 401 E. Third Street
Denise Bacon Community Room
Online: https://us06web.zoom.us/j/89536547180
Public Comment Registration: https://bit.ly/nbgcomment

View Slides

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1. CALL TO ORDER

2. ROLL CALL

3. PLEDGE OF ALLEGIANCE

4. CITY MANAGER'S REPORT

    4.1.   **August Statistical Report**

        i   **RCA: City Manager Report**

        ii   **Presentation**

5. PUBLIC COMMENTS

6. NEW BUSINESS

    6.1.   **River Street Discussion**

    6.2.   **Council Appointment Process Update**

        i   **Exhibit A- Committee Rules 2024**

7. CONTINUED BUSINESS

    7.1.   **A Resolution Requesting that the Department of Land Conservation and Development Dissolve the Sequential Urban Growth Boundary Review Program and Reschedule the City's Housing Lands Analysis to 2027/2028.**

        i   **Attachment 1. SB 1537 Potentially Eligible Parcels**

        ii   **Presentation**

7.2.   [Oak Knoll Booster Pump Discussion](#)

      i   [Attachment 1 7785-01 Oak Knoll Pump Station Design Report](#)

      ii   [Attachment 2 Oak Knoll Water Booster Pump Service Area](#)

      iii   [Attachment 3 2004 Water Distribution System Plan Pressure Zone MAP](#)

8. COUNCIL BUSINESS

9. ADJOURNMENT

ADA STATEMENT

Contact the City Recorder's Office for physical or language accommodations at least 2 business days before the meeting. Call (503) 537-1283 or email cityrecorder@newbergoregon.gov. For TTY services please dial 711.

*Indicates supplementary item

City of Newberg

Date Action Requested: (October 21, 2024)

Order ☐	Ordinance ☐	Resolution ☐	Motion ☐	Information ☒	Proclamation ☐
Subject: CM statistics to the end of August 2024			Staff: Will Worthey CM Department: Administration		
Work Session ☐ Business Session ☒			Order On Agenda: CM report		

Is this item state mandated? Yes ☐ No ☒

If yes, please cite the state house bill or order that necessitated this action: NA

Recommendation: NA

Executive Summary:
The summary of statistics for city department activities to the end of August 2024.

Fiscal Impact:
All were conventionally budgeted items.

Council Goals:
Goal 5: Create and maintain a high level of transparency with our residents in order to build trust.

Effective CM reporting assists with Objective 1:

Expand communication outreach in regard to regular city events and additional involvement with city businesses.

Newberg CM report

Monthly Statistics to the end of August 2024

City of Newberg
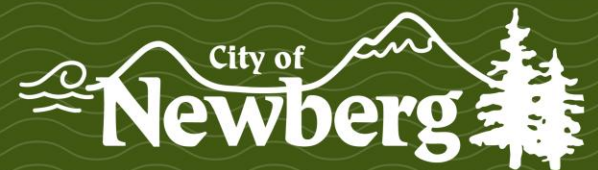
Planning: combined planning decisions of all sorts*: 7

Average 2022

11.67

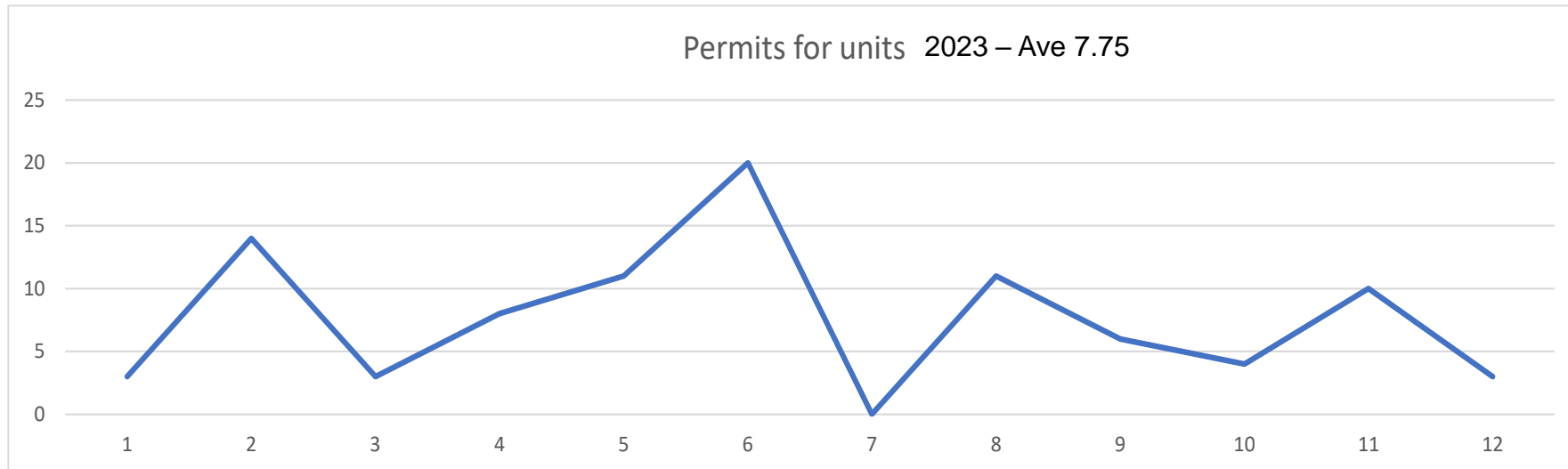### Planning Decisions

Planning Decisions   2023 – Ave 11.75
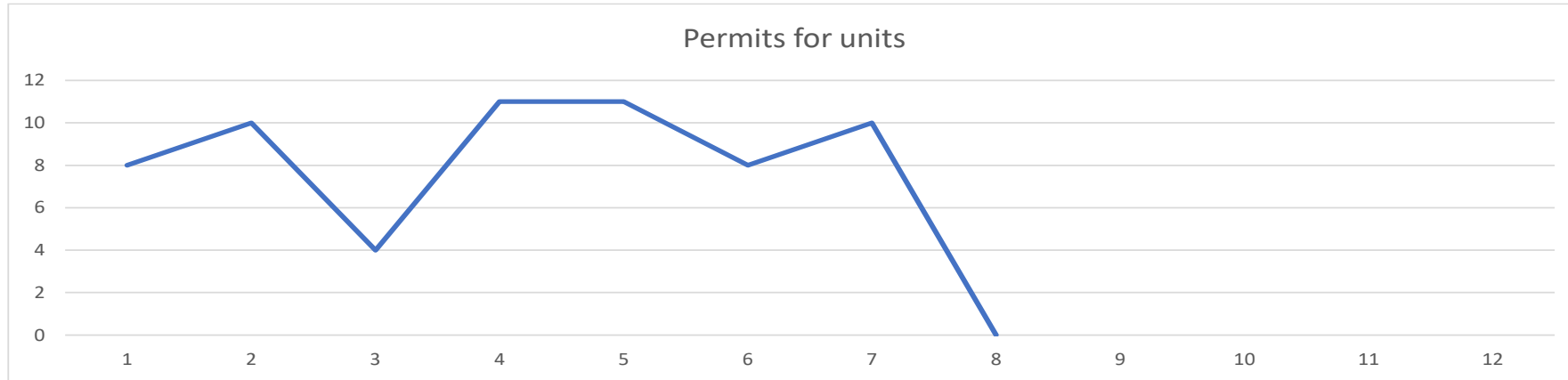

* Combined from the Director, Planning Commission and Council

Planning: building permits for housing units: Nil

Average 2022

15

Permits for units

Permits for units 2023 – Ave 7.75
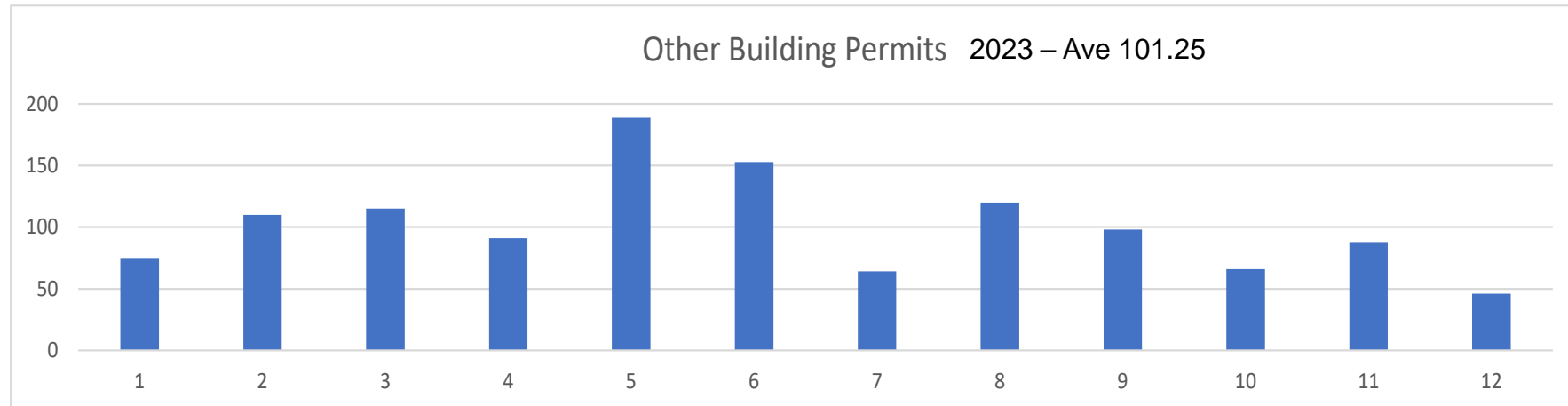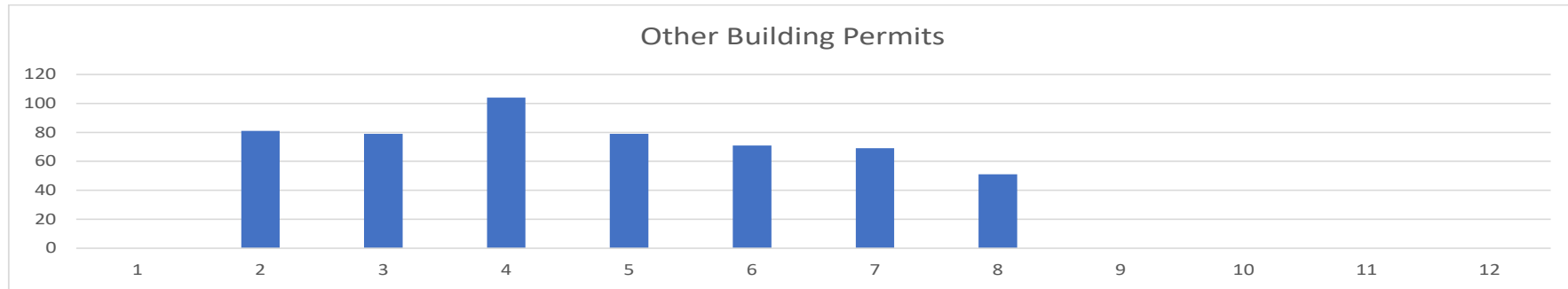
Planning: building inspections: 667

Average 2022

691

Building Inspections

Building Inspections   2023 – Ave 728.42
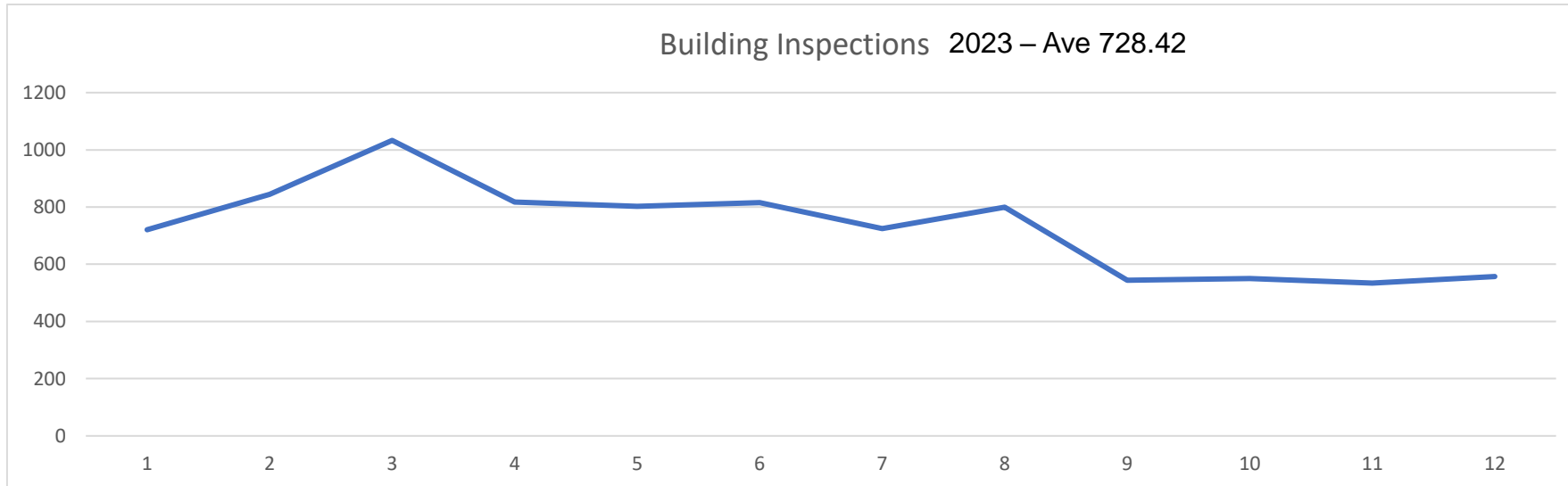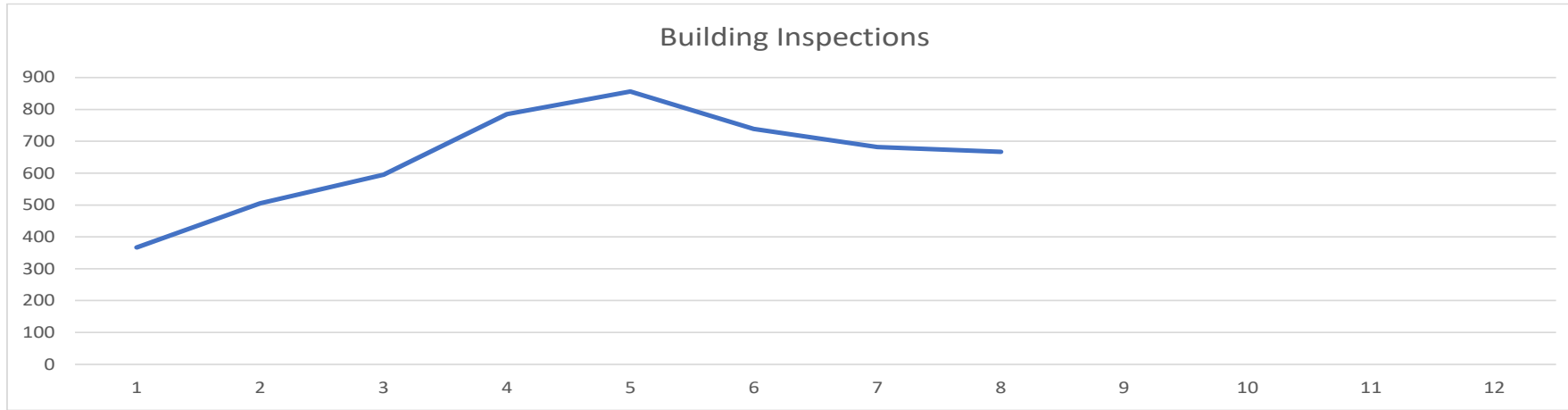
Community Engagement: submission forms through website: 25
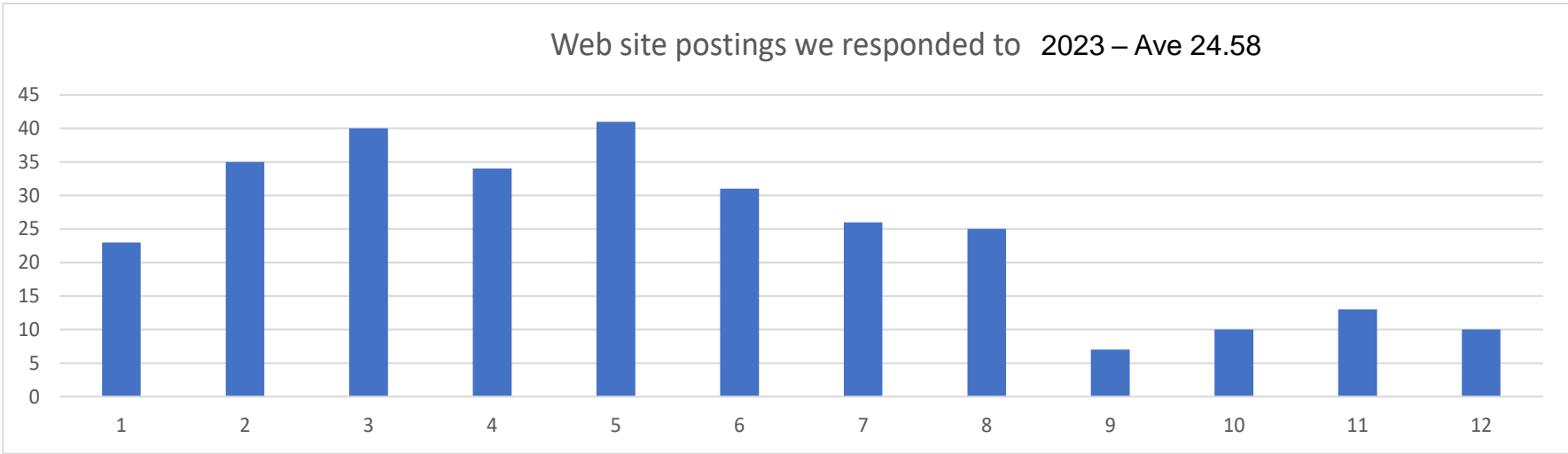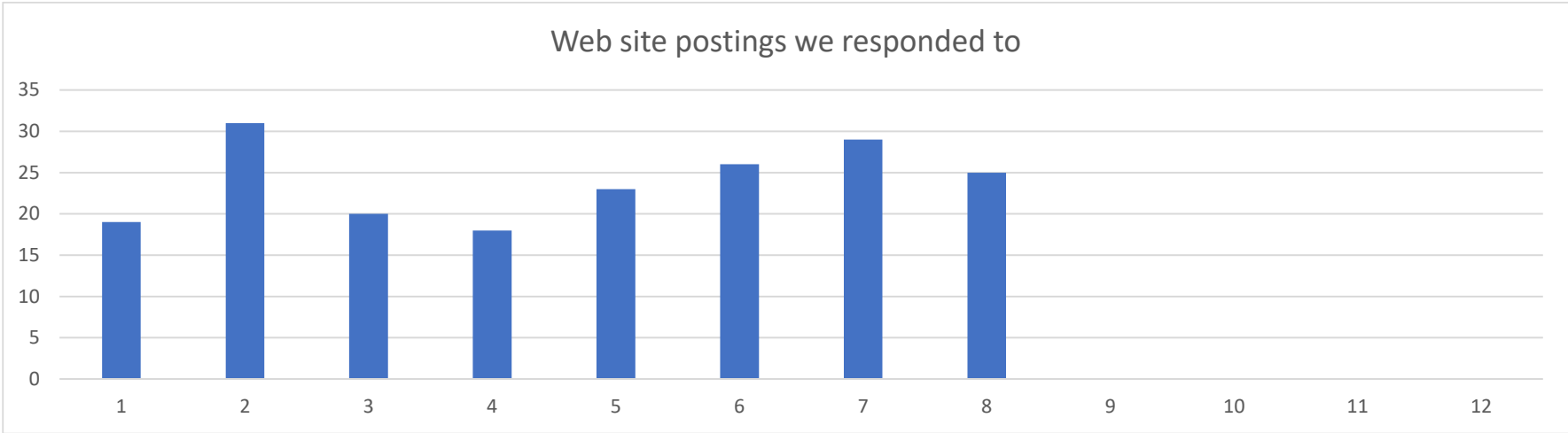
Community Engagement: social media engagement: 13,760

Average 2022

7942.5

Social Media Engagement

Social Media Engagement 2023 – Ave 7560.83

7
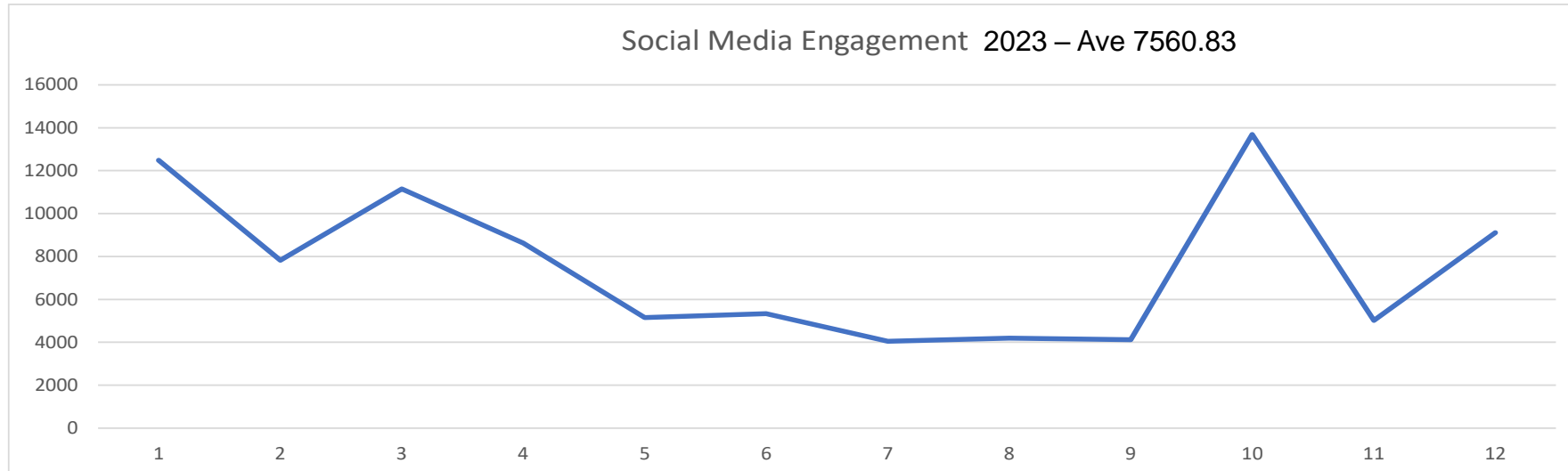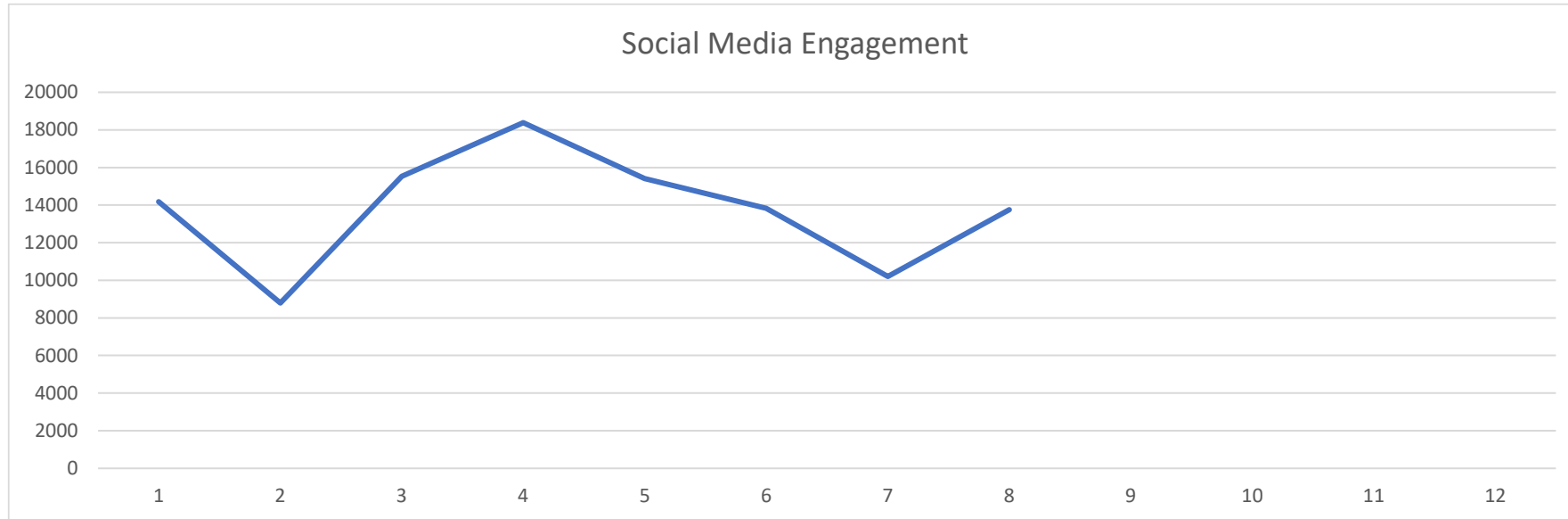
Community Engagement: Socials followers Facebook 4186, Other 852, LinkedIn 447
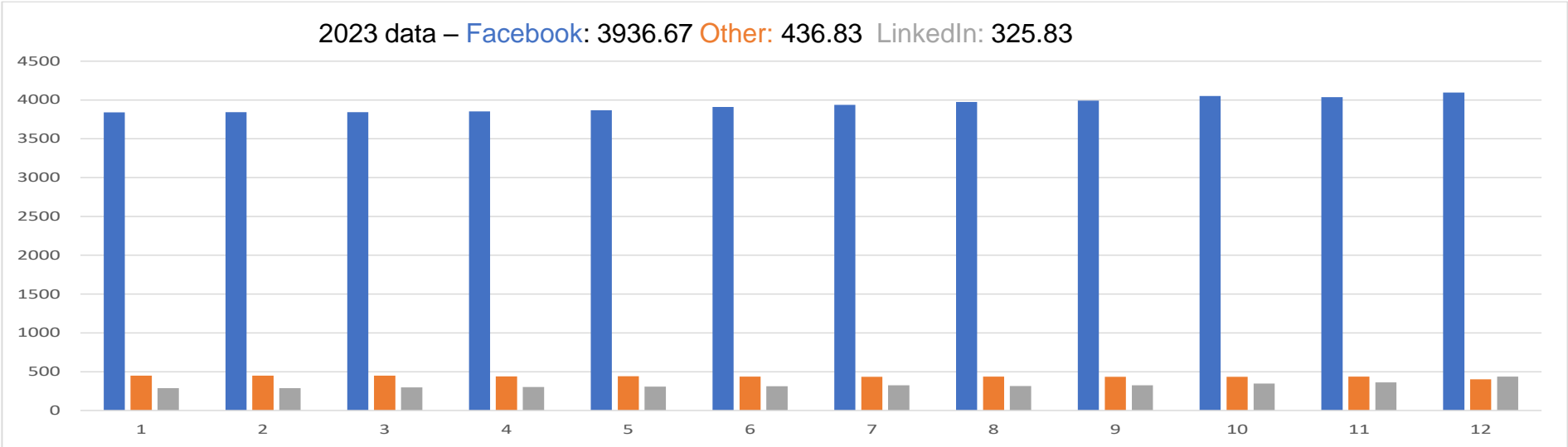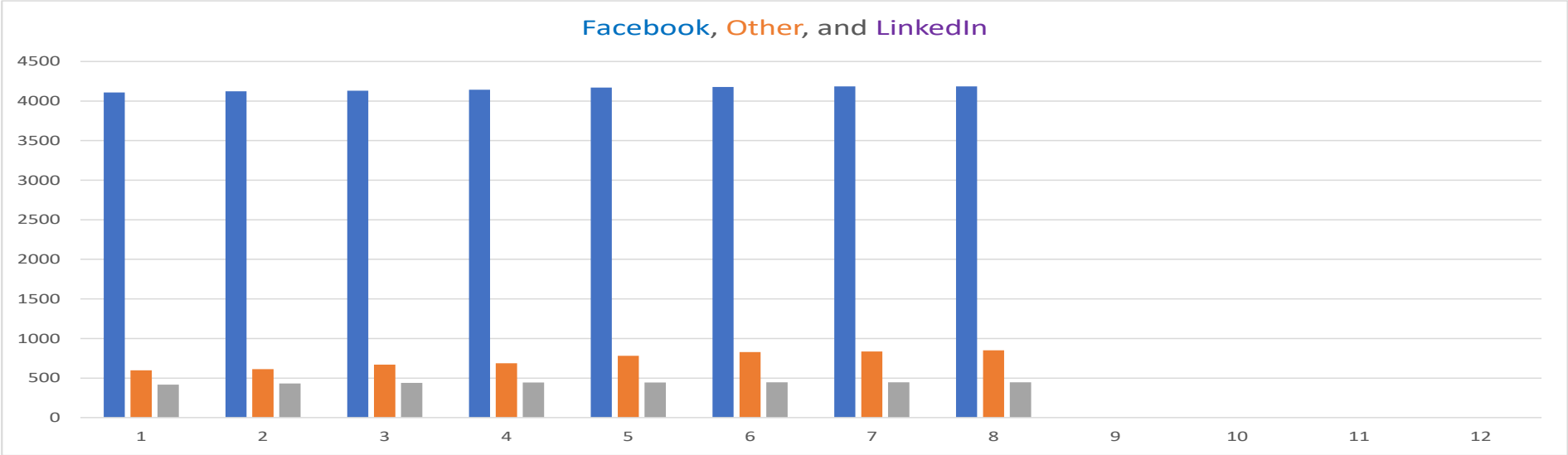
Average 2022

Facebook
3746
Twitter
415
LinkedIn
253.6

Facebook, Other, and LinkedIn

2023 data – Facebook: 3936.67 Other: 436.83 LinkedIn: 325.83

8
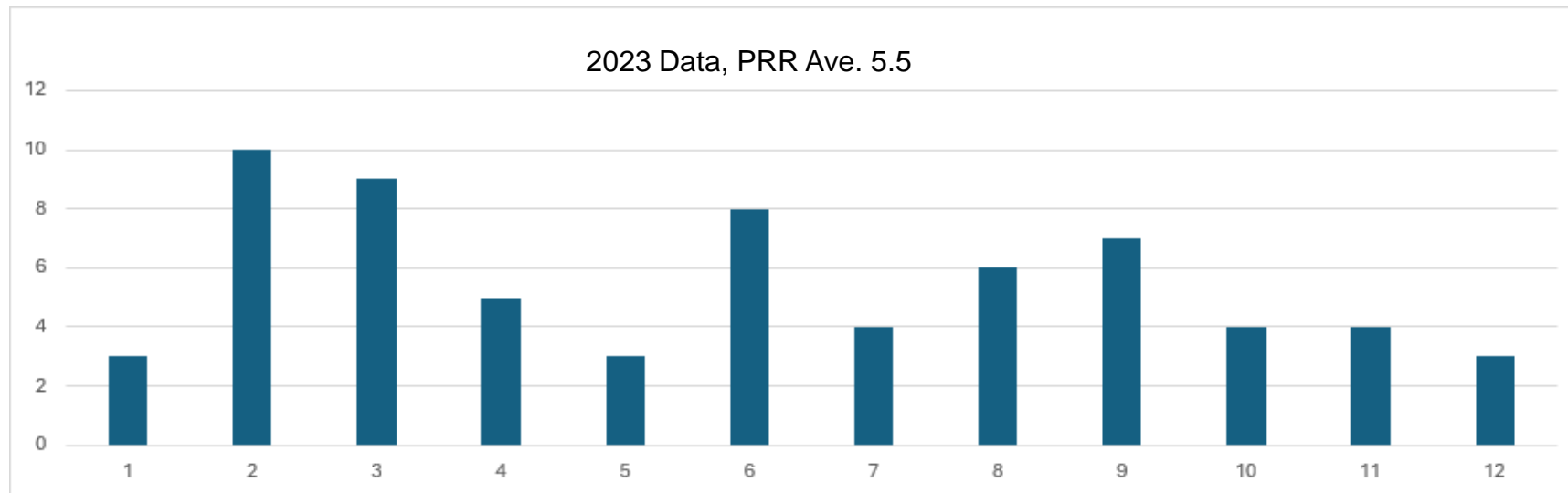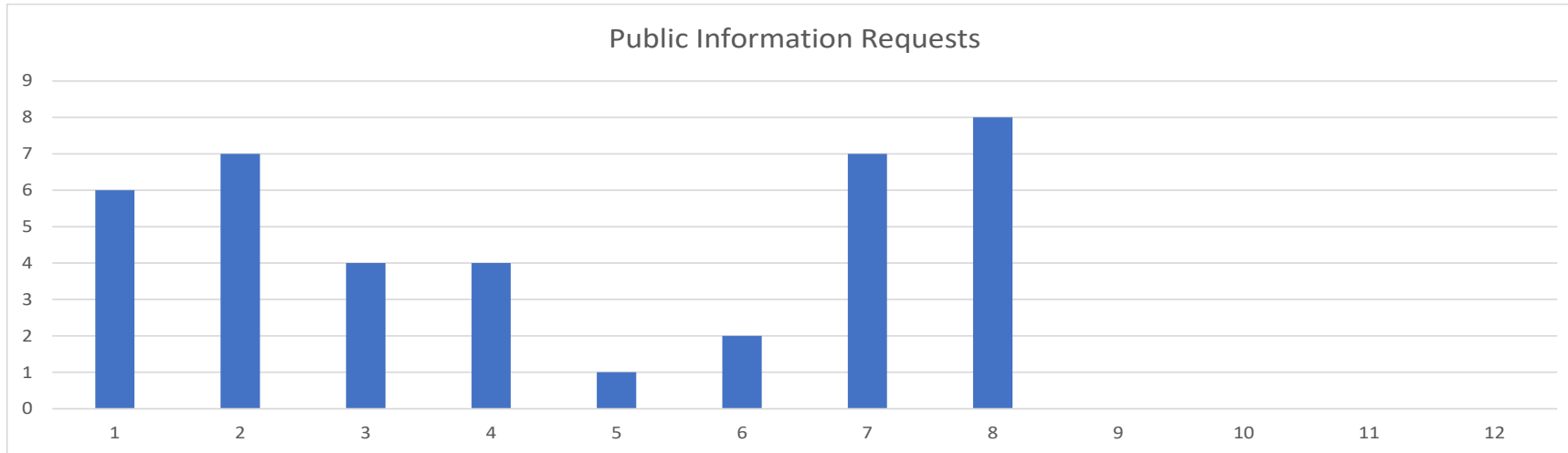
Finance: $1.52 M of payments to accounts payable & $1.12 M of payroll

Accounts Payable $ and Payroll $

2023 Data Accounts Payable Ave. $2.56M and Payroll Ave. $1.01M

Average 2022

AP
$1.75 M
Payroll
$0.93 M
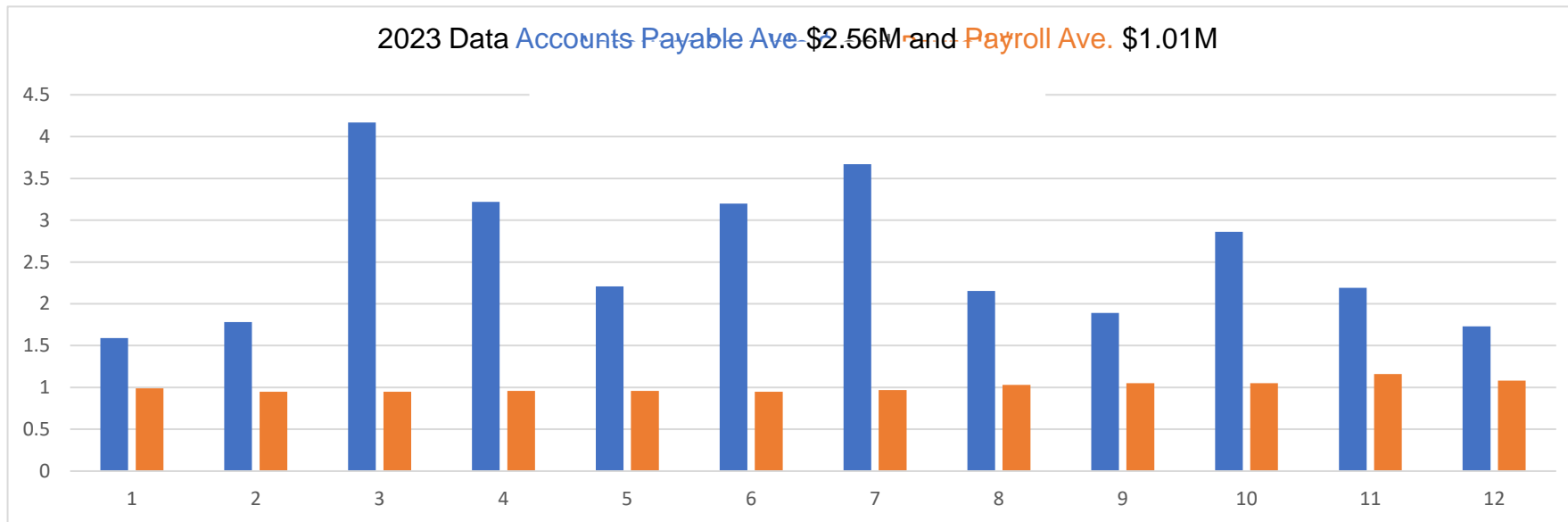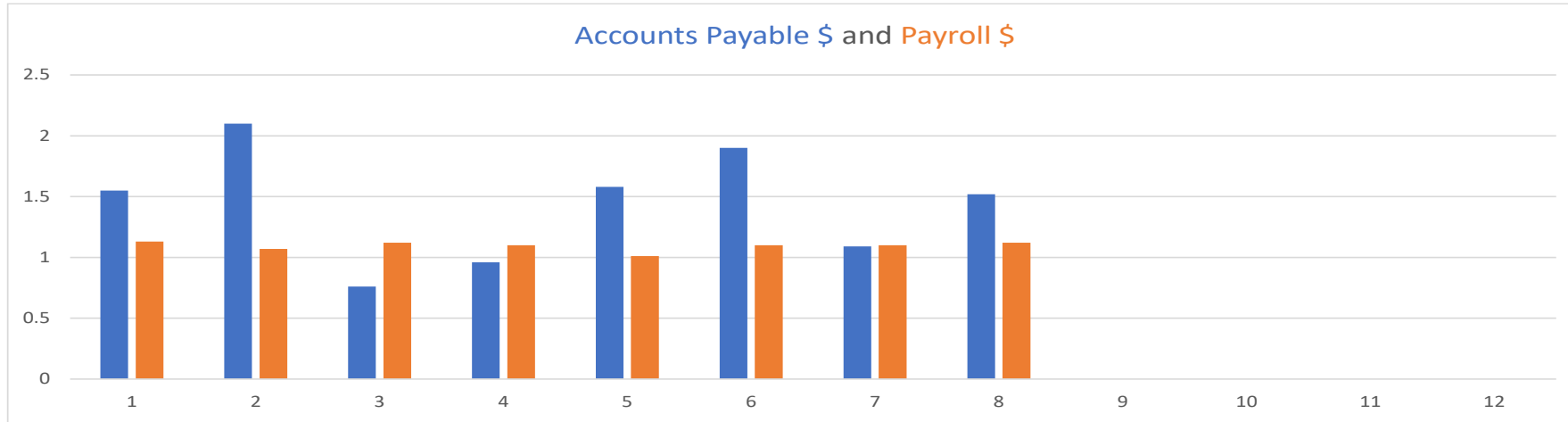
HR activity: Recruitments advertised - 5 Hires - 3 Separations - 2
FMLA / ADA / OFLA / workers comp claims - 5

Average 2022

Recruitments
5.6
Hires
1.9
Separations
1.6
Claims
2.6

Recruitments, Hires, Seperations, Claims

2023 Data, Recruitments Ave 4.17, Hires Ave 1.92, Separations Ave 1.08, Claims Ave 3.33
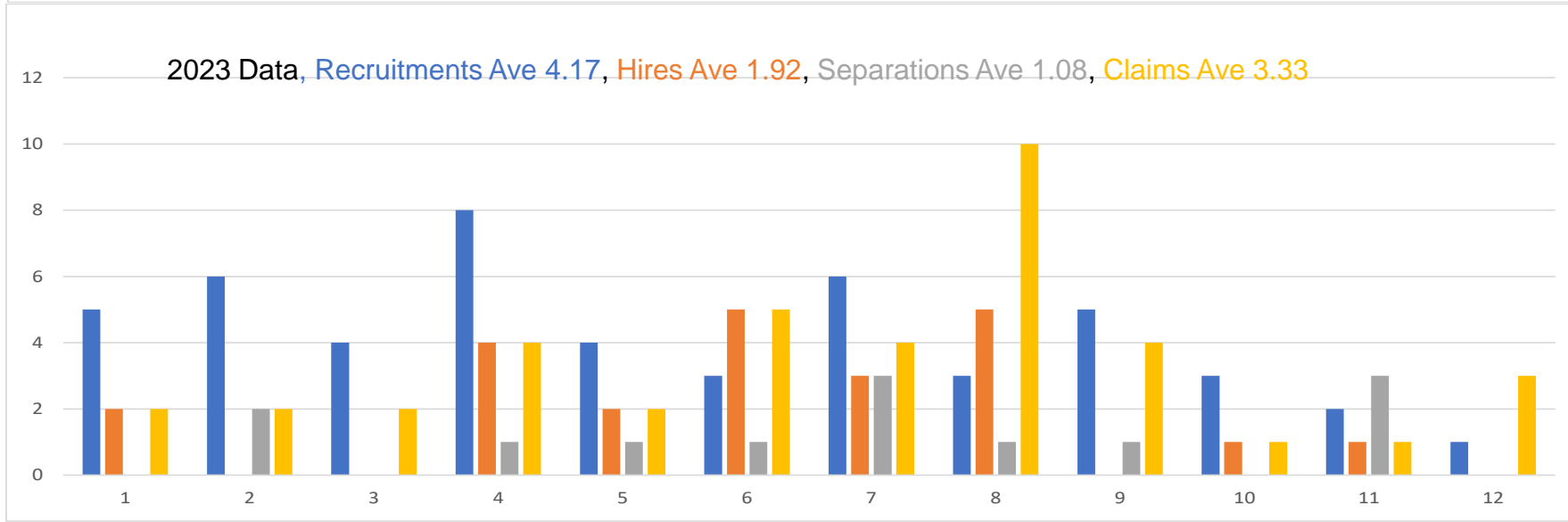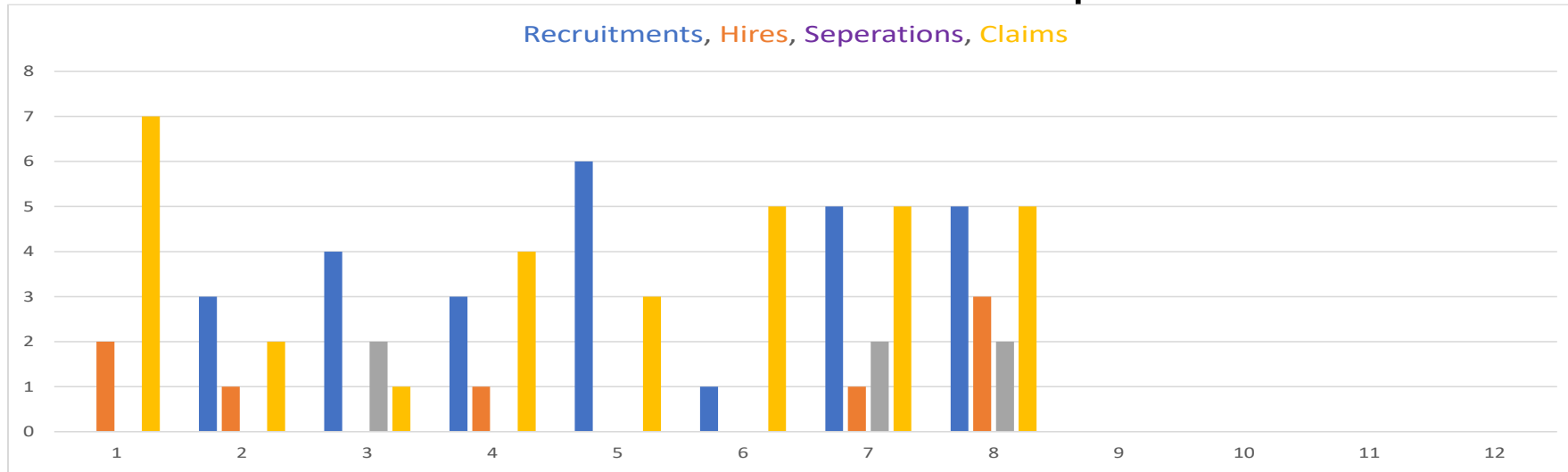
IT resolved 267 service tickets for the city.

Average 2022

203.4
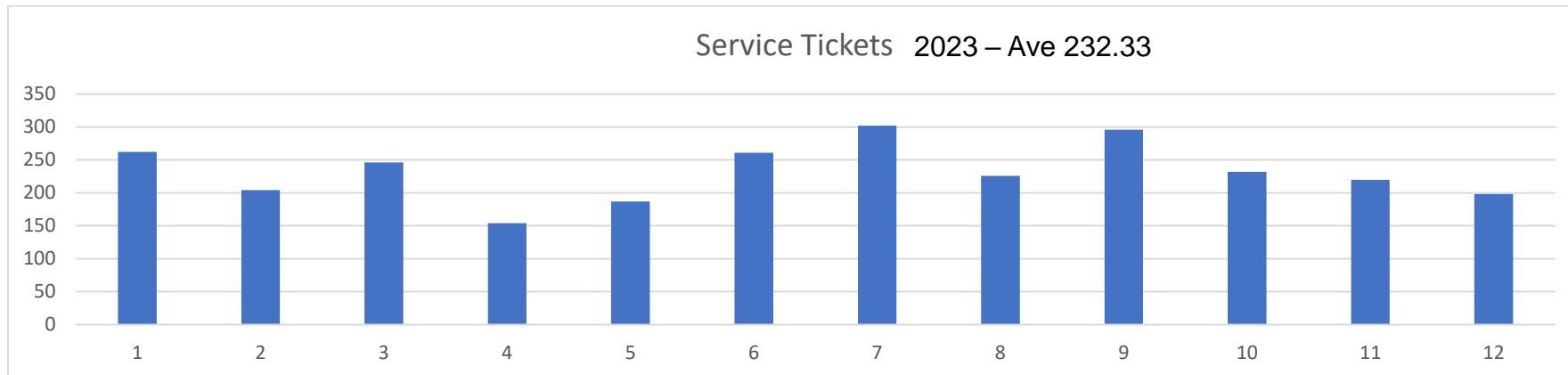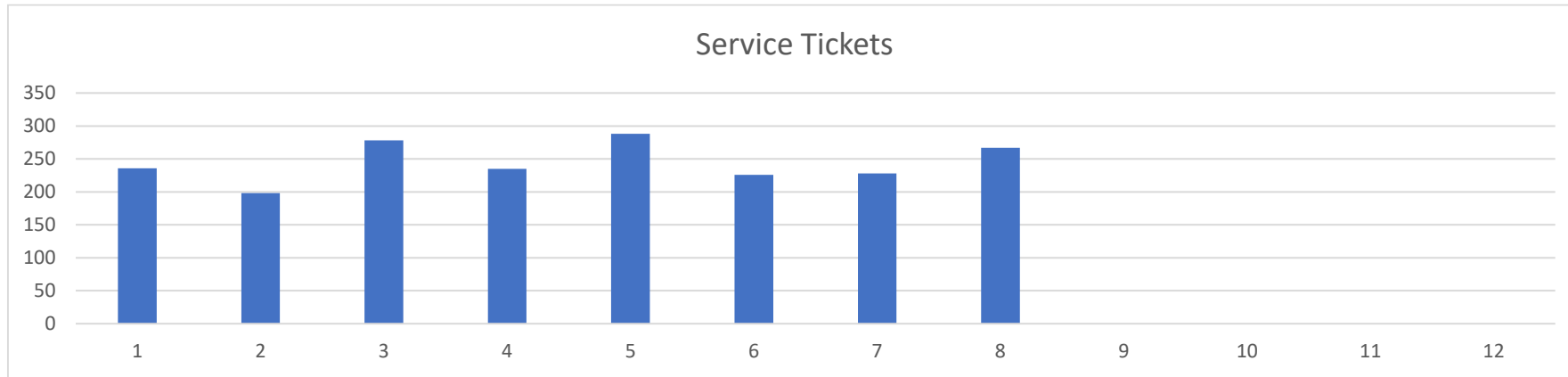
IT responded to 4 after hours on-call events.

Average 2022

3.6
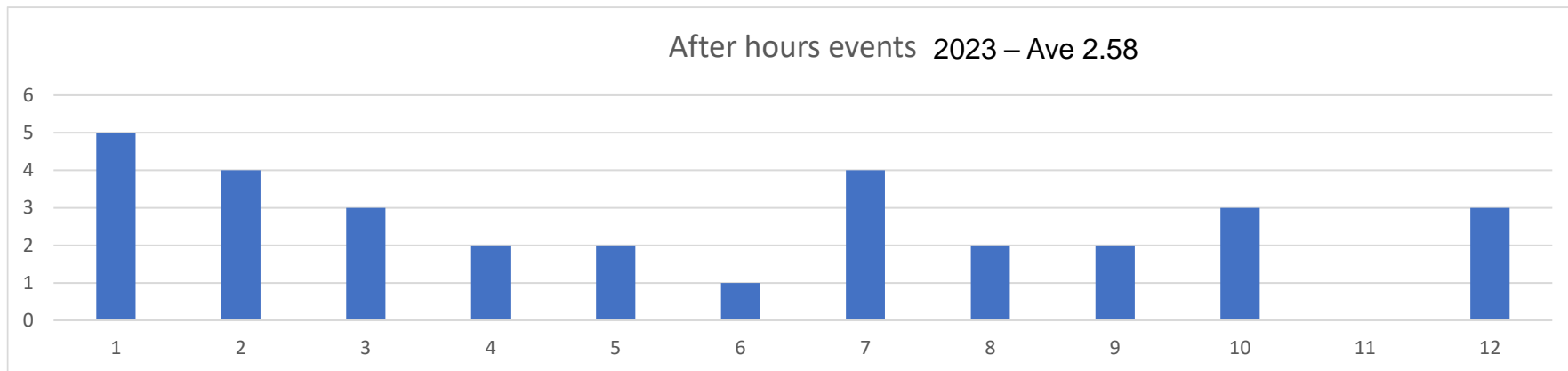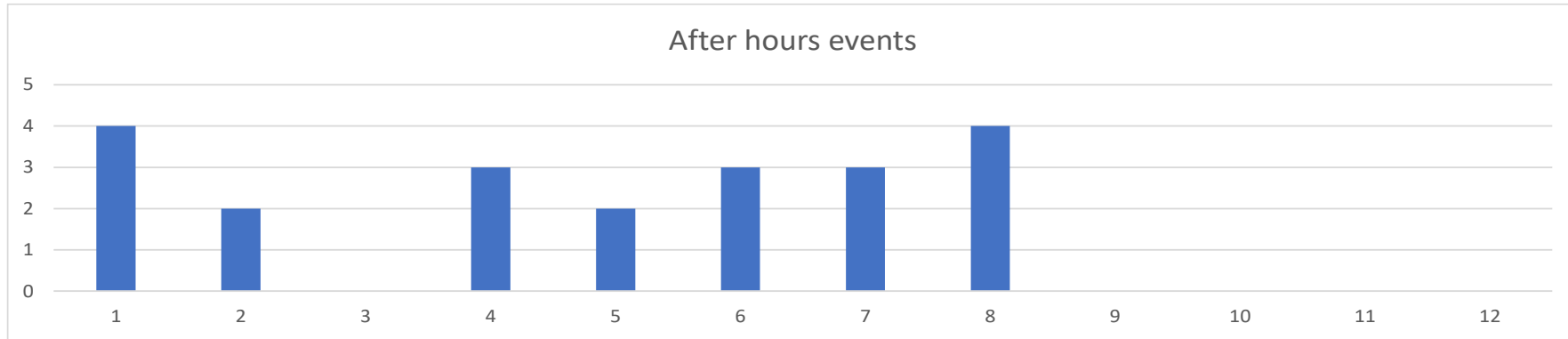
Library Activity: Door count 35,562, Circulation events 9355

Average 2022

Door Count
7108

Circulation Events
23,418

Door Count, Circulation Events

2023 Data, Door Count Ave 8371.58, Circulation Events Ave. 25,889.50

Public Safety: 2645 – calls for service

Average 2022

2065

Calls for service

Calls for service 2023 – Ave 2205.67
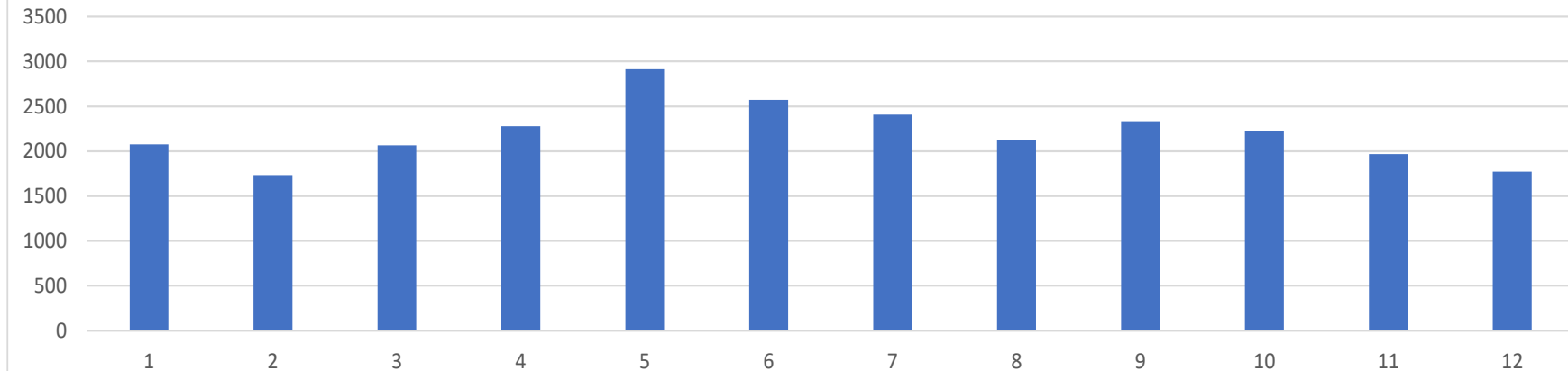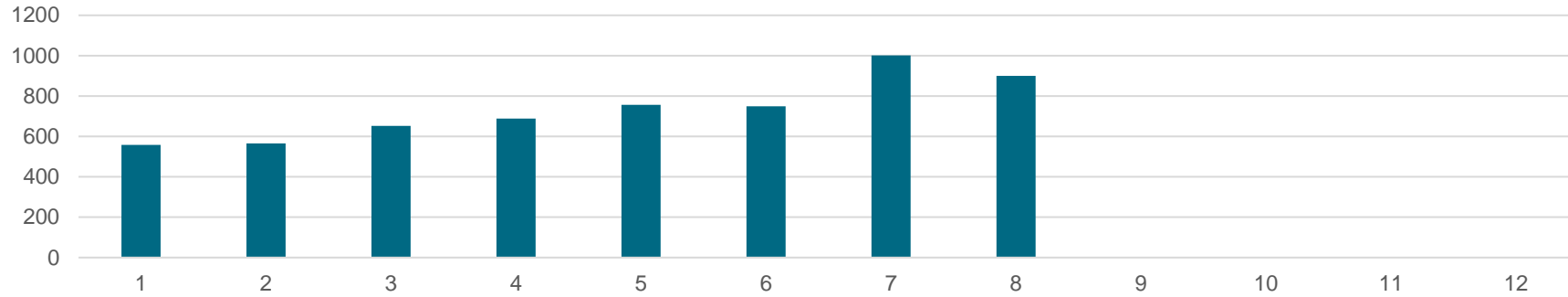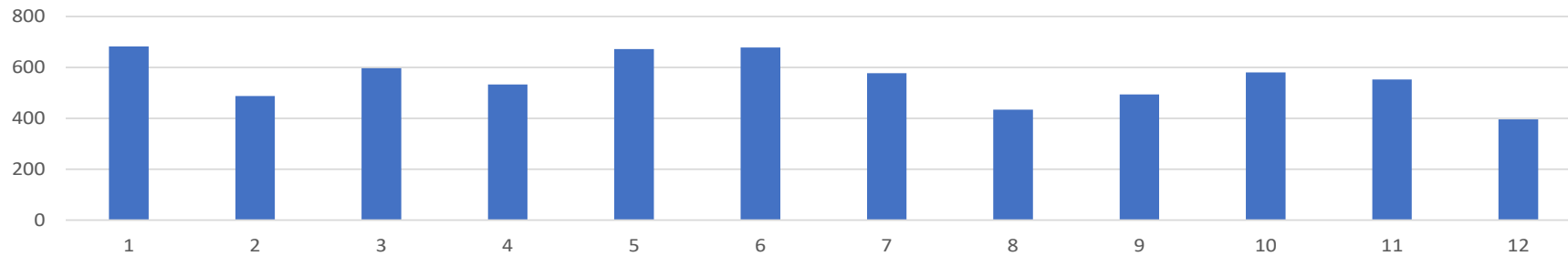
Public Safety: 646 – citations & warnings

Average 2022

428
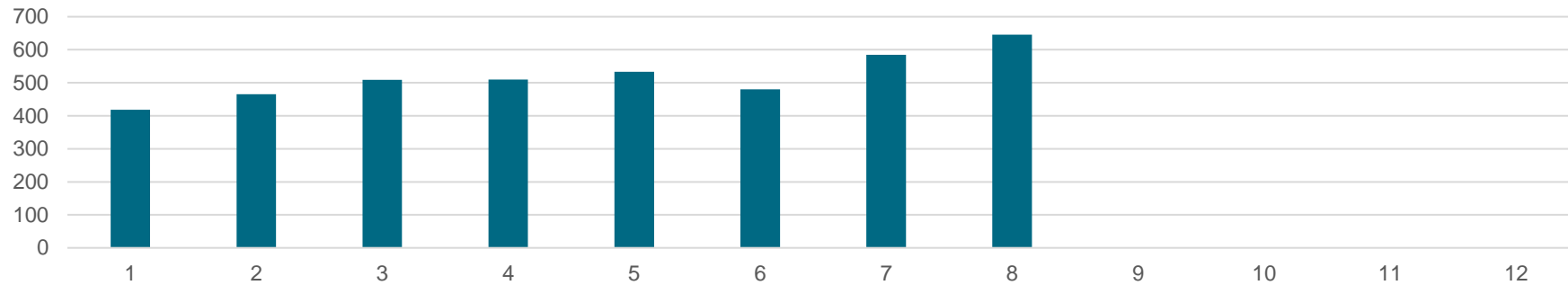
Public Safety: 13 – DUII's

DUIIs
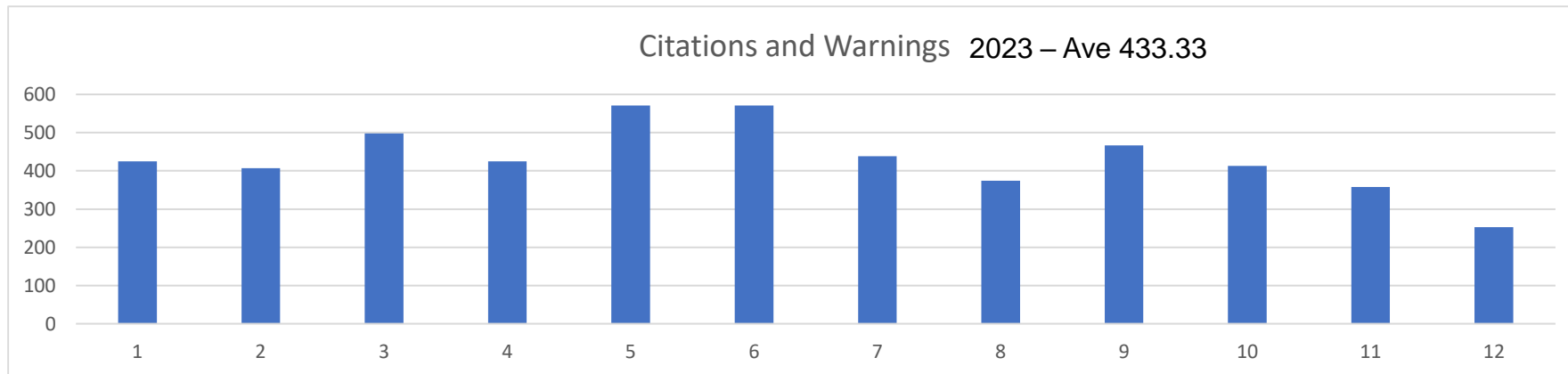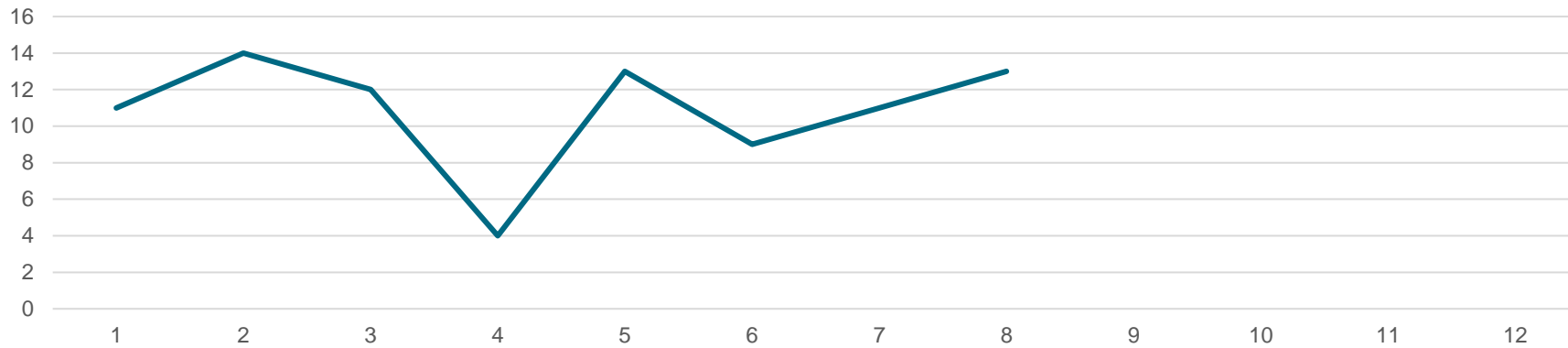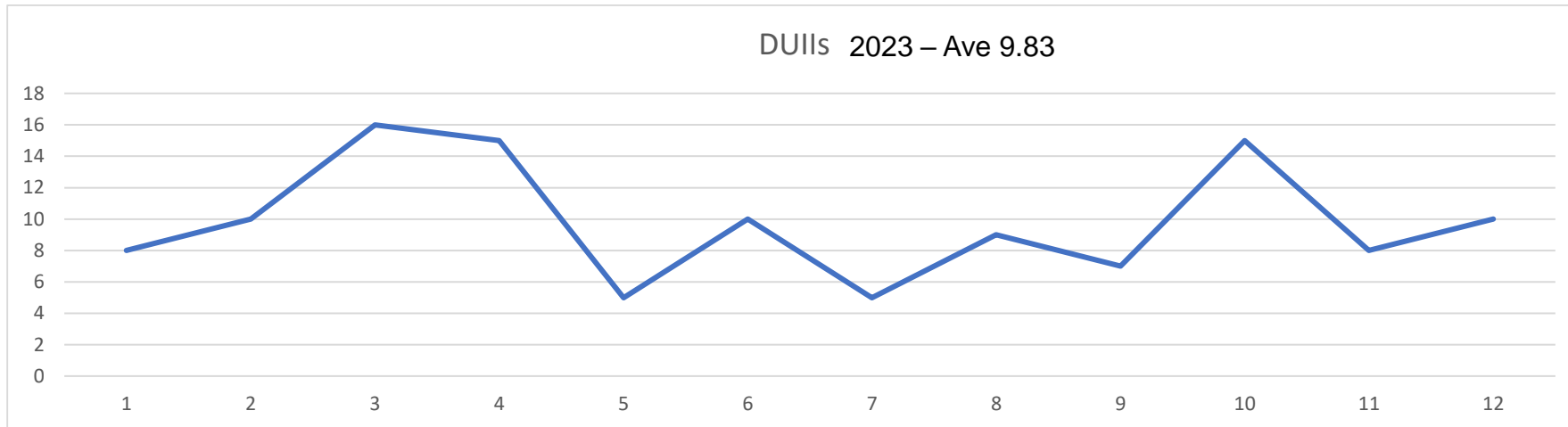
Dispatch: 808 "911" calls & 2947non-emergency calls
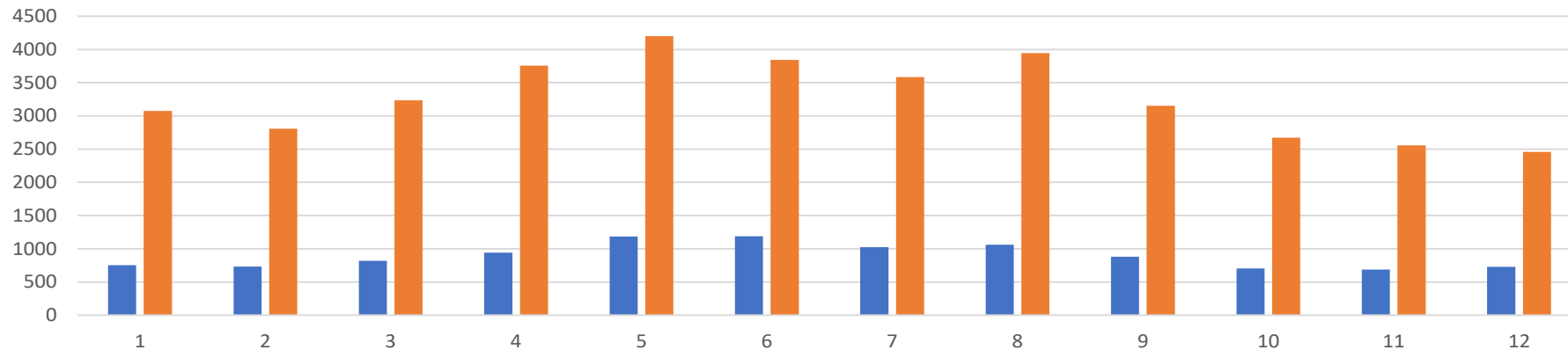
Public Works: water production was 115.5 million gallons, & 61.57 million gallons (MG) were treated

Clean water, Waste Water
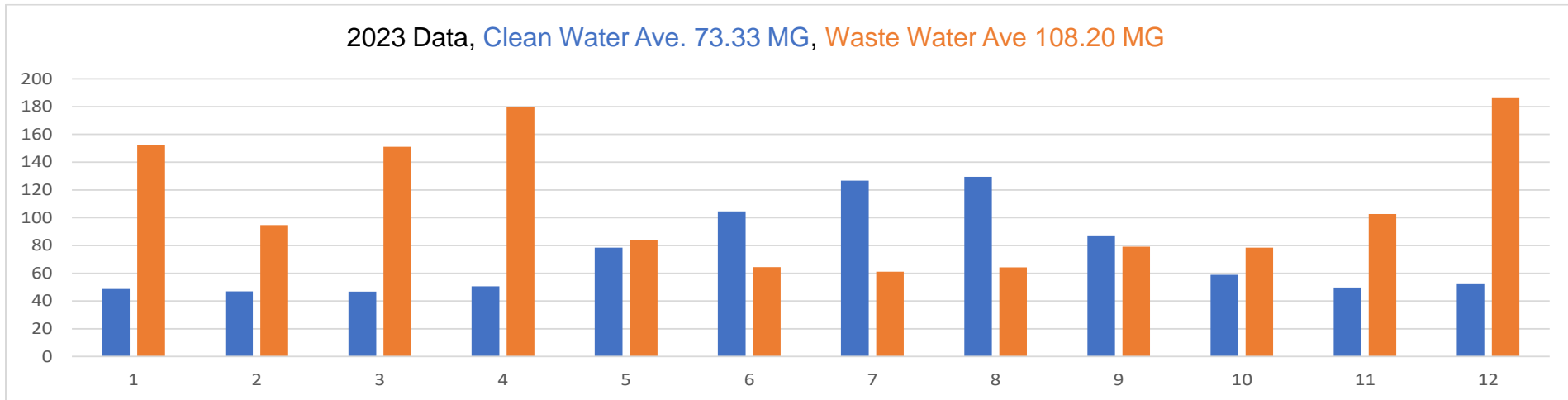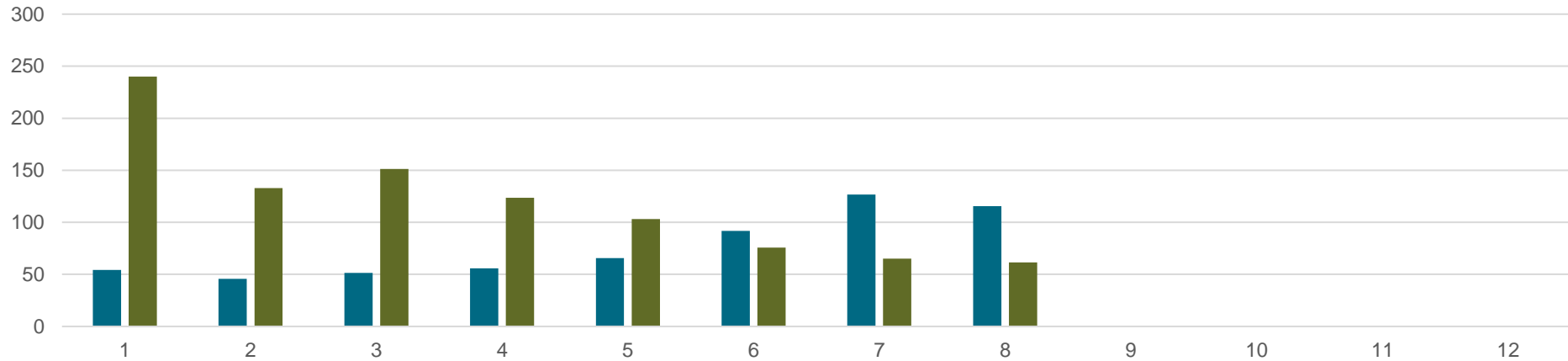
Average 2022

Clean Water 69.45 MG

Waste Water 105.46 MG

2023 Data, Clean Water Ave. 73.33 MG, Waste Water Ave 108.20 MG

20

Public Works: 1353 work orders completed

Average 2022

1452.6

Work orders completed

Work orders completed 2023 – Ave 1676.83
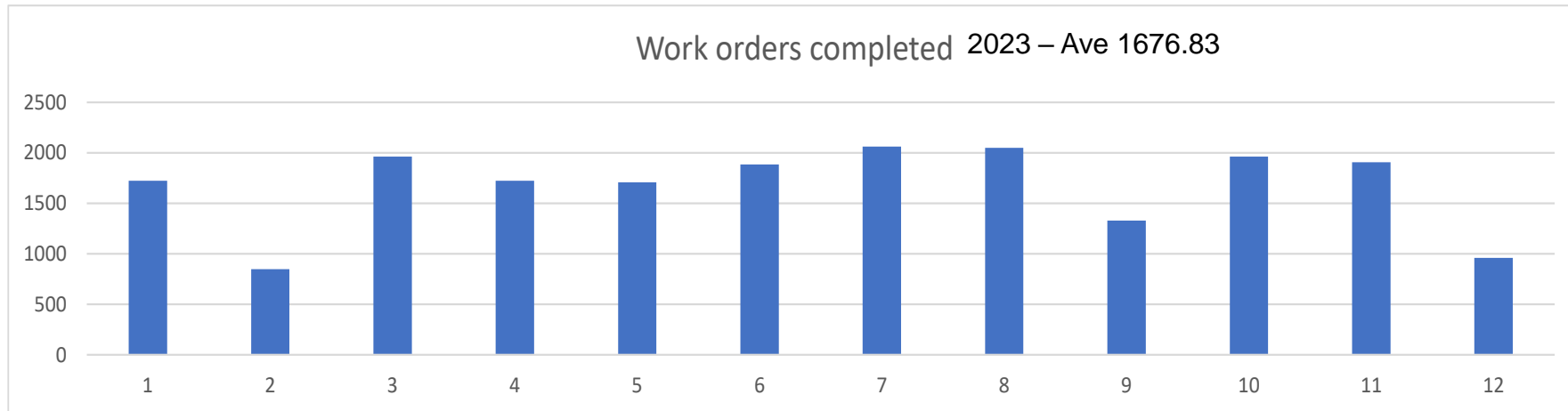
Public Works: 57.85 MWh of energy generated

Energy Production

Average 2022

47.35 MWh (April–Dec only)
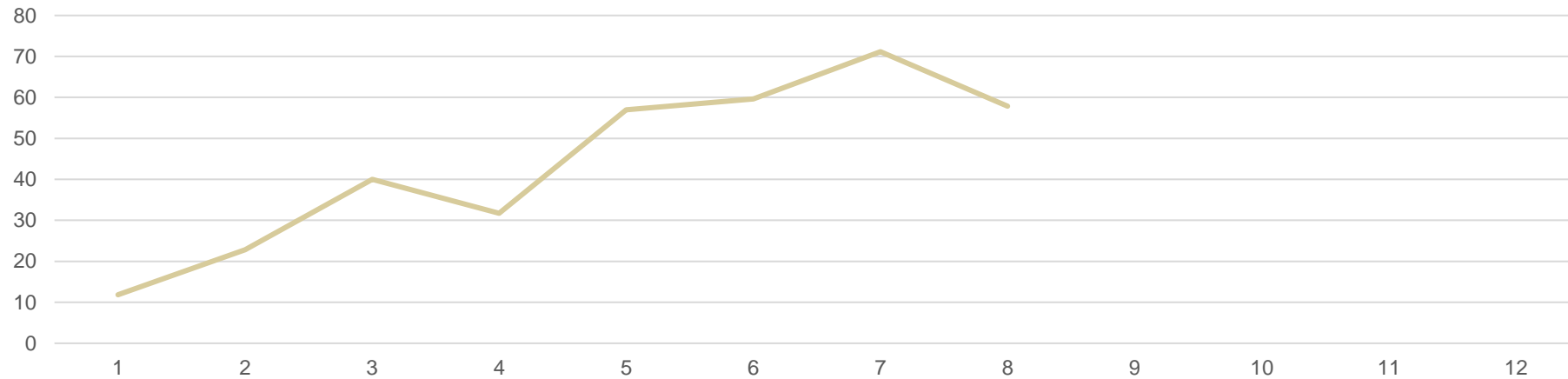
Energy Production 2023 – Ave 41.15 MWh

22
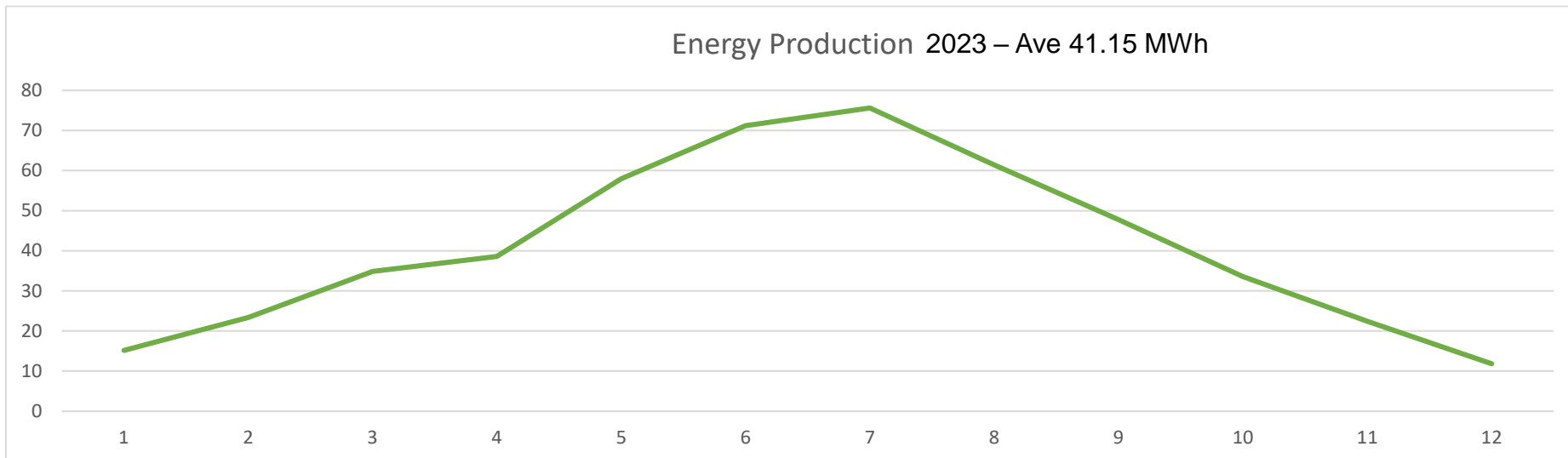
So that's the totals to the end of August 2024!

As we look towards the end of the year a few trends are emerging:

Housing production continues to be very slow this year.
The library is being used more than ever before.
There has been a slight but notable uptick in speeding but not DUII's.
Our social media engagement is twice what it was before we added Instagram.
There has been a slight uptick in average water production.
PW work orders are down somewhat this year, I attribute this to the large "all hands-on deck" construction projects they tackled at the yard and Hess Creek.

Questions?

REQUEST FOR COUNCIL ACTION

Date Action Requested: October 21, 2024

Order ☐ Ordinance ☐ Resolution ☒ Motion ☐ Information ☐ Proclamation ☐ No. 2024-3953	
Subject: **A Resolution authorizing the City Manager to approve all the proposed vehicle and equipment purchases with some dollar amounts for items above $100,000. Also authorizing the City manager to sell the proposed surplus vehicles and equipment and redistribute vehicle, grant and equipment money back to the Public Works Maintenance Vehicle Contingency funds.**	Staff: Preston Langeliers, Maintenance Superintendent Department: Public Works Maintenance
Business Session	Order On Agenda: Consent Calendar
Hearing Type: Administrative	

Is this item state mandated? s ☐ No ☒

If yes, please cite the state house bill or order that necessitated this action:

Recommendation:

Adopt Resolution 2024-3953: A Resolution authorizing the City Manager to approve all the proposed equipment, accessories, covers, attachments, and equipment purchases with some items exceeding $100,000 and authorizing the City manager to sell the proposed surplus vehicles and equipment and redistribute vehicle, grant and equipment money back to the Public Works Maintenance Vehicle Contingency funds.

Executive Summary:

The chart below lists the major equipment, accessories, attachments, and vehicles needed to update the City's fleet and equipment to minimize downtime. The majority of these items will be replacing existing vehicles and equipment. Some items are new pieces that will allow us to perform work more efficiently and provide a higher level of service.

Equipment Description	Brand	Sourcewell Estimated Price	Estimated Price
Loader (Bucket, Forks, Dabit, Mower)	John Deere 544G	$ 301,671.95	
Concrete Mixer			$ 130,000.00
Bucket Truck	VST-40-N on a Dodge Ram 5500		$ 179,000.00

Skid Steer (Forks, Soil conditioner, Grader, Planer)	Bob Cat T86	$ 153,001.16	
Small Dump Truck	2024 Chevy 6500		$ 118,913.00
Cone Truck	Ford 750 Truck body with Side doors		$ 185,000.00
Air Compressor	Chicago Pneumatic CPS 250 KD8 T4F		$ 43,800.00
Sewer Service Truck	Dodge Ram 5500	$ 112,040.00	
Roller 51"	Caterpillar	$ 92,722.97	
Pressure washer Trailer	North Star Commercial Pressure Washer Trailer		$ 16,999.99
Hot water Pressure Washer	Carson Equipment		$ 6,500.00
Forklift (5 ton hard surface)	Doosan	$ 68,959.84	
Fleet Air Compressor	Champion Two Stage		$ 9,500.00
Crane Truck	F-600 4-Ton Crane		$ 183,020.00
Spill Response Trailer	Buy and Enclosed trailer and Outfit accordingly		$ 25,000.00
WWTP F-150	F-150		$ 60,000.00
Sidewalk Grinder	Graco Grind Lazer Self-propelled Drum		$ 36,000.00
Thermoplastic Remover	Graco Grind Lazer Rotary		$ 89,000.00
Vacuum System	Graco Vacuum and Cyclone		$ 16,000.00
	Sub Total	$ 728,395.92	$ 1,098,732.99
	Total	**$ 1,827,128.91**	

The chart below lists all the proposed surplus vehicles and equipment to be sold. The proposed surplus pieces of equipment and vehicles below are being replaced by the above-proposed list of vehicles and equipment. The estimated resale values listed are 90% of the estimated low-end resale value. This amount was used to estimate the funds available to reinvest into the purchases of equipment, accessories, covers, attachments, and equipment that will allow the Public Works Maintenance division to more efficiently and effectively provide the level of service for the City of Newberg. The new equipment and vehicle will also allow staff to meet the changing needs and requirements of the community. Having the right vehicles, equipment, and tools that can complete tasks more efficiently, and at a higher quality. It will also allow staff to complete maintenance tasks that is normally forced to be differed as a result of limited staff and resources.

Vehicle Number	Vehicle Year	Make	Description	Kelly Blue Book Estimate	Estimated Resale Value
517-05	2005	Dodge	Pickup Truck	$ 13,876.00	
532-12	2012	Chevrolet	Pickup Truck	$ 18,113.00	
546-17	2017	Chevrolet	Pickup Truck	$ 22,628.00	
916-19	2019	Chevy	Pickup Truck	$ 25,560.00	
942-08	2008	Ford	Pickup Truck	$ 13,618.00	

945-11	2011	Caterpillar	Backhoe		$ 44,000.00
952-13	2013	Chevrolet	Pickup Truck	$ 12,988.00	
8340-04	2004	Ford	Pickup Truck	$ 6,964.00	
907-89	1989	International	Dump Truck		$ 10,000.00
533-96	1996	International	Dump Truck		$ 15,000.00
102-05	2005	Chevrolet	Silverado/KC15EX	$ 4,550.00	
512-04	2004	Ford	F-250 EX 4x4	$ 5,240.00	
600-06	2006	Dodge	Durango	$ 3,630.00	
908-04	2004	Ford	F150 Super Cab	$ 2,940.00	
914-00	2000	GMC	3500HD	$ 9,610.00	
356-03	2003	John Deere	Tractor		$ 8,000.00
538-13	2013	Freightliner	Vactor		$ 150,000.00
901-92	1992	International	6 Yd. Dump		$ 5,000.00
921-96	1996	Freightliner	Flusher		$ 850.00
940-97	1997	Freightliner	Flat Bed		$ 850.00
961-18	2018	Ford	On-Call Rig	$ 17,861.00	
NA	NA	NA	DEQ OZEF Charge Grant		$ 257,200.00
NA	NA	NA	DEQ Truck Grant		$ 682,500.00
307-00	2000	New Holland	New Holland Tractor Mower		$ 15,000.00
535-08	2008	Ford	Sewer Maintenance Truck	$ 12,929.00	
902-96	1996	Airman	Air Compressor Trailer		$ 3,500.00
912-99	1999	Multi Quip	Multi Quip Roller		$ 4,500.00
925-21	2021	Case	Case loader		$ 65,000.00
926-96	1996	Chevy	Emergency Traffic Control Truck	$ 3,297.00	
933-96	1996	Ford	Bucket Truck		$ 20,000.00
954-02	2002	Ford	Crane Service Truck		$ 30,000.00
NA	1999		Fleet Compressor		$ 150.00
918-77	1977	Eager Beaver	Pressure Washer Tilt Trailer		$ 100.00
NA			1305931 Landa Pressure		$ 150.00
941-08	2008	Ford	1 Ton Dump Steet Truck 4x2		$ 15,000.00
409-15	2015	Chevrolet	Silverado 1500	$ 17,507.00	
			Sub-Total	$ 191,311.00	$ 1,326,800.00
			10% Cushion for Safety	$ 172,179.90	$ 1,194,120.00
			Total	$ 1,366,299.90	

Fiscal Impact:

The chart below shows the approved funds within the budget. It also includes the total estimated resale value of the proposed vehicles and equipment. The cost of all the current vehicles and equipment ordered and the cost of the proposed vehicle and equipment purchases are represented.

With the approval to redistribute the funds from surplus vehicles and equipment sold to the Public Works Maintenance Contingencies funds, there will be ample funds to cover the purchases. This process follows the current proposed fleet replacement strategy that the City Manager, Public Works Director, and the Public Works Maintenance Superintendent jointly developed.

Vehicles Replacement Budget		
GL #'s	**GL Description**	**24/25 Budget**
06-9180-800001	Contingency-Assigned for veh	$ 451,152.00
06-5132-610001	Capital outlay	$ 687,328.00
07-9180-800001	Contingency-Assigned for veh	$ 262,496.00
07-5142-610001	Capital outlay	$ 668,432.00
17-9180-800001	Contingency-Assigned for veh	$ 301,252.00
17-5170-610001	Capital outlay	$ 486,856.00
31-9180-800003	Contingency-Assigned for Maint	$ -
Estimated Revenue from sale of vehicles		$ 1,366,299.90
Available Funds for Vehicle Purchases		**$ 4,223,815.90**
Currently Ordered		$ 1,842,740.97
Proposed Purchases Total		$ 1,827,128.91
Remaining Funds After Currently & Proposed Purchases		**$ 553,946.02**

Council Goals:

This purchase aligns with Goals 1, 3, and 6.

Goal 1:

These vehicles and equipment will allow us to respond to customer service requests quickly and efficiently regarding water leaks, broken sewer laterals and mains, street flooding, potholes, legend repairs, and many other activities that maintenance performs to provide high customer service to the citizens.

REQUEST FOR COUNCIL ACTION

City of Newberg

Date Action Requested: (October 21, 2024)

Order ☐ Ordinance ☐ Resolution ☐ Motion ☒	Information ☐ Proclamation ☐
Subject: Discerning the will of council on the River Street CIP (near term action concept)	Staff: CM Department: Administration
Business Session	Order On Agenda: Continued Business

Is this item state mandated? Yes ☐ No ☒
If yes, please cite the state house bill or order that necessitated this action:
NA

Recommendation:
Staff has no recommendation as such but needs to discern the will of council with regards to its desire to look at the reconstruction of River Street backed by city debt but paid by NURA tax increment financing. A motion will clarify the will of council.

Council may feel that it is advantageous to conduct the complete re-build of River Street sooner than the five to seven years it will take NURA to have sufficient resources to do this on its own. Conversely council may desire to wait until NURA has its own funds set aside to undertake this massive project.

If council desires to authorize staff to continue to spend time working on a more accurate cost estimate and CIP proposal a council member could motion as follows:

"I move that staff spent time developing an accurate cost estimate on the River Street project with the objective of paying for this with city secured debt paid for by NURA tax increment financing"

With no such motion staff should focus their efforts on other projects.

Executive Summary:
The NURA Community Advisory Board has recommended that the original NURA plan (and order of operations) should be followed. If accepted this would mean that the River Street project would be the first thing that NURA undertakes. At this time NURA does not have sufficient revenue to secure such a loan. The city could secure a loan with NURA making the payments and paying the interest. This would require an IGA between these overlaying taxing entities after the costs are further scoped.

Engineering and other staff effort should not be put in to this effort if there is no desire to create this arrangement from the perspective of City Council / NURA Board members.

Residents complain about River Street every week, but the city does not have any regular transportation funds to address this without the use of a debt mechanism.

Fiscal Impact:

It is anticipated that the dollar amount will be in the region of $10M based upon the sorts of expenses that we saw with Elliott Road and some initial estimates. With that said the costs may be less as the CM will be monitoring and controlling the structure and features of this project with a view to cutting costs. Currently engineering staff are dedicating time and effort towards a more exact estimate.

If the project is delayed until NURA can finance River Street there will be several hundreds of thousands of dollars spent in the near term on local sections of HB 2001 and spot repairs just to keep the road navigable.

On the other hand, it is obvious that going ahead now will ensure that a larger share of the overall cost will create interest via a loan. Waiting until later would reduce some of this debt burden.

A decision either way will inform the long-range financial plan that needs to be created soon.

Council Goals:

Goal 1: Ensure Newberg infrastructure (roads, water, city employees) is in good repair and supply.
    Objective 1: Regularly review the capital improvement projects (annually).
    Objective 2: Focus on road and sidewalk improvements in Districts 1 & 3.

Goal 6: Implement a careful and prudent fiscal policy.
    Objective 4: Ensure that the city has a long-term financial plan that supports its goals and objectives.

REQUEST FOR COUNCIL ACTION

City of Newberg

Date Action Requested: October 21, 2024

Order ☐ Ordinance ☐ Resolution ☒ Motion ☐ Information ☐ Proclamation ☐ No. 2024-3950	
Subject: Update to Committee Rules to align with current practice for appointments.	Staff: Rachel Thomas Department: City Recorder
Business Session	Order On Agenda: New Business

Is this item state mandated?   Yes ☐   No ☐

If yes, please cite the state house bill or order that necessitated this action:

Recommendation: Council should move to adopt resolution 2024-3950 to update the Committee Rules to align with current practice for appointments.

Executive Summary: A discrepancy between the current resolution determining the committee appointment process and the actual process was discovered. The current resolution approved the Committee Rules that require an interview of each candidate. The new resolution will update one word in the Committee Rules from "shall" to "may" leaving the interviewing of candidates up to the discretion of the mayor and City Council.

Fiscal Impact: N/A

RESOLUTION NO. 2024-3950

A Resolution to update the Committee Rules to reflect current practices surrounding the appointment of board, committee, and commission members.

Recitals:

1. The mayor appoints members of the public to Boards, Committees, and Commissions and the City Council confirms the appointments.

2. The process by which appointments takes place is detailed in the Committee Rules passed by Resolution 3850.

3. The requirement of interviewing candidates is no longer the desired practice.

The City of Newberg Resolves as Follows:

1. Adopt the new Committee Rules as shown in Exhibit A.

2. Overturn Resolution 3850.

Effective Date of this resolution is the day after the adoption date, which is: October 22, 2024.
Adopted by the City Council of Newberg, Oregon, this 21 day of October 2024.

_____
Rachel Thomas, City Recorder

Attest by the Mayor this 21 day of October 2024.

_____
Bill Rosacker, Mayor

COMMITTEE RULES

Approved by Council Resolution #3950 - Effective 10-22-2024

Appointed Boards

The City Council has several boards, commissions, and committees (for purposes of these Rules, each is a "Committee" and collectively, the "Committees") comprised of appointed persons that advise the Council on specific issues or serve a statutory role. Per City of Newberg City Council Rule 6.1, "The Mayor, with the consent of the council, will appoint members of boards, commissions and committees established by ordinance or resolution."

The appointment process is established by resolution, and the qualifications, terms, and other conditions of appointment shall be as specified in the code or the resolution or document establishing the Committee. Staff members such as department heads will not create Committees without following the formal processes listed here lead by the Council.

The powers and process for appointing persons to these entities are set forth as follows:

Types

There are three types of Committees: required, advisory, and ad hoc.

I. Required Committees are any Committee required by federal, state, or city statute. They are permanent in function and exist by City ordinance or resolution.
Examples: Budget Committee and Planning Commission

II. Advisory Committees are any Committee created by the Council to advise the City on policy and the operations and sustainability of City assets or departments. These Committees are considered "standing" and exist by ordinance or resolution.
Examples: Traffic Safety, Library Advisory, Historic Preservation, Rate Review, etc.

III. Ad hoc committees are any group convened to review a specific issue and develop recommended plans, policies, or specific actions to address them. These groups are considered temporary only and exist by resolution.

Powers

All Committees shall be advisory only, except for those appointed Committees that are formed to comply with state law, (e.g., the Budget Committee under ORS 294 or Planning Commission under ORS 227).

I. Required Committees have the rights and powers afforded them through their legal authority and any other delegated authority. These Committees shall always have staff support to ensure they meet their legal requirements.

II. Advisory Committees are either standing Committees of the City or Ad Hoc committees to investigate, create/review, and propose policies, programs, or projects that advise the Council and staff on issues within the City pertaining to their mandate.

III. Ad hoc Committees are temporary bodies created by the Mayor and ratified by the Council and shall meet within a finite period to create findings and provide information to the Mayor and the Council.

Voting – Except as otherwise required by applicable law:

I.   Each member will have an equal vote on the Committee. The reports of the Committee will have only the authority of recommendations to the Council. The Budget Committee has special provisions pertaining to ORS 294. The Council has the authority to follow the recommendations, change the recommendations, refer the matter back to the Committee, or take any other action the Council deems appropriate.

II.   The Mayor, City Manager, and the City Attorney will be ex-officio, non-voting members of all Committees and will not be used in determining a voting quorum.

Meetings – Except as otherwise required by applicable law:

I.   The meeting time and place of the Committees will be set by Newberg Municipal Code 2.15. The meeting time and place may be changed provided there is adequate notice. The chair will have the authority to cancel any meeting of a Committee for lack of business or necessity to meet. Meetings are public meetings and will be conducted in accordance with the Oregon Public Meetings Laws.

II.   Ex-officio members may attend any Committee meeting. If they attend, they may participate in the discussion as is appropriate. However, they are not required to attend Committee meetings.

Appointments and Removal – Except as otherwise required by applicable law:

I.   Following an election to be held at the Committee's first meeting, the Mayor will confirm the chairperson and the vice chair. The exception to this will be the Planning Commission that will continue to follow its own rules concerning its chair and vice-chair.

II.   The Mayor may remove any member of a Committee at any time with the consent of the Council. Notwithstanding the foregoing, however, the City Council may remove a member of a Committee if that member fails to attend 75% of the Committee's meetings in any one year (unless such absences are determined to be excused). The Mayor has the authority to grant an excused absence and in the Mayor's absence, the Committee chair has the authority. If a member is removed, the member will be replaced by the Council as provided for the filling of vacancies. See Newberg Municipal Code 2.15.005d.

III.   The Mayor and/or the Council may interview individuals for nomination except as otherwise provided under the City of Newberg Municipal Code.

Staff Support

The City Manager will have the responsibility to furnish the necessary staff support for each Committee. The Committee will not have the authority to assign specific tasks to any staff person of the City but will work through the City Manager or designee

Ethics

All members of a Committee shall review and observe the requirements of state ethics law. In addition to complying with state ethics law, all members of a Committee shall refrain from:

I. Disclosing confidential information.
II. Taking action which benefits special interest groups or persons at the expense of the City as a whole.
III. Expressing an opinion contrary to the official position of the Council or Committee without so saying.
IV. Conducting themselves in a manner so as to bring discredit upon the government of the City.

Etiquette

In addition to complying with state ethics law, all members of a Committee shall:

I. Honor the expertise in the room.
II. Avoid blame, speculation, and inflammatory language.
III. Ensure that all are heard and encourage participation.
IV. Acknowledge and respect differences.
V. Agree to disagree.
VI. Look for common ground.
VII. Come to meetings prepared.
VIII. Ask questions to staff in advance whenever possible.
IX. Active listening – Listen to understand, not to respond.
X. WAIT – Why Am I Talking?
XI. Stay on topic.
XII. Provide actual direction.
XIII. Respectful to all.
XIV. Functional procedural rules.

Statements to Other Organizations

I. Representing City – If a member of a Committee, to include the Mayor, appears as a representative of the City before another governmental agency or an organization to give a statement on an issue, the member may only state the official position of the City, as approved by a majority of the Council.
II. Personal Opinions – If a member of a Committee, to include the Mayor, appears in their personal capacity before another governmental agency or an organization to give a statement on an issue, the member must state they are expressing their own opinion and not that of the City before giving their statement.
III. Social Media – When commenting on social media platforms the Committee member, to include the Mayor, shall take care to follow the rules set forth in element I and II above.

Interactions with City Manager and Management

All members of Committees shall respect the separation between the Committee's role and the City Manager's responsibilities by:

I.   Not interfering with the day-to-day administration of City business, which is the responsibility of the City Manager.

II.   Refraining from action that would undermine the authority of the City Manager or management staff.

III. Limiting individual inquiries and requests for information from management to those questions that may be answered readily as part of management's day-to-day responsibilities. The City Manager should be informed regarding questions of a more complex nature.

IV.   Committee members should normally share any significant information obtained from management staff with the entire Committee.

Interactions with City Attorney

I.   The City Attorney is the chief legal officer of the City and represents the municipal corporation, not individual Committee members. Advice is given to the Committee as a whole, not to individual Committee members.

II.   Committee members may make requests to the City Attorney for information and advice provided the request is routed through the City Manager or designee, who will then create the appropriate request for legal services routing document.

Thank you for your willingness to serve!

City of Newberg

Date Action Requested: October 21, 2024

Order ☐ Ordinance ☐ Resolution ☒ Motion ☒	Information ☐ Proclamation ☐
Subject: A Resolution Requesting that the Department of Land Conservation and Development Dissolve the Sequential Urban Growth Boundary Review Program and Reschedule the City's Housing Lands Analysis to 2027/2028. (File No. GEN23-0009)	Staff: Scot Siegel, James Dingwall Department: Community Development
Business Session	Order On Agenda: Continued Business

Is this item state mandated? Yes ☐   No ☒

If yes, please cite the state house bill or order that necessitated this action: This item is not state mandated but any changes to the City's approved Sequential Urban Growth Boundary (UGB) Review work program must comply with State land use requirements, including deadlines for adopting a Housing Capacity Analysis and Housing Production Strategy.

Recommendation:

1. Move to approve Resolution No. 2024-3952 requesting the Department of Land Conservation and Development (DLCD) to dissolve the Sequential Urban Growth Boundary Review work program approved on April 9, 2024, and modify the deadlines for the City of Newberg to adopt a Housing Capacity Analysis and Housing Production Strategy, respectively, to 2027 and 2028, in compliance with state housing requirements.

2. Move to direct staff to initiate work on a solicitation for one-time UGB expansion proposals for housing under SB 1537 (2024).

Executive Summary:

On August 19, 2024, City Council heard an update on potential modifications to the approved Sequential Urban Growth Boundary Review work program to adopt the City's 2021 Housing Needs Analysis (HNA), Economic Opportunities Analysis (EOA), and Public and Semi-Public Land Needs Analysis (PSP) and consider any needed urban growth boundary (UGB) amendment. Council directed staff to request that the approved work program be modified to include only the EOA and explore the one-time UGB expansion for housing provided under SB 1537 (2024), including determining whether any lands might be eligible for expansion.

Employment Lands Strategy

DLCD staff has indicated that the City may adopt an EOA updating its employment projections and land supply and need forecasts without concurrently amending the UGB. If the EOA identifies a shortage of land inside the UGB, the City will be required to address that deficiency, but on its own timeline, not under a specific state-mandated clock. Because a UGB amendment would not be required concurrent to the EOA adoption, DLCD has indicated that the City should pursue the EOA update through a Post-Acknowledgement Plan Amendment (PAPA) process pursuant to Oregon Administrative Rule 660-18, rather than modifying the Sequential UGB Review Work Program to only include the EOA. While the Sequential process allowed the City to use the 2020 population projections in the HNA, EOA, and PSP, DLCD confirmed that it may continue to use the same population forecast for the EOA even if the work program is dissolved. Once the work program is dissolved, the City's existing PAPA notice to DLCD (for CPTA22-0002) would be updated to only include the EOA, and it would be reviewed under the regular adoption process. Following adoption, any future UGB amendment to add employment lands would be reviewed by DLCD and could be appealed to the Oregon Land Use Board of Appeals, though decoupling plans for employment from housing could reduce that risk.

Housing Lands Strategy

DLCD's *Housing Capacity Analysis-Housing Production Strategy Schedule for 2024-2032* indicates that Newberg is due to adopt a Housing Capacity Analysis (HCA) in 2024, and a Housing Production Strategy (HPS) in 2025. This assumes the City adopts the 2021 Housing Needs Analysis in 2024 given the City's work on it to date and approved Sequential UGB Review work program. Discussions with DLCD have indicated that the City could request to be placed in the 2027-2028 HCA/HPS cycle instead and use the most recent population forecast, which is from July 2024. Deferring the housing analysis would also require the City to utilize new, yet to be adopted, state rules for determining housing needs and amending the UGB for housing. DLCD staff have advised that the City would not be penalized for requesting dissolution of its work program and may be eligible for funding during the next cycle of DLCD planning grants. If the requested schedule change is approved, the City will be required to adopt a Housing Capacity Analysis in 2027 and Housing Production Strategy in 2028.

Streamlined Housing UGB Expansion Option

As an interim strategy for meeting the City's housing land needs, Newberg is currently eligible for the one-time UGB expansion of up to 100 net acres under SB 1537 (2024). This expansion may consist of one property or a group of contiguous properties that are not zoned for agriculture or forestry. The Oregon Legislature adopted the bill in 2024 to streamline UGB expansions for housing with affordable housing required. For a city to be eligible for UGB expansion under the bill, it must meet certain land use and infrastructure planning requirements and "rent burden" criteria and have non-resource lands adjacent to the UGB that can be added. Presently, the City meets those criteria, though that could change if the city's rent-burden level falls below the bill's threshold. If Council wants to pursue this pathway, staff recommends initiating it before the State publishes updated rent-burden data in 2025.

Senate Bill 1537 requires that new housing be planned at an average minimum density of 6 dwelling units per acre (for communities with populations between 2,500 and 30,000) and include some deed-restricted affordable housing as follows (60-year deed restriction):

- 30% of rental units must be affordable to households earning not more than 80% of Area Median Income, **or**
- 30% of for-sale units must be affordable to households earning not more than 130% of AMI

In addition, the 100 acres of UGB expansion allowed by SB 1537 is a "net area" for residential development after subtracting lands for streets, parks, and any non-residential development. For example, the bill requires that the UGB expansion area include land for open space and small-scale commercial or mixed-use development necessary to serve the residents of the new growth area. The size of any commercial/mixed-use area would be scaled depending on the growth area's location relative to existing or planned commercial areas.

Staff has confirmed that lands exist adjacent to the UGB that could be proposed for UGB expansion under SB 1537 (see Attachment 1), albeit many of parcels are relatively small and developed with rural residential uses or on steep topography. These lands include lots adjacent to the City's UGB or separated by a street that are either within an urban reserve, designated as non-resource land, or subject to an acknowledged exception to a statewide land use planning goal related to farmland or forestland. Lands that can be proposed for inclusion may total up to 100 acres. Few other jurisdictions are pursuing this UGB expansion pathway. Bend launched their process earlier this year.

If the City issues a solicitation for proposed expansion sites, a SB 1537 work program may include the following steps:

Item	*Actions & Decision*	*Conceptual Timeline*
Call for Site Applications	Info Sessions & Public Outreach; Notify Yamhill County and Service Districts	Winter 2024
Site Applications Due	Including a Draft Concept Plan	Spring 2025
Site Selection	Public Input including Planning Commission Hearing, Council Work Session, Council Site Selection Hearing	Summer 2025
Concept Plan Refinement		Fall 2025
Concept Plan Adoption	DLCD Review; City Council approval including Comprehensive Plan Amendment	Fall/Winter 2025
Future Annexation	Planning Commission and City Council	Property owner-driven

Fiscal Impact: The City's adopted budget for fiscal year 2024-25 includes $376,500 in the General Fund (01) for Planning Division Professional Services (01-4110-58000). Of this budgeted amount, $350,000 was budgeted in anticipation of costs associated with consultant service for a UGB expansion project. This budget amount is intended to cover more than one year of related expenses and carry over into the next fiscal year or biennium. Staff time will be required to prepare a solicitation for SB 1537 (2024) sites.

Council Goals:
- Goal 2: Identify industrial land and attract employers to encourage family wage jobs.
  - Objective 1. Identify land other than the Mill site to zone for Light Manufacturing.
  - Objective 2. Work to bring land into the urban growth boundary to zone for light manufacturing within 5 years.
- Goal 7: Increase land availability for housing.
  - Objective 2: Work to bring land into the urban growth boundary to zone for residential purposes within 5 years.

Attachments:
1. SB 1537 Potentially Eligible Parcels

RESOLUTION NO. 2024-3952

A RESOLUTION REQUESTING THAT THE DEPARTMENT OF LAND CONSERVATION AND DEVELOPMENT DISSOLVE THE SEQUENTIAL URBAN GROWTH BOUNDARY REVIEW PROGRAM AND RESCHEDULE THE CITY'S HOUSING LANDS ANALYSIS TO 2027/2028.

Recitals:

1. Whereas, on February 5, 2024, the Newberg City Council elected to use the Sequential Urban Growth Boundary Review Process and submit a proposed work program for approval by the Department of Land Conservation and Development for meeting Newberg's housing and employment land needs.

2. Whereas, on April 9, 2024, the Department of Land Conservation and Development Director approved the proposed Sequential Urban Growth Boundary Review work program.

3. Whereas, on August 19, 2024, the Newberg City Council directed staff to coordinate with the Department of Land Conservation and Development to modify the approved Sequential Urban Growth Boundary Review work program by removing the 2021 Housing Needs Analysis that City Council had accepted in Resolution 2021-3728.

4. Whereas, the Department of Land Conservation and Development's *Housing Capacity Analysis-Housing Production Strategy Schedule for 2024-2032* indicates that Newberg is due to adopt a Housing Capacity Analysis (HCA) in 2024, and a Housing Production Strategy (HPS) in 2025.

5. Whereas, the Newberg City Council, on considering Newberg's housing and employment needs, seeks a more flexible and targeted approach to planning for growth than can be provided by the Sequential Urban Growth Boundary Review work program.

The City of Newberg Resolves as Follows:

1. The City Council authorizes the Community Development Department to submit a request to the Department of Land Conservation and Development to dissolve the Newberg Sequential Urban Growth Boundary Review work program and move the City of Newberg's Housing Capacity Analysis and Housing Production Strategy deadlines to the 2027/2028 cycle of the Department of Land Conservation and Development's *Housing Capacity Analysis-Housing Production Strategy Schedule for 2024-2032.*

Effective Date of this resolution is the day after the adoption date, which is: October 22, 2024.
Adopted by the City Council of Newberg, Oregon, this 21st day of October, 2024.

_____

Rachel Thomas, City Recorder

Attest by the Mayor this _____ day of _____, 2024.

_____

Bill Rosacker, Mayor

Resolution No. 2024-396:

A Resolution Requesting that the Department of Land Conservation and Development Dissolve the Sequential Urban Growth Boundary Review Program and Reschedule the City's Housing Lands Analysis to 2027/2028.

Attachment "1"

SB 1537 (2024) Potentially Eligible Parcels

SB 1537 Potentially Eligible Parcels
City of Newberg

(2017 UGB Study Area)

Legend:
- City Limits
- Urban Growth Boundary
- Urban Reserve Area
- Exception Land
- Urban Reserve Area Land

SB 1537 (2024) Criteria
- *Adjacent or separated by only a street to the UGB **and:***
  - *Designated as an urban reserve;*
  - *Designated as non-resource land; or*
  - *Subject to an acknowledged exception to farmland or forestland*

N

0   2,500   5,000 Feet

City of Newberg

Staff Recommendation

1. Move to approve Resolution No. 2024-3952 requesting the Department of Land Conservation and Development (DLCD) to dissolve the Sequential Urban Growth Boundary Review work program approved on April 9, 2024, and modify the deadlines for the City of Newberg to adopt a Housing Capacity Analysis and Housing Production Strategy, respectively, to 2027 and 2028, in compliance with state housing requirements.
2. Move to direct staff to initiate work on a solicitation for one-time UGB expansion proposals for housing under SB 1537 (2024).

City Council Goals

- *Goal 2: Identify industrial land and attract employers to encourage family wage jobs.*

- *Goal 7: Increase land availability for housing.*

Work Program Modifications

Sequential UGB Review Work Program

2021 Housing Needs Analysis

2021 Economic Opportunities Analysis

2021 Public and Semi-Public Needs Analysis

request DLCD to dissolve

Post-Acknowledgement Plan Amendment

2021 Economic Opportunities Analysis

Efficiency Measures (Periodic Review)

UGB Amendment (Periodic Review)

SB 1537 One-time Housing Expansion

Scheduled Future Work
(DLCD Calendar 2027/2028)

Housing Capacity Analysis

Housing Production Strategy

(potential) UGB Amendment for Housing

request DLCD to amend schedule

SB 1537 (2024)

- Provides for a one-time UGB expansion not to exceed 100 acres, subject to concept planning and affordability requirements.
- Cities must demonstrate need for additional land and need for affordable housing.
- Land must be:
  - Adjacent to existing UGB (or separated by street or road)
  - Designated an urban reserve, non-resource land, or subject to an acknowledged exception to statewide land use planning goal related to farmland or forestland
- The City will run a solicitation for applications with a concept plan including:
  - Types and affordability of housing
  - Non-residential designation
  - Transportation network
  - At least 30 percent of residential units will be subject to affordability restriction for 60 years

SB 1537 (2024)

SB 1537 Potentially Eligible Parcels
City of Newberg

(2017 UGB Study Area)

City Limits

Urban Growth Boundary

Urban Reserve Area

Exception Land

Urban Reserve Area Land

SB 1537 (2024) Criteria
- Adjacent or separated by only a street
  to the UGB and:
  - Designated as an urban reserve;
  - Designated as non-resource land; or
  - Subject to an acknowledged
    exception to farmland or forestland

N

0   2,500   5,000 Feet

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PARTICULARY PURPOSE FOR ANY INFORMATION HEREIN.
The map is created from various data sources and is
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This map is intended for general planning purposes only.

Source: Business Oregon, City of Newberg, OR DOGAMI, ODOT
Last Updated on: October 10, 2024 by James Dingwall

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SB 1537 (2024)

Item	Actions & Decision	Conceptual Timeline
Call for Site Applications	Info Sessions & Public Outreach; Notify Yamhill County and Service Districts	Winter 2024
Site Applications Due	Including a Draft Concept Plan	Spring 2025
Site Selection	Public Input including Planning Commission Hearing, Council Work session, Council Site Selection Hearing	Summer 2025
Concept Plan Refinement		Fall 2025
Concept Plan Adoption	DLCD Review; City Council approval including Comprehensive Plan Amendment	Fall/Winter 2025
Future Annexation	Planning Commission & City Council	Property owner driven

Staff Recommendation

1. Move to approve Resolution No. 2024-3952 requesting the Department of Land Conservation and Development (DLCD) to dissolve the Sequential Urban Growth Boundary Review work program approved on April 9, 2024, and modify the deadlines for the City of Newberg to adopt a Housing Capacity Analysis and Housing Production Strategy, respectively, to 2027 and 2028, in compliance with state housing requirements.
2. Move to direct staff to initiate work on a solicitation for one-time UGB expansion proposals for housing under SB 1537 (2024).

Thank you!

Questions?

REQUEST FOR COUNCIL ACTION

City of Newberg

Date Action Requested: (October 21, 2024)

Order ☐	Ordinance ☐	Resolution ☐	Motion ☐	Information ☒	Proclamation ☐
Subject: A request for clarification on the Oak Knoll booster pump project.			Staff: CM Department: Administration and Public Works		
Work Session ☐ Business Session ☐			Order On Agenda: Old Business		

Is this item state mandated? Yes ☐   No ☒

If yes, please cite the state house bill or order that necessitated this action:
NA

Recommendation:
The CM is seeking clarification on the decision to continue to pursue the Oak Knoll Booster pump station project as approved previously by the rate review, budget committee and city council. The City Manager is not a qualified engineer and as a result has provided this data based upon information sent to him by other staff and the recent AKS engineering study. See attachment #1.

Staff does not have a recommended course of action, however if council desires to cancel the project a motion could be made to this effect:

"I move that we cancel the Oak Knoll Booster Pump CIP project".

If cancelled staff will need direction on the disposal of the pumps and the possible reimbursement of those who purchased the pumps. Any reimbursement will of course need to come from the general fund.

Executive Summary:
Many years ago (in 2018) the city of Newberg came into the possession of a two booster pumps that had been paid for by local residents.

The pumps currently in hand were jointly purchased by Veritas School, N. Valley Friends Church, and local developer Bill Roark, for the purpose of upgrading the OKBS, at a cost of **$68,428.00**. The city had previously agreed to upgrading the OKBS with these pumps. If not used, the city would need to reimburse them for the cost of the pumps in the following amounts, as provided by Larry Hampton.

Bill Rourke   - 41% - $28,055.00
NVFC   - 24% - $16,423.00
Veritas   - 35% - $23,950.00

As no members of the administration team that worked for the city at that time are still on staff, the current team does not know the details around the negotiations that caused the pumps to be purchased.

After sitting idle for many years, it was proposed first by the engineering division that the pumps should be deployed to the site to increase water pressure for the subdivision that serves a church, a school and several private homes.

Recently the mayor has suggested that this project may be a waste of public funds (in this case from the water fund). It was suggested that this project should be cancelled to save money. The CM cannot cancel this project without the approval of council since the project has been approved by the rate review, budget committee and city council (as part of this year's budget).

Staff desires to know the will of council on this matter.

Here are the advantages of ending the project:
- The city would save $350,000 that could be used for other water projects such as HB2001 water lines etc.
- The current infrastructure of the pump is working in a satisfactory way and meeting the needs of the residents in the area.
- If other housing units are added the builders should bear the burden for the costs of a new pump to supply units at higher elevations.
- The city can save money by waiting for the current pump to fail rather than spending money now. This would result in a more modern pump later since the pump in hand is already quite old.
- A failure of the current pump would not be catastrophic as it would simply reduce the flow until a replacement could be installed.
- Veritas was required by the city to provide the pump to supply water for their school. It was later discovered that the pump wasn't necessary for that purpose.
- Water pressure in Newberg is provided inexpensively by gravity below approximately the 200 ft level.
- The Oak Knoll pump supplies water to a few homes on and around Knoll Drive. The school, church, and subject residences will not be affected by installing a new pump.
- It may not be cost effective to replace a working pump, panel, and generator.

Here are the disadvantages of ending the project:

- The city already has the pump in hand, and it was purchased by local residents for this purpose.
- The original pump station in 2000 was designed at 250 gallons per minute (gpm) to support 40 single family homes.
- Using actual metering data in 2022 peak demand was measured at 315gpm.
- The Veritas school added 7 gpm. The plumbing fixture count calculations for the existing Church campus would result in a load of approximately 41 gpm.
- The proposed Peace Trail Village consisting of 8 units would result in a load of approximately 17 gpm.
- Currently the maximum load equals about 400 gpm.
- The emergency backup generator at OKBS is undersized and not capable of supplying emergency power to operate both domestic flow pumps and the one fire pump in the OKBS in the event of an emergency requiring greater than 1,000 GPM. It is only capable of running the Fire Service Pump, and one of the 2 water service pumps, not all three pumps.
- The current OKBS motors, Variable Frequency Drives (VFD's), and electrical service panels that was constructed in 2000 are 24 years old, and nearing end of serviceable life.
- Funds will need to be paid back to the parties involved.

Fiscal Impact:

- If the project is cancelled the city will save $350,000, but likely lose $68,428 in exchange.
- These funds could reduce the cost of other capital water projects, for example HB 2001 projects.
- The city will however need to build a new pump one day at an unknown date when the pump fails if it is not replaced now.

Council Goals:

It is unclear how this project relates directly to council goals.

9/20/2023

Peace Trails Village Cottages
Oak Knoll Booster Station Capacity Evaluation
Project Report

Date: September, 2023

Client: North Valley Friends Church
                                4020 N. College Street
                                Newberg, OR0 97132

Engineering Contact: John Christiansen, PE, CWRE
                                (503) 563-6151 | johnc@aks-eng.com

AKS Job Number: 7785-01

AKS
ENGINEERING & FORESTRY

12965 SW Herman Road, Suite 100
Tualatin, OR 97062
(503) 563-6151

Table of Contents

Appendices

Booster Station Evaluation Project Report
NORTH VALLEY FRIENDS CHURCH
YAMHILL, OREGON

1.0   Purpose of Report

The purpose of this report is to provide a detailed evaluation of the existing Oak Knoll Booster Station. The North Valley Friends Church (NVFC) is proposing to develop a cottage cluster on their property located on Yamhill County Assessor's Map 3 2 08 Tax Lots 2701, 2703, and 2802. The project is known as the Peace Trails Village. The proposed development will obtain domestic and fire protection water from the City of Newberg's water system, which in the case of the subject property, is fed by the Oak Knoll Water Booster. Conditions of approval for DR122-0011 require NVFC to assess the capacity of the booster station to serve existing connections and the proposed development. This report will provide an assessment of the booster station and recommended improvements necessary to allow for the connection of the proposed cottage cluster development and existing facilities at the NVFC campus.

2.0   Project Description

The Oak Knoll Booster Station was constructed in 2000 and includes two domestic flow pumps, each rated at 250-gpm and one fire pump rated at 750-gpm. The booster pump system operates in parallel to meet low-flow (10-gpm), high-flow (250-gpm), and fire flow (1,000-gpm) demands. The booster station feeds the 8" distribution system shown in Appendix A.

2.1.   Project Purpose

Peace Trails Village is a proposed residential cottage cluster on the North Valley Friends Church campus. The project is proposed to create eight cottages with access to a new community facility for laundry and storage. The development application (DR122-0011) for the project was submitted on December 2, 2022 and deemed completed on December 21, 2022. At the time of the application submittal and completeness determination, the City had a capital improvement plan to replace the existing Oak Knoll Booster with a larger regional booster known as the Bell West Pump Station. On February 6, 2023 Newberg's City Council adopted resolution 2023-3885 to '*formally end the Bell West Pump Station Project*'. NVFC received their Notice of Decision for DR122-0011 on February 10, 2023 which included the afore mentioned condition of approval to evaluate the capacity of the Oak Knoll Booster Pump Station and implement any improvements necessary to improve the pump station's capacity to serve the increased water demands from the proposed development.

3.0   Previous Evaluations

3.1.   Sandager Subdivision (The Summit at Oak Knoll No. 3) Water Booster Pump Station Design Calculations

The original water booster pump station design calculations were completed in January of 2000 by HBH Consulting Engineers. The system was originally designed to serve 56 single family units (40 in Sandager, 16 in adjacent development) with a total load of 225-gpm. The final pumps selected were 250-gpm. This demand was reevaluated in this report based on actual meter data.

3.2. Oak Knoll Booster Pump Upgrade Memorandum

This Memorandum was completed in November of 2015 by AKS Engineering & Forestry, LLC to present recommendations for upgrades to the Oak Knoll booster pumps to meet the domestic water needs of the proposed development of a 11-lot single-family residential lots. The increased peak demand on the pumps due to the proposed development was deemed to be approximately 70-gpm. This demand was reevaluated in this report based on actual meter data. In this evaluation, hydrant flow tests were completed on existing hydrants adjacent to the property at 4016 N College Street. The tests determined fire flow rates of 1,693-gpm and 2,272-gpm at 20 psi.

The conclusion of this memorandum is that the booster pump station could be upgraded to supply water to the proposed 11-lot residential development as well as support the existing development and facilities. AKS collaborated with the original supplier for the Oak Knoll booster pumps and found that recommended upgrades included Goulds Close-Coupled End-Suction pumps coupled with 30 HP motors with variable frequency drives to reduce wear and electrical load at pump start up.

3.3. Oak Knoll Booster Capacity Evaluation and Water Service Connection – Veritas Memorandum

This Memorandum was completed in August of 2018 by AKS Engineering & Forestry, LLC to provide calculation and documentation on how the existing Oak Knoll Booster Station can support the requested water service for the Veritas School located at 26288 NE Bell Road. The increased peak demand on the pumps due to the proposed service was deemed to be approximately 30-gpm. This demand was reevaluated in the 2015 Memorandum and determined to be 60-gpm. This demand will again be reevaluated in this report based on actual meter data. The total headloss through the on-site water system was estimated to be 18 psi. The City of Newberg completed flow tests on two hydrants near the subject property. The tests determined fire flow rates of 1,110-gpm and 1,010-gpm at 42 psi and 55 psi respectively.

The conclusion of this memorandum is that the booster pump station has the capacity to support the domestic water system demands of the Veritas School.

4.0 Engineering Analysis

The City of Newberg Public Works Design and Construction Standards identifies that for single-family residential areas, the minimum pressure shall be 40 psi measured at the meter and the minimum fire flow shall be 1,000-gpm at 20 psi. Water system engineering calculations for the Oak Knoll Booster Station Evaluation are summarized below.

4.1. Existing Connections

There are 40 single family residential homes connected to the existing booster station all of which were created with The Summit at Oak Knoll No. 3 subdivision. In addition to the SFR connections, several buildings on the Veritas School site are connected to the existing booster station via the City's water main.

Individual metering data at the Veritas School connection from 2022, Appendix B, was analyzed to determine a more accurate depiction of the demand from the Veritas connection. The school demand was estimated from the meter reading by dividing by an assumed 22 school days out of the month and 8-hours of use per day. To estimate peak demand for each reading, the demand was multiplied by a factor of 2. The peak demands for the months of July, August and September were averaged and **7.23-gpm** was used to re to estimate the schools' demand on the system.

Metering data at the booster station from 2022, Appendix B, were analyzed to determine a more accurate depiction of the demand from the existing 40 single family residential connections. Normal distribution curves and maximum flow occurrence bar graphs were developed with the data. The normal distribution curve for August was ultimately the most accurate depiction of the system demand and 322-gpm was used to represent the existing connections including the Veritas School connection. It was determined from the 2022 data that the peak demand on the pumps due to the existing 40 residential lots is **315-gpm** which yields approximately 7.88-gpm per lot.

4.2. Rourke Development

The Oak Knoll Booster Pump Upgrade memo from 2015 estimated an increased peak demand on the pumps due to the proposed development to be approximately 70-gpm. This was based on the existing booster system domestic use capacity of 250-gpm for 40 single family homes equating to 6.25-gpm/lot.

Metering data from 2022, Appendix B, was analyzed to determine a more accurate depiction of the demand from the Rourke Development connections. It was determined that the demand was about 7.88-gpm/lot, therefore the demand on the pumps from the Rourke Development is estimated to be **87-gpm.**

4.3. Existing NVFC Campus

The existing NVFC campus includes the Church, a gymnasium, a single-family residence, and several accessory structures.

NVFC Domestic Water Demand:

> **Domestic Demand:** The existing Church results in 91.5 fixture units as summarized in Table 1 below. From the 2021 Oregon Plumbing Specialty Code (OPSC), Appendix C, Chart A 103.1(2) the NVFC fixture count results in a load of approximately **41-gpm**.

Table 1:

FIXTURE	NUMBER	WATER FIXTURE UNITS	
		EACH	TOTAL
Toilets	13	2.5	32.5
Urinals	3	2.0	6.0
Sink	20	1.5	30.0
Water Fountains	3	0.5	1.5
Showers	3	2.0	6.0
Shower/Tub	1	4.0	4.0
Hose Bibb (1st)	1	2.5	2.5
Hose Bibb (each additional)	6	1.0	6.0
Dish Washer	2	1.5	3.0
TOTAL WATER FIXTURE UNITS			**91.5**

4.4. Proposed Cottage Cluster Development

The cluster cottage development will include 8 individual units. Each unit will be equipped with a kitchen and one full bathroom. In addition to the units, a common laundry facility will be constructed which will include one washer, a washer/dryer split unit and a wash sink.

Peace Trails Village Cottage Cluster Domestic Water Demand:

Domestic Demand: The proposed cottage cluster results in 23.5 fixture units as summarized in Table 2 below. From the 2021 Oregon Plumbing Specialty Code (OPSC), Appendix C, Chart A 103.1(2) the cottage cluster fixture count results in a load of approximately **17-gpm**.

Table 2:

FIXTURE	NUMBER	WATER FIXTURE UNITS	
		EACH	TOTAL
Kitchen	8	1.5	12.0
Laboratory	8	1.0	8.0
Sink	1	2.0	2.0
Laundry	1	1.5	1.5
TOTAL WATER FIXTURE UNITS			23.5

Line Sizing: The proposed on-site water system is to be constructed of approximately 400-LF of 2" PEX pipe and a backflow device. Headloss through the water service line was determined using OPSC Appendix C, Chart A 105.1(1) and was calculated to be 1.2-PSI over the 400-FT length. It is noteworthy that this calculation assumes the 17-GPM demand runs through the entire 400-FT length of the system. The water demand will decrease along the length of the service as individual connections are made. The headloss of 4.8-PSI is a conservative calculation. The double check valve assembly would result in an additional 4.5-PSI loss at 17-GPM per the Watts Series 007 data sheet. The total headloss through the on-site water system is estimated to be 5.7-PSI.

4.5. Fire Flow Requirements

Single family residential connections to the booster station have a fire flow requirement of 1,000-gpm at 20-PSI for a duration of 1 hour per correspondence from Tualatin Valley Fire & Rescue (TVF&R). The proposed cluster cottages will be equipped with an NFPA 13D sprinkler system. Oregon Fire Code (Section B105) states that the proposed cottages (Group R-3) require a minimum fire flow of 500-gpm for a duration of 0.5 hours however TVF&R requires a minimum of 1,000-gpm for a duration of 1 hour. The existing Institutional uses on the NVFC and Veritas properties will remain unchanged as a result of the proposed development and should not drive a fire flow requirement beyond the 1,000-gpm listed above.

4.6. Factor of Safety

Water booster stations are not designed with a factory of safety, but rather redundancy, in that the pump or combination of pumps are sized to meet 2x the domestic flow demand in the event of a failure of one of the pumps. The fire pump is designed to meet the fire flow requirement. Pump data can be found in Appendix D.

5.0 Summary of Evaluation & Recommendation

The evaluation of the Oak Knoll Booster Station concludes that the booster station does not have the capacity to support the domestic water system demands proposed. The total demand for existing connections adds up to a total demand of 322-gpm which would exceed the normal pump operation capacity.

Proposed demand from the Rourke Development, the NVFC Church, and the Cottage Cluster bring the total load up to 467-gpm. Table 3 below summarizes the existing and proposed demands on the system.

USER GROUP	DEMAND (GPM)
Existing:	
Veritas School	7.2
40-SRF Connections	314.8
Sub Total =	**322**
Proposed:	
NVFC Facilities	41
Rourke Subdivision	87
Cottage Cluster Development	17
Sub Total =	**145**
Total =	**467**

It is recommended that the booster station is upgraded with two pumps each rated at 467-gpm (one for redundancy) and a third 1,000-gpm pump for fire protection. It is also recommended that the booster station is supplemented with a jockey pump to accommodate low flow (10-gpm) demand scenarios.

Total Dynamic Head (THD) for the booster is calculated as follows:

$H_T = H_F + H_L + H_E$		
$H_F = (10.44*(L)* Q^{1.85})/ (C^{1.85} d^{4.87}) = $ Hazen-Williams		$H_L = \Sigma K(V^2)/2g$
Q = Flow (gpm)	d = Pipe Diameter (in)	K = Minor Loss Coeffient
L = Pipe Length (ft)	H_E = Energy/Static Head	V = Velocity (fps)
C = Pipe Coefficient (120 for CL DI pipe)		

Assumptions:

Length of main from Booster to subject property = ~2,000-ft

Q = 467-gpm

d = 8-in

$H_L = 0$

Existing Booster Elevation = 290-ft

Maximum Service Elevation = 340-ft

Minimum Service Pressure = 40-PSI = 92.3-ft

$H_F = (10.44*(2,000\text{-ft})*(467^{1.85}))/(120^{1.85}\ 8\text{-in}^{4.87}) = 10.3\text{-ft}$

$H_E = 340\text{-ft} – 290\text{-ft} + 92.3\text{-ft} = 142.3\text{-ft}$

$H_T = 10.3\text{-ft} + 142.3\text{-ft} = 152.6\text{-ft} \sim$ **153-ft TDH**

The maximum line velocity will occur under fire flow conditions (1,000 gpm). The proposed development will not result in an increase to the fire flow rate; therefore, this design criteria does not apply. The line velocity for the peak domestic demand is summarized as follows:

Q=VA; where
Q = Flow Rate (cfs)
V = Velocity (fps)
A = Area (sf)

<div style="text-align: right">

Assumptions:
Q = 467-gpm = 1.04-cfs (peak flow)
A = 8" CL DI Class 52 = 0.38 sf

</div>

V_{PEAK} = 1.04-cfs/0.38-sf = **2.74 fps**

The pump capacity of the Oak Knoll Booster station must be increased to **467 gpm @ 153 ft TDH**. NVFC/Veritas/Rourke jointly purchased two Goulds close-coupled end-suction pumps in 2018, each rated for 425 gpm @ 150 ft TDH. These pumps are currently stored at the City's public works facility. Assuming the pumps have been sufficiently stored and still function properly, these pumps can be utilized at the new design variables determined in this report.

Following City review of the above calculations and pump sizing recommendations, AKS will develop an implementation plan of the items discussed in this report. The implementation plan will evaluate, and document improvements required at the existing Oak Knoll Booster Pump Station to accept the proposed pumps improvements. The anticipated improvements include piping, electrical, backup generator, and controls upgrades.

Appendix A: Water System Map

EXISTING VERITAS CONNECTION

EX 8" MAIN

EXISTING NVFC FACILITIES

PROPOSED COTTAGE CLUSTER DEVELOMPENT

FUTURE 'ROURKE SUBDIVISION'

EXISTING 'THE SUMMIT AT OAK KNOLL' SRF SERVED BY OAK KNOLL BOOSTER

OAK KNOLL BOOSTER

SCALE 1" = 200 FEET

200   0   80 120 160 200

NOTE: IMAGE SOURCE AND UTILITY MAPPING SOURCE IS THE CITY OF NEWBERG GIS SYSTEM. SCALE IS APPROXIMATE.

DATE: 6/20/2023

WATER SYSTEM MAP
4016 N. COLLEGE STREET

EXHIBIT

A

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TUALATIN, OR 97062
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AKS

DRWN: SCB
CHKD: JPC

AKS JOB:

7785-01

Appendix B: 2022 Flow Metering Data

Oak Knoll Booster Station Flow data

Date	Flow Rate @7am	Total Flow	Average Flow Rate	Max Flow Rate	Time of Max Flow
1/1/2022	92	110722	76.9	170	8:37:59
1/2/2022	93	121653	84.5	151	16:30:58
1/3/2022	102	117523	81.6	147	22:59:16
1/4/2022	118	120586	83.7	137	12:33:59
1/5/2022	76	104091	72.3	180	7:44:34
1/6/2022	93	105799	73.5	176	5:26:47
1/7/2022	98	119351	82.9	170	5:33:46
1/8/2022	73	123861	86	149	8:09:30
1/9/2022	86	121047	84.1	145	21:40:28
1/10/2022	87	127330	88.4	185	17:03:23
1/11/2022	93	112442	78.1	151	5:31:17
1/12/2022	94	123389	85.7	141	15:02:20
1/13/2022	93	131331	91.2	166	20:25:19
1/14/2022	122	131951	91.6	149	1:41:08
1/15/2022	96	135024	93.8	165	15:25:31
1/16/2022	90	132445	92	166	8:15:26
1/17/2022	111	140369	97.5	178	20:22:35
1/18/2022	102	144141	100.1	176	6:11:08
1/19/2022	87	124803	86.7	156	12:24:38
1/20/2022	85	129041	89.6	161	14:36:15
1/21/2022	91	136081	94.5	161	13:11:40
1/22/2022	111	139745	97	152	7:19:48
1/23/2022	118	140471	97.5	156	22:12:42
1/24/2022	94	139302	96.7	165	22:37:40
1/25/2022	96	137474	95.5	158	14:30:39
1/26/2022	97	134746	93.6	182	8:06:48
1/27/2022	83	133667	92.8	163	7:12:37
1/28/2022	97	134393	93.3	153	1:59:21
1/29/2022	100	136740	95	163	4:52:04
1/30/2022	105	138717	96.3	163	12:09:33
1/31/2022	104	139920	97.2	167	8:14::38
Average	96		89	161	
Max	122		100	185	

Date	Flow Rate @7am	Total Flow	Average Flow Rate	Max Flow Rate	Time of Max Flow
2/1/2022	91	135045	93.8	160	8:30:56
2/2/2022	92	131746	91.5	165	18:21:49
2/3/2022	86	132497	92	148	11:05:37
2/4/2022	86	132870	92.3	160	13:58:06
2/5/2022	83	134359	93.3	155	7:16:07
2/6/2022	97	137094	95.2	172	18:07:05
2/7/2022	118	133775	92.9	181	7:09:13
2/8/2022	104	137540	95.5	157	7:05:31
2/9/2022	91	136941	95.1	164	14:55:46
2/10/2022	71	140062	97.3	175	6:57:29
2/11/2022	89	137807	95.7	150	5:37:23
2/12/2022	90	141638	98.4	171	0:24:53
2/13/2022	106	142525	99	162	6:38:30
2/14/2022	110	128400	89.2	173	8:23:20
2/15/2022	49	133761	92.9	165	6:42:57
2/16/2022	120	138307	96	174	14:15:23
2/17/2022	113	133696	92.8	158	2:58:16
2/18/2022	110	142309	98.8	157	7:44:46
2/19/2022	105	146866	102	177	10:19:39
2/20/2022	111	152106	105.6	160	17:56:18
2/21/2022	94	144233	100.2	175	23:53:25
2/22/2022	106	142486	98.9	180	9:41:35
2/23/2022	104	142379	98.9	170	19:22:43
2/24/2022	102	143125	99.4	168	21:33:17
2/25/2022	114	168518	117	*1403*	19:45:21
2/26/2022	112	147916	102.7	190	5:12:11
2/27/2022	102	146282	101.6	165	7:26:05
2/28/2022	110	135116	93.8	168	8:42:54
Average	99		97	166	
Max	120		117	190	

Date	Flow Rate @7am	Total Flow	Average Flow Rate	Max Flow Rate	Time of Max Flow
3/1/2022	117	162760	113	206	5:30:06
3/2/2022	125	152357	105.8	174	14:40:46
3/3/2022	89	145430	101	168	18:26:14
3/4/2022	100	139051	96.6	165	7:53:43
3/5/2022	111	135128	93.8	171	23:24:17
3/6/2022	103	141096	98	168	5:44:35
3/7/2022	128	141939	98.6	197	8:25:04
3/8/2022	102	142795	99.2	156	8:19:38
3/9/2022	114	143136	99.4	181	12:49:02
3/10/2022	102	143495	99.6	161	5:09:10
3/11/2022	85	144250	100.2	158	9:25:46
3/12/2022	129	146872	102	175	9:31:23
3/13/2022	85	134385	93.3	175	14:33:51
3/14/2022	114	137226	95.3	162	15:49:51
3/15/2022	99	141761	98.4	160	21:42:34
3/16/2022	97	139821	97.1	170	9:48:44
3/17/2022	97	136138	94.5	158	9:34:53
3/18/2022	115	143027	99.3	166	22:14:45
3/19/2022	90	133291	92.6	158	9:27:40
3/20/2022	98	138745	96.4	149	20:32:12
3/21/2022	103	151869	105.5	155	19:21:31
3/22/2022	103	141217	98.1	161	7:31:17
3/23/2022	79	135404	94	157	13:05:19
3/24/2022	122	138187	96	145	5:06:37
3/25/2022	98	139089	96.6	164	9:17:03
3/26/2022	89	137058	95.2	145	9:17:03
3/27/2022	109	142853	99.2	157	9:20:49
3/28/2022	111	143194	99.4	171	8:42:12
3/29/2022	111	141338	98.2	150	8:54:42
3/30/2022	100	135706	94.2	152	19:58:55
3/31/2022	139	146672	101.9	156	6:47:58
Average	105		98	164	
Max	139		113	206	

Date	Flow Rate @7am	Total Flow	Average Flow Rate	Max Flow Rate	Time of Max Flow
4/1/2022	126	150975	104.8	162	5:28:06
4/2/2022	98	139772	97.1	171	8:11:27
4/3/2022	80	140776	97.8	150	0:51:24
4/4/2022	115	140919	97.9	155	20:40:07
4/5/2022	120	137470	95.5	167	6:36:56
4/6/2022	103	134634	93.5	155	8:54:46
4/7/2022	123	129956	90.2	152	6:13:59
4/8/2022	95	127860	88.8	153	7:14:49
4/9/2022	119	127733	88.7	159	11:45:12
4/10/2022	79	132070	91.7	167	10:23:06
4/11/2022	107	133989	93	164	17:02:24
4/12/2022	112	137676	95.6	161	7:19:13
4/13/2022	116	142618	99	177	15:48:07
4/14/2022	132	148645	103.2	172	7:52:26
4/15/2022	115	145204	100.8	168	7:36:40
4/16/2022	99	145775	101.2	168	9:37:49
4/17/2022	117	139561	96.9	152	7:26:47
4/18/2022	106	138611	96.3	181	7:38:32
4/19/2022	118	138115	95.9	169	7:56:44
4/20/2022	113	136172	94.6	156	6:02:57
4/21/2022	140	142335	98.8	162	10:12:12
4/22/2022	104	138602	96.3	178	9:30:11
4/23/2022	112	138776	96.4	164	21:53:28
4/24/2022	117	140914	97.9	219	4:55:13
4/25/2022	135	142617	99	161	21:30:21
4/26/2022	115	148551	103.2	172	11:06:25
4/27/2022	119	146557	101.8	172	9:21:50
4/28/2022	126	144053	100	162	6:46:18
4/29/2022	121	139661	97	167	7:25:23
4/30/2022	108	133653	92.8	166	7:21:26
Average	113		97	166	
Max	140		105	219	

Date	Flow Rate @7am	Total Flow	Average Flow Rate	Max Flow Rate	Time of Max Flow
5/1/2022	88	132894	92.3	147	7:19:49
5/2/2022	138	140102	97.3	158	12:30:08
5/3/2022	121	143976	100	162	14:01:46
5/4/2022	128	135740	94.3	159	7:27:40
5/5/2022	121	137234	95.3	150	7:26:09
5/6/2022	106	129223	89.7	144	8:01:43
5/7/2022	103	123514	85.8	143	8:09:32
5/8/2022	85	134981	93.7	144	8:26:01
5/9/2022	133	134079	93.1	176	7:07:14
5/10/2022	136	138192	96	152	13:39:33
5/11/2022	113	128734	89.4	146	6:29:55
5/12/2022	121	133145	92.5	173	8:39:46
5/13/2022	119	133134	92.5	156	7:52:44
5/14/2022	98	134741	93.6	156	13:27:53
5/15/2022	79	130613	90.7	152	10:10:46
5/16/2022	126	128102	89	146	6:39:55
5/17/2022	106	132696	92.2	156	7:15:25
5/18/2022	93	119309	82.9	146	21:45:32
5/19/2022	108	125028	86.8	179	8:12:56
5/20/2022	111	118639	82.4	153	7:28:30
5/21/2022	94	118081	82	135	7:54:24
5/22/2022	90	118418	82.2	153	14:07:26
5/23/2022	105	121802	84.6	234	1:59:04
5/24/2022	94	120390	83.6	160	7:20:54
5/25/2022	82	119803	83.2	147	7:00:52
5/26/2022	100	116512	80.9	151	4:14:26
5/27/2022	87	116364	80.8	170	4:45:09
5/28/2022	92	114746	79.7	145	4:21:23
5/29/2022	110	120274	83.5	186	4:04:27
5/30/2022	98	117789	81.8	156	7:10:09
5/31/2022	93	116379	80.8	140	5:12:18
Average	106		88	157	
Max	138		100	234	

Date	Flow Rate @7am	Total Flow	Average Flow Rate	Max Flow Rate	Time of Max Flow
6/1/2022	99	117671	81.7	194	3:31:17
6/2/2022	122	121573	84.4	197	4:41:00
6/3/2022	87	119478	83	180	3:34:49
6/4/2022	93	121778	84.6	132	5:08:08
6/5/2022	86	124370	86.4	172	5:05:17
6/6/2022	94	125637	87.2	175	5:01:06
6/7/2022	110	126036	87.5	143	4:22:49
6/8/2022	93	124258	86.3	192	3:28:43
6/9/2022	100	120216	83.5	140	4:21:45
6/10/2022	91	128267	89.1	162	5:11:35
6/11/2022	100	140420	97.5	151	5:12:29
6/12/2022	115	136205	94.6	199	3:33:52
6/13/2022	111	135601	94.2	153	5:10:46
6/14/2022	90	127918	88.8	147	11:12:21
6/15/2022	83	127886	88.8	208	3:29:58
6/16/2022	109	125048	86.8	150	5:07:07
6/17/2022	91	128998	89.6	180	3:33:16
6/18/2022	94	132292	91.9	141	5:22:34
6/19/2022	91	131093	91	191	3:34:08
6/20/2022	103	127611	88.6	135	10:14:07
6/21/2022	93	130830	90.9	154	4:15:25
6/22/2022	88	129890	90.2	229	3:09:28
6/23/2022	138	144578	100.4	167	5:54:23
6/24/2022	100	137576	95.5	192	4:38:56
6/25/2022	109	143715	99.8	224	3:12:11
6/26/2022	98	141991	98.6	225	2:40:14
6/27/2022	138	151751	105.4	192	3:34:12
6/28/2022	117	155830	108.2	198	5:00:00
6/29/2022	124	152154	105.7	202	3:29:58
6/30/2022	140	151920	105.5	187	5:25:17
Average	104		92	177	
Max	140		108	229	

Date	Flow Rate @7am	Total Flow	Average Flow Rate	Max Flow Rate	Time of Max Flow
7/1/2022	148	157289	109.2	207	5:02:21
7/2/2022	139	157655	109.5	189	3:22:45
7/3/2022	139	156991	109	204	5:07:23
7/4/2022	138	157542	109.4	200	3:30:02
7/5/2022	113	163034	113.2	215	1:24:40
7/6/2022	105	157658	109.5	169	2:47:00
7/7/2022	150	162584	112.9	236	2:51:08
7/8/2022	135	160120	111.2	233	3:32:27
7/9/2022	141	160832	111.7	186	3:29:41
7/10/2022	133	165619	115	204	5:04:08
7/11/2022	163	173253	120.3	204	5:43:56
7/12/2022	162	175385	121.8	245	5:01:55
7/13/2022	156	177434	123.2	284	3:00:50
7/14/2022	170	184278	128	512	9:31:29
7/15/2022	194	178778	124.2	486	8:03:00
7/16/2022	162	174041	120.9	486	7:21:45
7/17/2022	165	176512	122.6	259	6:18:19
7/18/2022	154	180292	125.2	246	6:24:56
7/19/2022	149	179439	124.6	343	7:27:52
7/20/2022	128	164676	114.4	221	6:16:28
7/21/2022	153	171370	119	315	10:13:45
7/22/2022	96	170584	118.5	265	11:29:52
7/23/2022	145	160785	111.7	204	4:39:05
7/24/2022	123	173549	120.5	263	5:02:23
7/25/2022	173	177018	122.9	272	5:04:06
7/26/2022	123	174074	120.9	378	7:18:21
7/27/2022	139	175125	121.6	348	8:07:05
7/28/2022	144	171992	119.4	307	12:13:29
7/29/2022	150	178967	124.3	485	11:52:51
7/30/2022	144	179765	124.6	407	14:24:05
7/31/2022	146	180067	125	217	6:42:33
Average	145		118	284	
Max	194		128	512	

Date	Flow Rate @7am	Total Flow	Average Flow Rate	Max Flow Rate	Time of Max Flow
8/1/2022	175	183924	127.7	255	5:21:02
8/2/2022	162	186248	129.3	235	7:57:37
8/3/2022	177	200560	139.3	365	14:42:19
8/4/2022	150	180376	125.3	356	12:20:38
8/5/2022	179	182890	127	243	5:18:42
8/6/2022	164	173311	120.4	525	7:59:05
8/7/2022	143	174344	121.1	243	6:26:33
8/8/2022	148	172087	119.5	265	5:20:16
8/9/2022	143	166602	115.7	439	8:08:57
8/10/2022	125	163748	113.7	234	6:28:53
8/11/2022	162	161431	112.1	234	5:07:53
8/12/2022	118	174855	121.4	349	14:09:17
8/13/2022	152	162817	113.1	224	6:22:09
8/14/2022	130	167807	116.5	214	6:01:59
8/15/2022	176	168778	117.2	226	5:01:41
8/16/2022	143	172268	119.6	473	9:45:52
8/17/2022	145	176835	122.8	490	7:44:55
8/18/2022	142	173218	120.3	452	10:47:23
8/19/2022	129	170968	118.7	233	6:44:25
8/20/2022	140	162981	113.2	313	7:36:56
8/21/2022	152	160383	111.4	235	6:33:48
8/22/2022	130	171946	119.4	234	6:20:51
8/23/2022	152	168005	116.7	419	13:25:50
8/24/2022	138	164020	113.9	420	8:23:05
8/25/2022	151	175426	121.8	514	7:56:04
8/26/2022	136	165111	114.7	353	12:51:22
8/27/2022	154	161567	112.2	225	6:21:18
8/28/2022	143	166278	115.5	221	5:03:02
8/29/2022	162	165765	115.1	244	6:23:31
8/30/2022	139	161488	112.1	*1025*	5:05:41
8/31/2022	112	168974	117.3	426	14:33:40
Average	147		119	322	
Max	179		139	525	
Min				214	

Oak Knoll Booster Station Flow data

Date	Flow Rate @7am	Total Flow	Average Flow Rate	Max Flow Rate	Time of Max Flow
9/1/2022	157	164011	113.9	*1074*	16:56:03
9/2/2022	137	173733	120.6	452	11:36:47
9/3/2022	145	157929	109.7	365	14:05:00
9/4/2022	115	166403	115.6	221	5:02:32
9/5/2022	159	177123	123	260	5:19:46
9/6/2022	175	173969	120.8	231	5:02:35
9/7/2022	158	179130	124.4	418	14:31:45
9/8/2022	128	167900	116.6	324	14:22:37
9/9/2022	166	181148	125.8	291	8:35:36
9/10/2022	142	167723	116.5	317	10:26:44
9/11/2022	118	177191	123	231	5:02:57
9/12/2022	137	178006	123.6	244	3:30:46
9/13/2022	172	175925	122.2	274	14:04:25
9/14/2022	120	179597	124.7	283	12:06:34
9/15/2022	174	171661	119.2	243	5:08:07
9/16/2022	130	179055	124.3	315	7:43:12
9/17/2022	153	172844	120	256	11:41:40
9/18/2022	146	178516	124	211	5:36:32
9/19/2022	145	179224	124.5	233	5:36:01
9/20/2022	118	177614	123.3	263	10:36:12
9/21/2022	135	178433	123.9	336	12:46:59
9/22/2022	135	178899	124.2	411	17:23:28
9/23/2022	133	176117	122.3	214	5:14:21
9/24/2022	127	172109	119.5	273	15:13:26
9/25/2022	125	173996	120.8	*1091*	16:18:39
9/26/2022	138	171739	119.3	250	3:34:46
9/27/2022	124	167785	116.5	379	7:34:55
9/28/2022	121	169934	118	408	7:42:55
9/29/2022	128	163327	113.4	411	16:36:06
9/30/2022	108	152397	105.8	262	3:35:02
Average	**139**		**120**	**299**	
Max	**175**		**126**	**452**	

Date	Flow Rate @7am	Total Flow	Average Flow Rate	Max Flow Rate	Time of Max Flow
10/1/2022	111	153705	106.7	371	14:53:14
10/2/2022	123	146655	101.8	220	3:31:42
10/3/2022	137	155535	108	213	5:17:11
10/4/2022	118	162446	112.8	366	14:21:15
10/5/2022	142	166283	115.5	356	13:42:35
10/6/2022	147	161183	111.9	213	3:07:03
10/7/2022	125	161377	112.1	318	15:23:56
10/8/2022	128	158303	109.9	209	3:07:19
10/9/2022	112	157601	109.4	183	5:00:39
10/10/2022	137	161670	112.3	248	3:31:42
10/11/2022	135	163009	113.2	178	4:36:52
10/12/2022	142	164361	114.1	208	3:32:40
10/13/2022	122	165044	114.6	206	3:07:19
10/14/2022	127	160511	111.5	180	3:31:37
10/15/2022	132	162866	113.1	192	7:12:22
10/16/2022	104	156610	108.8	179	3:06:54
10/17/2022	143	163146	113.3	220	3:34:52
10/18/2022	141	170963	118.7	177	4:44:27
10/19/2022	108	172072	119.5	416	8:16:11
10/20/2022	107	159407	110.7	320	13:12:15
10/21/2022	140	154934	107.6	222	3:37:18
10/22/2022	116	154247	107.1	169	11:15:07
10/23/2022	118	154586	107.4	205	4:20:51
10/24/2022	115	148086	102.8	256	3:37:49
10/25/2022	118	145454	101	223	4:45:12
10/26/2022	103	152560	105.9	157	15:50:57
10/27/2022	96	151182	105	193	3:37:29
10/28/2022	127	148686	103.3	211	3:39:53
10/29/2022	100	159070	110.5	188	3:37:13
10/30/2022	101	139473	96.9	146	17:32:52
10/31/2022	105	142358	98.9	139	4:45:25
Average	**122**		**109**	**228**	
Max	**147**		**120**	**416**	

Date	Flow Rate @7am	Total Flow	Average Flow Rate	Max Flow Rate	Time of Max Flow
11/1/2022	101	134182	93.2	132	8:50:55
11/2/2022	102	141208	98.1	171	6:50:48
11/3/2022	98	137890	95.8	152	23:56:57
11/4/2022	100	138051	95.9	215	11:27:37
11/5/2022	128	137850	95.7	145	22:42:15
11/6/2022	82	157331	109.3	158	21:24:33
11/7/2022	88	141892	98.5	144	19:13:22
11/8/2022	114	135537	94.1	172	3:45:35
11/9/2022	84	130926	90.9	173	3:50:24
11/10/2022	101	126858	88.1	162	17:04:03
11/11/2022	95	128524	89.3	151	18:06:52
11/12/2022	94	126541	87.9	167	3:47:21
11/13/2022	100	133940	93	153	23:00:00
11/14/2022	103	127785	88.7	162	17:12:34
11/15/2022	105	122560	85.1	162	18:23:37
11/16/2022	88	127309	88.4	393	11:07:46
11/17/2022	119	125175	86.9	146	23:33:44
11/18/2022	102	126311	87.7	159	8:58:54
11/19/2022	110	142199	98.7	474	11:06:18
11/20/2022	121	150326	104.4	162	8:53:48
11/21/2022	134	154860	107.5	167	17:07:46
11/22/2022	98	154509	107.3	170	7:41:06
11/23/2022	115	156376	108.6	161	20:15:57
11/24/2022	105	159401	110.7	165	9:37:01
11/25/2022	101	157008	109	168	15:33:55
11/26/2022	78	146342	101.6	156	9:24:20
11/27/2022	64	125898	87.4	160	8:52:38
11/28/2022	110	130275	90.5	173	20:09:51
11/29/2022	94	128279	89.1	134	7:59:16
11/30/2022	100	127924	88.8	143	16:24:19
Average	**101**		**96**	**178**	
Max	**134**		**111**	**474**	

Date	Flow Rate @7am	Total Flow	Average Flow Rate	Max Flow Rate	Time of Max Flow
12/1/2022	103	136611	94.9	158	21:28:02
12/2/2022	70	143934	100	165	18:30:07
12/3/2022	89	133280	92.6	169	16:57:30
12/4/2022	95	126715	88	154	
12/5/2022	87	128842	89.5	155	
12/6/2022	90	126983	88.2	300	
12/7/2022	93	128621	89.3	308	
12/8/2022	82	134850	93.6	438	
12/9/2022	96	135765	94.3	246	
12/10/2022	82	135837	94.3	148	
12/11/2022	85	135378	94	167	12:22:46
12/12/2022	99	133251	92.5	150	1:32:24
12/13/2022	107	129069	89.6	155	7:49:04
12/14/2022	101	129398	89.9	162	15:44:53
12/15/2022	86	132794	92.2	238	8:20:36
12/16/2022	91	132494	92	*955*	12:18:25
12/17/2022	127	137310	95.4	284	12:34:49
12/18/2022	79	131935	91.6	148	7:31:57
12/19/2022	86	130532	90.6	166	7:27:07
12/20/2022	89	128535	89.3	187	14:05:10
12/21/2022	82	124593	86.5	188	7:55:10
12/22/2022	89	124340	86.3	150	22:34:28
12/23/2022	109	127091	88.3	155	16:31:11
12/24/2022	110	126647	87.9	150	15:45:50
12/25/2022	71	125318	87	145	
12/26/2022	74	116458	80.9	150	
12/27/2022	107	121583	84.4	146	
12/28/2022	93	155826	108.2	170	
12/29/2022	66	126537	87.9	347	
12/30/2022	90	109161	75.8	153	
12/31/2022	85	113533	78.8	179	
Average	**91**		**90**	**194**	
Max	**127**		**108**	**438**	

Summary

	Avg Flow Rate	Max Flow Rate	Avg. Max Flow Rate
January	89	185	161
February	92	190	166
March	118	206	164
April	97	219	166
May	88	234	157
June	92	229	177
July	118	512	284
August	119	525	322
September	120	452	299
October	109	416	228
November	96	474	178
December	90	438	194

Flow Data

Average Flow Rate for 2022

July

Flow Range	Quantity
150-175	1
175-200	2
200-225	9
225-250	4
250-275	4
275-300	1
300-325	2
325-350	2
350-375	
375-400	1
400-425	1
425-450	
450-475	
475-500	3
500-525	1
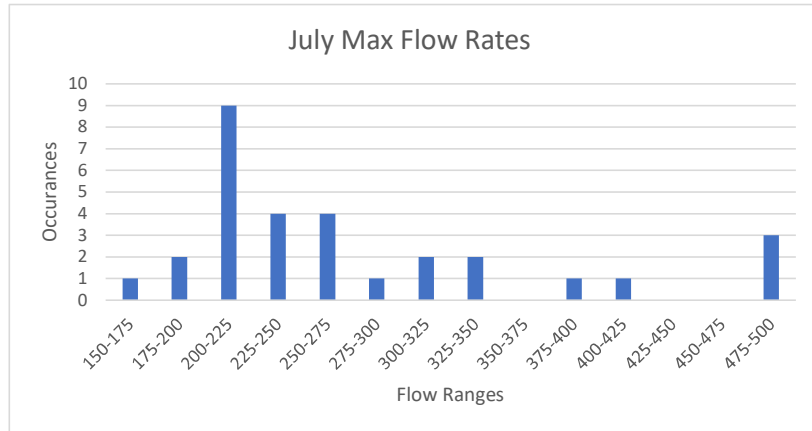
August

Flow Range	Quantity
200-225	3
225-250	11
250-275	2
275-300	0
300-325	1
325-350	1
350-375	3
375-400	0
400-425	2
425-450	2
450-475	2
475-500	1
500-525	2
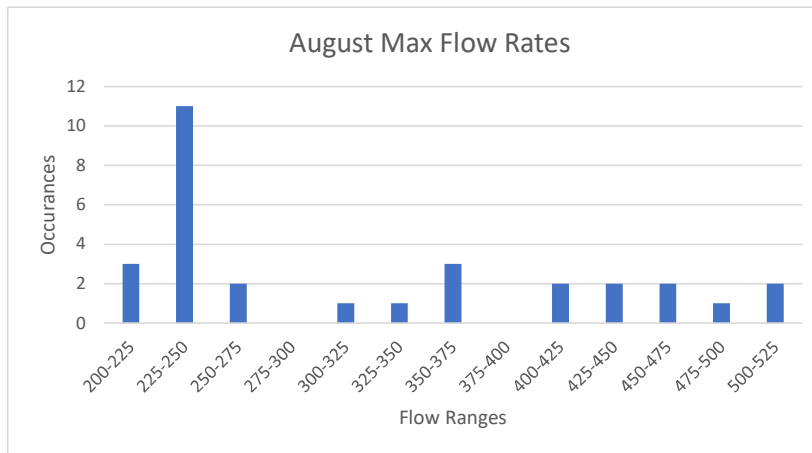
September

Flow Range	Quantity
200-225	3
225-250	5
250-275	7
275-300	2
300-325	3
325-350	1
350-375	1
375-400	1
400-425	4
425-450	
450-475	1
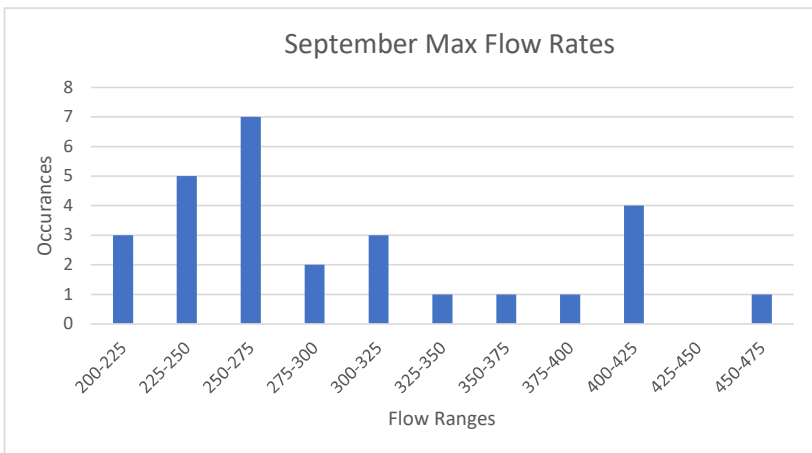
July	
Max Flow Rate	**Normal Distribution**
169	0.002070191
186	0.002478994
189	0.002551435
200	0.002813898
204	0.002907162
204	0.002907162
204	0.002907162
204	0.002907162
207	0.002976007
215	0.00315377
217	0.003196648
221	0.003280225
233	0.003510448
236	0.003562464
245	0.003703138
246	0.00371725
259	0.003870296
263	0.003905348
265	0.003920641
272	0.003962142
284	0.0039886
307	0.003880494
315	0.003796235
343	0.003342754
348	0.003240836
378	0.002553768
407	0.001862155
485	0.000524719
486	0.000514233
486	0.000514233
512	0.000293748

Mean 284
Std. Dev. 100

August	
Max Flow Rate	**Normal Distribution**
214	0.002238792
221	0.002393697
224	0.002459945
225	0.002481978
226	0.00250398
233	0.002656737
234	0.002678327
234	0.002678327
234	0.002678327
235	0.002699845
235	0.002699845
243	0.00286887
243	0.00286887
244	0.002889539
255	0.003108143
265	0.00328944
313	0.003801852
349	0.003690405
353	0.003651403
356	0.003618944
365	0.003505924
419	0.00248051
420	0.002458475
426	0.00232584
439	0.002039325
452	0.001760671
473	0.00134406
490	0.001048723
514	0.00070629
525	0.000578961

Mean 322
Std. Dev. 105

September	
Max Flow Rate	**Normal Distribution**
211	0.002613238
214	0.002748824
221	0.003072185
231	0.003542129
231	0.003542129
233	0.003635914
243	0.004095328
244	0.004139914
250	0.004399796
256	0.004643348
260	0.004794464
262	0.004866171
263	0.004900995
273	0.005207206
274	0.005233256
283	0.005425924
291	0.005529474
315	0.005430753
317	0.005395239
324	0.005240535
336	0.004876192
365	0.003649281
379	0.002992276
408	0.001756861
411	0.00164724
411	0.00164724
418	0.001407702
452	0.000572957

Mean 299
Std. Dev. 72

July Normal Distribution

August Normal Distribution

September Normal Distritbution
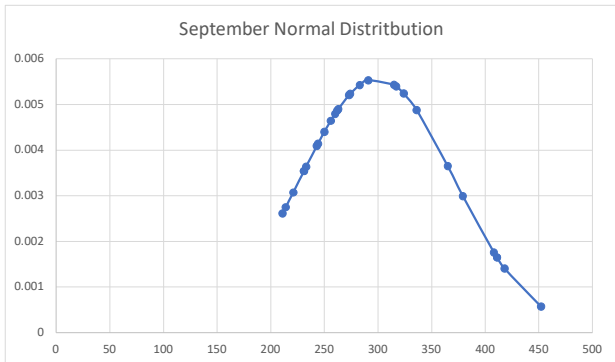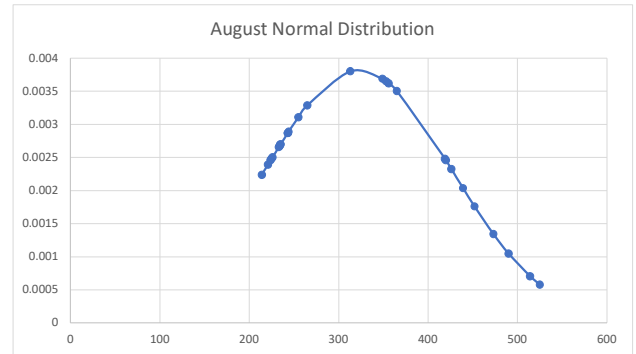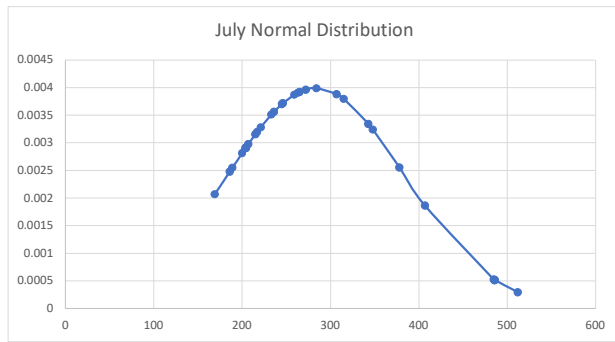
Veritas School Metering Consumption

Month	Meter Reading (CF)	Meter Reading (gal)	Daily Demand (gpd)	Demand (gpm)	Peak Demand (gpm)			
Dec-21	1000	7481	340	0.71	1.42			
Jan-22	1000	7481	340	0.71	1.42			
Feb-22	1200	8977	408	0.85	1.70			
Mar-22	1300	9725	442	0.92	1.84			
Apr-22	1500	11221	510	1.06	2.13			
May-22	1400	10473	476	0.99	1.98			
Jun-22	900	6732	306	0.64	1.28			
Jul-22	**3000**	**22442**	**1020**	**2.13**	**4.25**			
Aug-22	**5000**	**37403**	**1700**	**3.54**	**7.08**			
Sep-22	**7300**	**54608**	**2482**	**5.17**	**10.34**	**Mean =**	**7.23**	gpm
Oct-22	3500	26182	1190	2.48	4.96			
Nov-22	1200	8977	408	0.85	1.70			
Dec-22	900	6732	306	0.64	1.28			
			2022 Mean =	**1.66**	**3.33**			
			2022 Max.=	**5.17**	**10.34**			

Appendix C: Proposed Demand Calculations

CHART A 103.1(1)
ESTIMATE CURVES FOR DEMAND LOAD
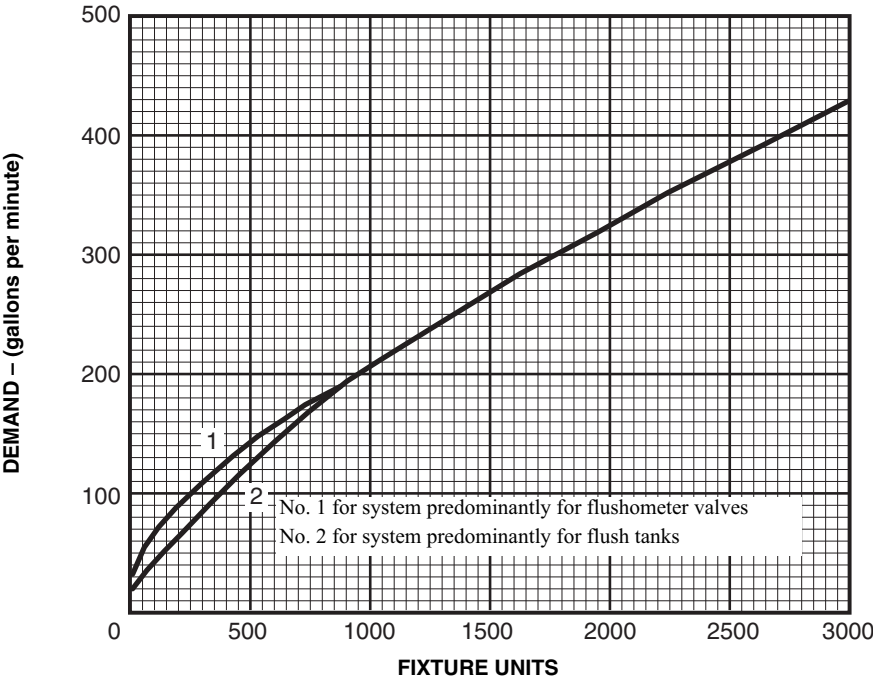
No. 1 for system predominantly for flushometer valves
No. 2 for system predominantly for flush tanks

For SI units: 1 gallon per minute = 0.06 L/s

CHART A 103.1(2)
ENLARGED SCALE DEMAND LOAD

DEMAND = 17-GPM

FC = 23.5

For SI units: 1 gallon per minute = 0.06 L/s

CHART A 105.1(1)

Copper Tubing
Smooth Pipe
Type M – – – –
Type L ————
Type K —·—··—

FLOW (gallons per minute)

Demand = 17-GPM

FRICTION LOSS IN HEAD (pounds-force per square inch) PER 100-FOOT LENGTH
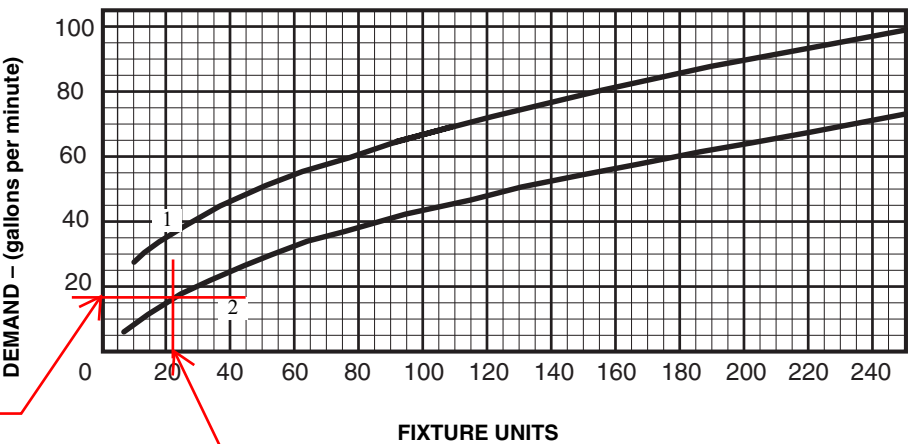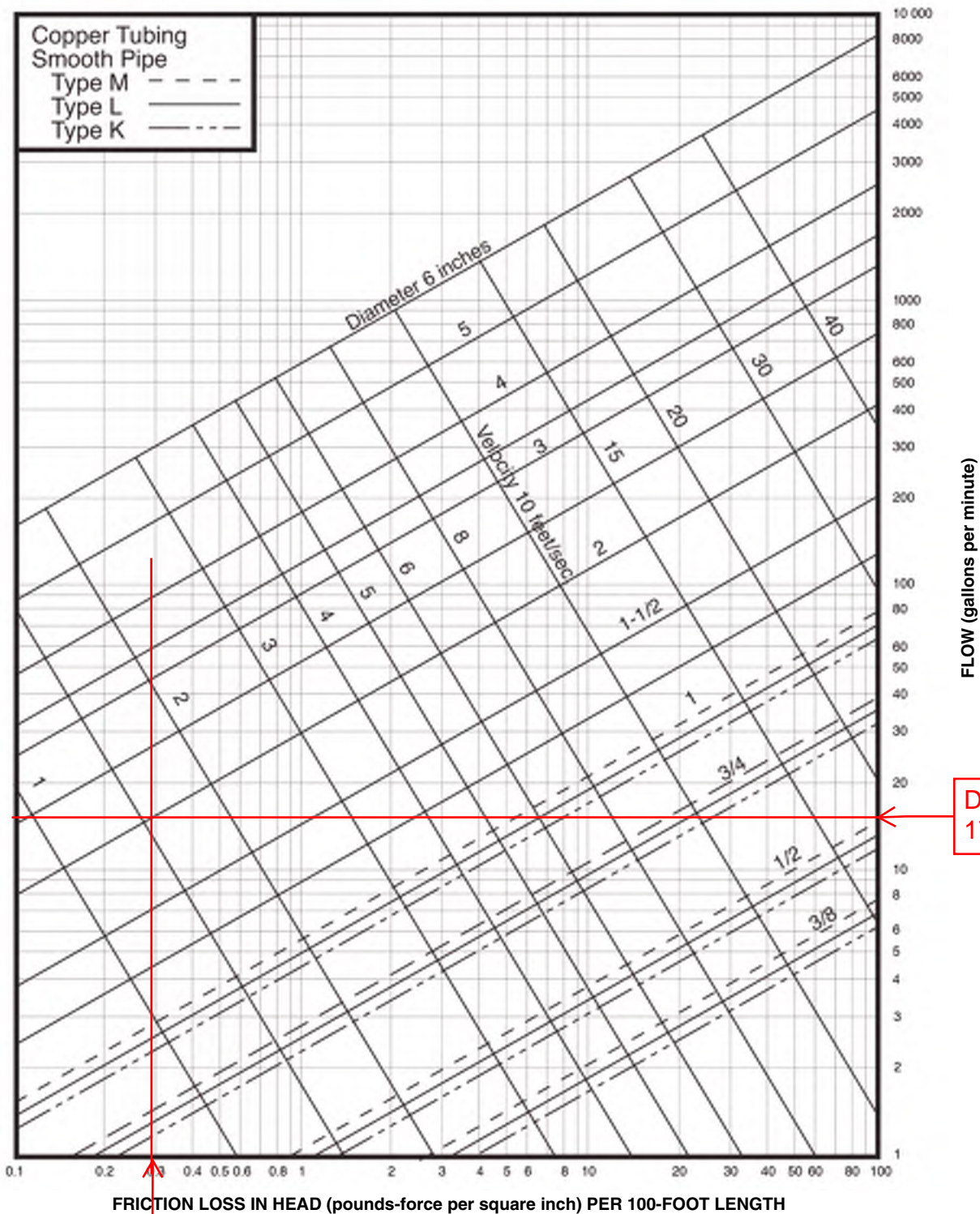
Headloss/100-LF = 0.3-PSI

For SI units: 1 inch = 25 mm, 1 gallon per minute = 0.06 L/s, 1 pound-force per square inch = 6.8947 kPa, 1 foot = 304.8 mm, 1 foot per second = 0.3048 m/s

Appendix D: Pump Data

Performance Curves – 60 Hz, 3500 RPM
Curvas de Funcionamiento – 60 Hz, 3500 RPM

Model SSH – 22SH / Size (Tamaño) 2¹/₂ x 3-8
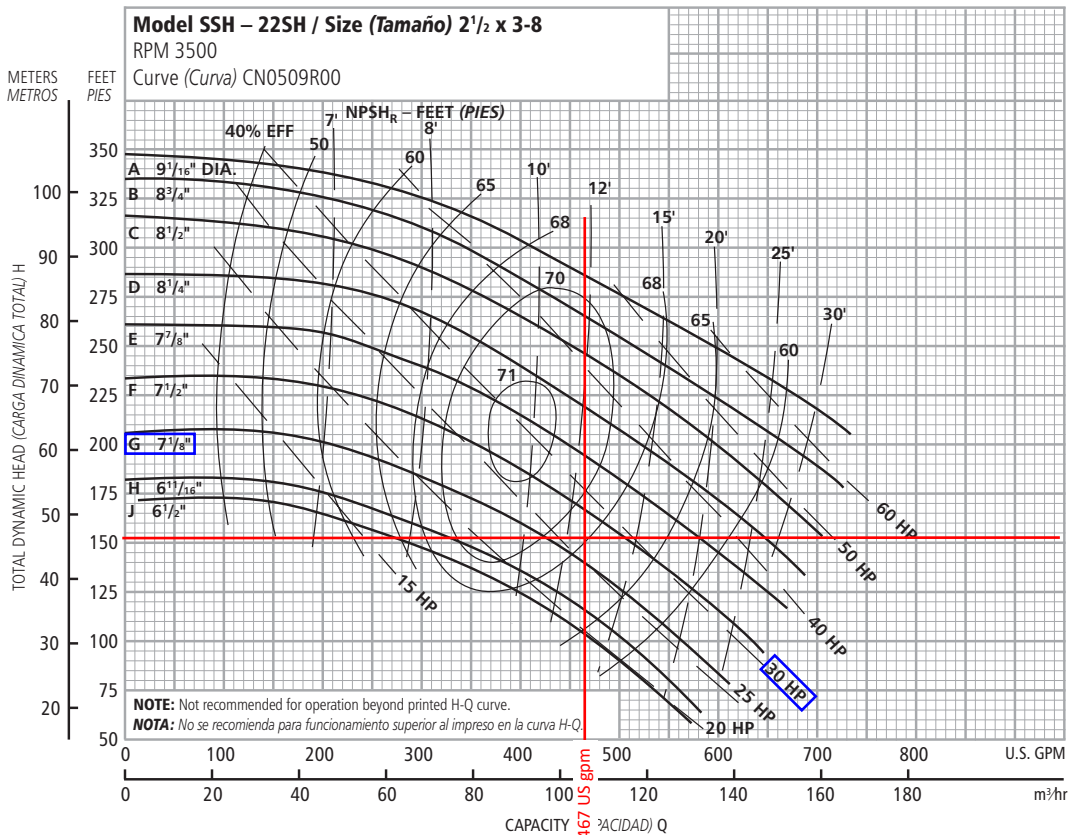RPM 3500
Curve (Curva) CN0509R00

Optional Impeller, *Impulsor Opcional*		
Impeller Code, *Código del Impulsor*	**Dia., *Diá.***	**Standard HP Rating, *Estándar HP Potencia***
A	9¹/₁₆"	60
B	8¾"	50
C	8½	50
D	8¼	40
E	7⅞	40
F	7½	30
G	7⅛	25
H	6¹¹/₁₆	20
J	6½	20

NOTE: Pump will pass a sphere to ¹⁹/₃₂" diameter.

NOTA: La bomba pasará una esfera a ¹⁹/₃₂" diámetro.

NOTE: Not recommended for operation beyond printed H-Q curve.
NOTA: No se recomienda para funcionamiento superior al impreso en la curva H-Q.

Model SSH – 27SH / Size (Tamaño) 2¹/₂ x 3-10
RPM 3500
Curve (Curva) CN0512R00

Optional Impeller, *Impulsor Opcional*		
Impeller Code, *Código del Impulsor*	**Dia., *Diá.***	**Standard HP Rating, *Estándar HP Potencia***
A	10³/₈"	100
B	9¹⁵/₁₆	75
C	9⁹/₁₆"	75
D	9¼	60
E	8¾	50

NOTE: Pump will pass a sphere to ¹⁹/₃₂" diameter.

NOTA: La bomba pasará una esfera a ¹⁹/₃₂" diámetro.

NOTE: Not recommended for operation beyond printed H-Q curve.
NOTA: No se recomienda para funcionamiento superior al impreso en la curva H-Q.

GOULDS PUMPS
Commercial Water

18

Appendix E: Sandager Subdivision Water Booster Pump Station Design Calculations (2000)

SANDAGER SUBDIVISION
Newberg, Oregon

WATER BOOSTER PUMP STATION
DESIGN CALCULATIONS

January 10, 2000

REGISTERED PROFESSIONAL
ENGINEER
19191
OREGON
JULY 15, 1997
ROBERT M. HENRY
EXPIRES: 6/30/ O 1
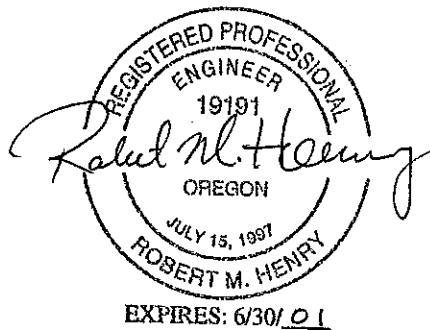
Prepared for:

MIKE HANKS
10225 SW Redway
Beaverton, Oregon 97007

Prepared by:

H B H
Consulting
Engineers

11535 SW Durham Road, Ste C6
Tigard, Oregon 97224
Phone: 503.670.0499 – Fax: 503.670.0540

NOTE: THESE CALCULATIONS SUPERCEDE (AND SUPPLEMENT) PRELIMINARY CALCULATIONS DATED 10-7-99. SEE PRELIMINARY CALCULATIONS FOR NUMBER OF HOUSES SERVED (56).

PUMP SIZING - DUTY PUMPS

FROM CITY OF NEWBERG STANDARDS (EXHIBIT 3):

     50 RESIDENCES → 200 GPM
     75 RESIDENCES → 250 GPM

FOR 56 LOTS (40 IN SANDAGER, 16 IN ADJACENT DEVELOPMENT), FLOW OF 225 GPM IS THE ACCEPTABLE AMOUNT OF FLOW.

HOWEVER, BASED ON CONVERSATIONS WITH CITY ENGINEER AND FIRE CHIEF, IT WOULD BE APPROPRIATE TO PROVIDE 500 GPM OF FIRE FLOW (WITH SPRINKLED HOUSES) DURING POWER FAILURE. TO DO THIS, THE 2 PUMPS WOULD BE POWERED BY THE GENERATOR FOR A TOTAL OF 500 GPM. THE FIRE PUMP WILL NOT BE POWERED BY THE GENERATOR DUE TO THE LARGE SIZE.

THEREFORE, THE DUTY PUMPS WILL BE 250 GPM EACH.

PUMP SIZING - FIRE DEMAND

FIRE FLOW REQUIREMENTS FOR CITY OF NEWBERG IS 1,000 GPM.

FIRE FLOW WILL BE PROVIDED BY USING ONE OF THE TWO 250-GPM DUTY PUMPS AND A 750-GPM FIRE PUMP.

Project	Project No.	
SANDAGER SUBDIVISION BOOSTER PUMP STATION	99015	**HbH** Consulting Engineers — 11535 SW Durham Road, Suite C6, Tigard, Oregon 97224 — 503/670-0499 ■ fax 503/670-0540 — email: hbh@teleport.com

DESIGN CALCULATIONS	Date 04 JAN 00	Sheet 2 / 5 Of
	By RMH	

CALCULATE PUMP HEADS

PUMPS MUST BE SIZED TO MEET THE FOLLOWING DEMAND CONDITIONS:

1. 50 PSI AT HIGHEST HOUSE (EL. 346).

2. 30 PSI @ 1,000 GPM FIRE FLOW AT FURTHEST HYDRANT IN SUBDIVISION (SANDAGER).

3. MAINTAIN 20 PSI IN SYSTEM WITH 1,000 GPM FIRE FLOW IN DEVELOPMENT TO THE EAST

SYSTEM MODELLED USING MicroHardyCross COMPUTER PROGRAM.

THE FOLLOWING ASSUMPTIONS/VARIABLES WERE USED:

- $C = 120$
- FOR "NORMAL" FLOW (225 GPM), DEMAND SPREAD EQUALLY FOR EACH NODE
- FOR FIRE FLOW CALCS, ASSUME DEMAND IS 1/2 OF PEAK INSTANTANEOUS FLOW, OR 125 GPM, DISTRIBUTED EQUALLY TO ALL NODES

  - SPLIT DEMAND BY DEVELOPMENT
    30 LOTS IN SANDAGER, 26 IN FUTURE

    FLOW FOR SANDAGER $= \left(\frac{30}{56}\right) 225 = 120$ GPM
    " " FUTURE $= 105$ GPM

    FOR SANDAGER, 9 NODES → 13.4 GPM/NODE

    FOR FUTURE, 1 NODE → 105 GPM

  - MINOR LOSS COEFFICIENTS (K)
    $90° - 0.3$
    TEE (THROUGH) $- 0.6$
    TEE (BRANCH) $- 1.8$
    VALVE $- 0.14$

Project		Project No.	HdH 11535 SW Durham Road, Suite C6 Tigard, Oregon 97224
SANDAGER SUBDIVISION BOOSTER PUMP STATION		99015	Consulting 503/670-0499 ■ fax 503/670-0540 Engineers email: hbh@teleport.com

DESIGN CALCULATIONS	Date	06 JAN 00	Sheet
	By	RMH	3 / 5 Of

CALC PUMP HEADS (CON'T)

SYSTEM WAS ALSO MODELLED FOR THE POSSIBILITY THAT ADJACENT DEVELOPMENT WILL NOT BE CONNECTED. CRITERIA 1 & 2 WERE TESTED.

THE FOLLOWING RESULTS CAME FROM THE MODELS:

CONDITION	EGL (HGL) AT P/S
1 (50 psi)	462 FT
2 (FIRE)	432 FT
3 (FIRE)	432 FT
1 (SANDAGER)	462 FT
2 (SANDAGER)	436 FT

COMPUTE PUMP HEAD

EGL = ENERGY GRADE LINE

EGL = ELEVATION HEAD + SUCTION HEAD + PUMP HEAD

$$EGL = H_E + H_S + H_P$$

$$H_P = EGL - H_E - H_S \; ; \; \begin{array}{l} EGL = 462 \text{ FT} \\ H_E = 286 \text{ FT} \\ H_S = ? \end{array}$$

FIND SUCTION HEAD:

ALTHOUGH EXACT PRESSURE IS NOT KNOWN, IT CAN BE CLOSELY APPROXIMATED BY USING SOME KNOW FIGURES:

CALCULATE PUMP HEADS (CONT.)

FIND SUCTION HEAD (CONT.)

KNOWN PRESSURES/HEADS:

1. STATIC PRESSURE AT LOT 6 (EL.298) = 40 PSI
2. MIN. PRESSURE ON OAK KNOLL CT = 20 PSI
3. CITY "DESIGN" ELEVATION FOR RESERVOIR = 381 FT

USE ITEM 1:

$\Delta ELEV = 298 - 286 = 12 FT$

$\Delta P = \Delta H \gamma = (12 FT)(62.3 \, lb/FT^3) = 747.6 \, PSF$

$= 5.2 \, PSI$

$\therefore P_{P/S} = 40 \, PSI + 5.2 \, PSI = 45.2 \, PSI \; (NORMAL)$

USE ITEM 2:

$\Delta ELEV = 315 - 286 = 29 \, FT$

$\Delta P = \Delta H \gamma = (29 \, FT)(62.3 \, lb/FT^3) = 1807 \, PSF$

$= 12.5 \, PSI$

$\therefore P_{P/S} = 20 \, PSI + 12.5 \, PSI = 32.5 \, PSI$

USE ITEM 3:

$H_{RES} = 381 \, FT \qquad H_{P/S} = 286 \, FT$

$\Delta H = 95 \, FT,$ BUT THERE WILL BE HEAD LOSS IN THE PIPE FROM RESERVOIR SO ASSUME 15 FT LOSS, SO $H_S = 80 \, FT = 34.6 \, PSI$

FOR DESIGN, USE SUCTION HEAD = 80 FT ✓ P ≈ 36 PS

Project	Project No.		
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DESIGN CALCULATIONS	Date 06 JAN 00	Sheet 5 / 5 Of
	By RMH	

CALCULATE PUMP HEADS (CONT.)

So... FIND PUMP HEAD

$$H_P = EGL - H_E - H_0$$

$$= 462 \text{ FT} - 286 \text{ FT} - 80 \text{ FT} = 96 \text{ FT} \rightsquigarrow \text{USE } 100 \text{ FT}$$

PUMP SIZES

DUTY PUMPS (×2) — 250 GPM @ 100 FT TDH

FIRE PUMP — 750 GPM @ 100 FT TDH

PRESSURE AT PUMP STATION

WITH SUCTION PRESSURE OF 35 PSI,

$$P_P = H_P \gamma + P_S = \frac{(100 \text{ FT})(62.3 \frac{\text{lb}}{\text{ft}^3})}{144 \frac{\text{in}^2}{\text{ft}^2}} + 35 \text{ PSI}$$

$$\underline{P_P = 78.3 \text{ PSI}}$$

NOTE: SEE PAGES FOLLOWING FOR MODEL PRINTOUT

RUN NO.   36-1431

NETWORK NAME : Sandager Subdivision

Pump Station System Analysis
Sizing Criteria 1
50 psi at highest house
Q=250 gpm

Analysis Statistics :

Analysis Method : Hazen Williams

Tolerance level was set to   0.0 gpm
The solution was found (or stopped) after   1 Iterations
Maximum head error was   0.0 ft
Maximum flow error was   0.0 gpm

	Flow Rate gpm	Vel. fps	Head Loss ft	From Node	To Node	Dia. in	Length ft	Roughness C	K
1	212.2	1.4	0.3	1	2	8.00	218	120	0.30
2	13.4	0.1	0.0	2	3	8.00	161	120	1.80
3	185.4	1.2	0.3	2	4	8.00	250	120	1.80
4	13.4	0.1	0.0	4	5	8.00	233	120	1.94
5	69.3	0.4	0.0	4	6	8.00	181	120	1.94
6	89.3	0.6	0.1	4	7	8.00	302	120	1.94
7	13.4	0.1	0.0	7	8	8.00	351	120	1.94
8	62.5	0.4	0.0	7	9	8.00	181	120	1.94
9	49.1	0.3	0.0	9	10	8.00	250	120	0.60
10	55.9	0.4	0.1	6	10	8.00	950	120	0.90

Pipe No.	From Node	To Node	Starting Head ft	Ending Head ft	Drop in Head ft	Pipe Loss ft	Head Error ft

1/ 5/2000   NODE REPORT
Run #   36-1431

	Water Demand gpm	Ground Elev. ft	H.G.L. Elev. ft	Pressure psi	X Co-ord. ft	Y Co-ord. ft	
1	-212.2	286.0	462.0	76.2	0	0	FIXED HEAD
2	13.4	307.0	461.7	67.0	0	0	
3	13.4	296.0	461.7	71.7	0	0	
4	13.4	320.0	461.5	61.2	0	0	
5	13.4	304.0	461.5	68.2	0	0	
6	13.4	321.0	461.4	60.8	0	0	
7	13.4	345.0	461.4	50.4	0	0	
8	13.4	330.0	461.4	56.9	0	0	
9	13.4	342.0	461.3	51.7	0	0	
10	105.0	330.0	461.3	56.9	0	0	

1/ 5/2000   LOOP REPORT
Run #   36-1431

Loop Type	Pipes in Loop
1	6 8 9 -10 -5

RUN NO. 37-   2

NETWORK NAME : Sandager Subdivision

Pump Station System Analysis
Sizing Criteria 2
30 psi at Node 7 and 1,000 gpm at Node 8
Q (fire) = 1,000 gpm, Q (domestic) = 125 gpm

Analysis Statistics :

Analysis Method : Hazen Williams

Tolerance level was set to   0.0 gpm
The solution was found (or stopped) after   1 Iterations
Maximum head error was   0.0 ft
Maximum flow error was   0.0 gpm

	Flow Rate gpm	Vel. fps	Head Loss ft	From Node	To Node	Dia. in	Length ft	Roughness C	K
1	1099.4	7.0	5.7	1	2	8.00	218	120	0.30
2	6.7	0.0	0.0	2	3	8.00	161	120	1.80
3	1086.0	6.9	7.5	2	4	8.00	250	120	1.80
4	6.7	0.0	0.0	4	5	8.00	233	120	1.94
5	337.9	2.2	0.7	4	6	8.00	181	120	1.94
6	734.7	4.7	4.3	4	7	8.00	302	120	1.94
7	1000.0	6.4	8.6	7	8	8.00	351	120	1.94
8	-272.0	-1.7	-0.4	7	9	8.00	181	120	1.94
9	-278.7	-1.8	-0.5	9	10	8.00	250	120	0.60
10	331.2	2.1	2.7	6	10	8.00	950	120	0.90

Pipe No.	From Node	To Node	Starting Head ft	Ending Head ft	Drop in Head ft	Pipe Loss ft	Head Error ft

1/ 6/2000   NODE REPORT
Run #   37-   2

	Water Demand gpm	Ground Elev. ft	H.G.L. Elev. ft	Pressure psi	X Co-ord. ft	Y Co-ord. ft	
1	-1099.4	286.0	432.0	63.2	0	0	FIXED HEAD
2	6.7	307.0	426.3	51.6	0	0	
3	6.7	296.0	426.3	56.4	0	0	
4	6.7	320.0	418.8	42.8	0	0	
5	6.7	304.0	418.8	49.7	0	0	
6	6.7	321.0	418.1	42.0	0	0	
7	6.7	345.0	414.5	30.1	0	0	
8	1000.0	330.0	405.9	32.8	0	0	
9	6.7	342.0	415.0	31.6	0	0	
10	52.5	330.0	415.5	37.0	0	0	

1/ 6/2000   LOOP REPORT
Run #   37-   2

Loop Type	Pipes in Loop
1	6 8 9 -10 -5

RUN NO.   37-   8

NETWORK NAME : Sandager Subdivision

Pump Station System Analysis
Sizing Criteria 3
30 psi in system with 1,000 gpm at Node 10
Q (fire) = 1,000 gpm, Q (domestic) = 125 gpm

Analysis Statistics :

Analysis Method : Hazen Williams

Tolerance level was set to   0.0 gpm
The solution was found (or stopped) after   4 Iterations
Maximum head error was   0.0 ft
Maximum flow error was   0.0 gpm

	Flow Rate gpm	Vel. fps	Head Loss ft	From Node	To Node	Dia. in	Length ft	Roughness C	K
1	1106.1	7.1	5.8	1	2	8.00	218	120	0.30
2	6.7	0.0	0.0	2	3	8.00	161	120	1.80
3	1092.7	7.0	7.6	2	4	8.00	250	120	1.80
4	6.7	0.0	0.0	4	5	8.00	233	120	1.94
5	488.3	3.1	1.3	4	6	8.00	181	120	1.94
6	591.0	3.8	2.8	4	7	8.00	302	120	1.94
7	6.7	0.0	0.0	7	8	8.00	351	120	1.94
8	577.6	3.7	1.8	7	9	8.00	181	120	1.94
9	570.9	3.6	2.0	9	10	8.00	250	120	0.60
10	481.6	3.1	5.3	6	10	8.00	950	120	0.90

Pipe No.	From Node	To Node	Starting Head ft	Ending Head ft	Drop in Head ft	Pipe Loss ft	Head Error ft
==

1/ 6/2000   NODE REPORT
Run #   37-   8

	Water Demand gpm	Ground Elev. ft	H.G.L. Elev. ft	Pressure psi	X Co-ord. ft	Y Co-ord. ft	
1	-1106.1	286.0	432.0	63.2	0	0	FIXED HEAD
2	6.7	307.0	426.2	51.6	0	0	
3	6.7	296.0	426.2	56.4	0	0	
4	6.7	320.0	418.6	42.7	0	0	
5	6.7	304.0	418.6	49.6	0	0	
6	6.7	321.0	417.3	41.7	0	0	
7	6.7	345.0	415.8	30.6	0	0	
8	6.7	330.0	415.8	37.1	0	0	
9	6.7	342.0	414.0	31.2	0	0	
10	1052.5	330.0	412.0	35.5	0	0	

1/ 6/2000   LOOP REPORT
Run #   37-   8

Loop Type	Pipes in Loop
==
| 1 | 6   8   9   -10   -5 |

RUN NO.   37-   18

NETWORK NAME : Sandager Subdivision

Pump Station System Analysis
Sizing Criteria 1 (Sandager Only)
50 psi at highest house
Q = 120 gpm

Analysis Statistics :

Analysis Method :   Hazen Williams

Tolerance level was set to   0.0 gpm
The solution was found (or stopped) after   1 Iterations
Maximum head error was   0.0 ft
Maximum flow error was   0.0 gpm

	Flow Rate gpm	Vel. fps	Head Loss ft	From Node	To Node	Dia. in	Length ft	Roughness C	K
1	117.9	0.8	0.1	1	2	8.00	218	120	0.30
2	14.7	0.1	0.0	2	3	8.00	161	120	1.80
3	88.4	0.6	0.1	2	4	8.00	250	120	1.80
4	14.7	0.1	0.0	4	5	8.00	233	120	1.94
5	14.7	0.1	0.0	4	6	8.00	181	120	1.94
6	44.2	0.3	0.0	4	7	8.00	302	120	1.94
7	14.7	0.1	0.0	7	8	8.00	351	120	1.94
8	14.7	0.1	0.0	7	9	8.00	181	120	1.94

Pipe No.	From Node	To Node	Starting Head ft	Ending Head ft	Drop in Head ft	Pipe Loss ft	Head Error ft

1/ 6/2000   NODE REPORT
Run # 37- 18

	Water Demand gpm	Ground Elev. ft	H.G.L. Elev. ft	Pressure psi	X Co-ord. ft	Y Co-ord. ft	
1	-117.9	286.0	462.0	76.2	0	0	FIXED HEAD
2	14.7	307.0	461.9	67.1	0	0	
3	14.7	296.0	461.9	71.8	0	0	
4	14.7	320.0	461.8	61.4	0	0	
5	14.7	304.0	461.8	68.3	0	0	
6	14.7	321.0	461.8	61.0	0	0	
7	14.7	345.0	461.8	50.6	0	0	
8	14.7	330.0	461.8	57.1	0	0	
9	14.7	342.0	461.8	51.9	0	0	

1/ 6/2000   LOOP REPORT
Run # 37- 18

Loop Type	Pipes in Loop

RUN NO.   37-   13

NETWORK NAME : Sandager Subdivision

Pump Station System Analysis
Sizing Criteria 2 (Sandager Only)
30 psi in system with 1,000 gpm at Node 8
Q (fire) = 1,000 gpm, Q (domestic) = 60 gpm

Analysis Statistics :

Analysis Method : Hazen Williams

Tolerance level was set to   0.0 gpm
The solution was found (or stopped) after   1 Iterations
Maximum head error was   0.0 ft
Maximum flow error was   0.0 gpm

	Flow Rate gpm	Vel. fps	Head Loss ft	From Node	To Node	Dia. in	Length ft	Roughness C	K
1	1053.6	6.7	5.3	1	2	8.00	218	120	0.30
2	6.7	0.0	0.0	2	3	8.00	161	120	1.80
3	1040.2	6.6	6.9	2	4	8.00	250	120	1.80
4	6.7	0.0	0.0	4	5	8.00	233	120	1.94
5	6.7	0.0	0.0	4	6	8.00	181	120	1.94
6	1020.1	6.5	7.9	4	7	8.00	302	120	1.94
7	1006.7	6.4	8.8	7	8	8.00	351	120	1.94
8	6.7	0.0	0.0	7	9	8.00	181	120	1.94

Pipe No.	From Node	To Node	Starting Head ft	Ending Head ft	Drop in Head ft	Pipe Loss ft	Head Error ft

1/ 6/2000   NODE REPORT
Run #   37-   13

	Water Demand gpm	Ground Elev. ft	H.G.L. Elev. ft	Pressure psi	X Co-ord. ft	Y Co-ord. ft	
1	-1053.6	286.0	436.0	64.9	0	0	FIXED HEAD
2	6.7	307.0	430.7	53.6	0	0	
3	6.7	296.0	430.7	58.3	0	0	
4	6.7	320.0	423.8	44.9	0	0	
5	6.7	304.0	423.8	51.9	0	0	
6	6.7	321.0	423.8	44.5	0	0	
7	6.7	345.0	415.9	30.7	0	0	
8	1006.7	330.0	407.2	33.4	0	0	
9	6.7	342.0	415.9	32.0	0	0	

1/ 6/2000   LOOP REPORT
Run #   37-   13

Loop Type	Pipes in Loop

Project	Project No.		
SANDAGER & OSTER PUMP STATION	99015		I B H 11535 SW Durham Road, Suite C6 Tigard, Oregon 97224 Consulting 503/670-0499 ∎ fax 503/670-0540 Engineers email: hbh@teleport.com

	FIRE PROTECTION CALC. (AS REQUESTED BY CITY)	Date 07 OCT 99	Sheet 1
		By R. HENRY	1 Of

REQUIRED - DETERMINE PRESSURE WITH
        PUMP STATION POWER FAILURE.
        (IN CASE OF POWER FAILURE COUPLED
        WITH HOUSE FIRE)

CALCULATION:

— FIRST OF ALL, DETERMINE WHAT STATIC
PRESSURE WOULD BE —

$$P = \gamma H = \gamma(z_2 - z_1)$$

$P = $ PRESSURE $= ?$
$\gamma = 62.4 \ lb/ft^3$
$z_2 = $ RESERVOIR ELEV $= 381'$
$z_1 = $ HIGHEST HYDRANT ELEV $\approx 342'$

$$P = \gamma(z_2 - z_1) = 62.4(381 - 342) = 2,434 \ psf$$

$$\underline{P = 16.9 \ psi}$$

STATIC PRESSURE IS TOO LOW FOR FIRE
PROTECTION WITH POWER FAILURE.

Project	Project No.	
SANDAGER BOOSTER PUMP STATION	99015	HBH Consulting Engineers 11535 SW Durham Road, Suite C6 Tigard, Oregon 97224 503/670-0499 ✶ fax 503/670-0540 email: hbh@teleport.com

PRELIMINARY DESIGN CALCULATIONS	Date 07 OCT 99	Sheet 1
	By ROB HENRY	3 of

KNOWN:
1) DESIGN ELEVATION OF NEAREST RESERVOIR IS 381 FT
2) MINIMUM FIRE FLOW = 1,000 GPM
3) SIZE PUMP STATION WITH ONE PUMP OUT OF SERVICE.

DETERMINE LOW SERVICE ELEVATION:

FIND ELEVATION WITH PRESSURE OF 30 PSI BASED ON RESERVOIR ELEVATION = 381'.

$$P = \gamma H = \gamma (z_2 - z_1)$$

P = PRESSURE = 30 PSI = 4,320 PSF
γ = 62.4 lb/ft^3
z_2 = RESERVOIR ELEV = 381 FT
z_1 = LOW SERVICE ELEV = ? FT

BY ALGEBRA, $z_1 = z_2 - \dfrac{P}{\gamma}$

$$z_1 = 381 - \frac{4320}{62.4} = 311.7 \text{ FT}$$

✗ LOWER SERVICE ELEVATION = 310 FT

DETERMINE NO. OF HOUSES SERVED:

(SEE EXIBIT 1)

LOTS IN NEIGHBORING SUBDIVISION = 26
(ALTHOUGH MANY LOTS ARE BELOW ELEV 310, THERE IS NO PLACE TO GET GRAVITY SERVICE FROM)

LOTS IN SANDAGER SUBDIVISION = 30
(SEE EXIBIT 2)
TOTAL LOTS   56

Project	Project No.	I B H — 11535 SW Durham Road, Suite C6 Tigard, Oregon 97224
SANDAGER BOOSTER PUMP STATION	99015	Consulting 503/670-0499 · fax 503/670-0540 Engineers email: hbh@teleport.com

| PRELIMINARY DESIGN CALCULATIONS (CONT.) | Date 07 OCT 99 | Sheet 2 / 3 Of |
| | By R. HENRY | |

SIZE PUMP STATION!

FROM CITY OF NEWBERG STDS (EXHIBIT 3):

50 RESIDENCES = 200 GPM
75 RESIDENCES = 250 GPM

PUMP STATION WILL SERVICE 50 LOTS, THEREFORE PUMP SIZE OF 225 GPM WILL BE SUFFICIENT

SO...   PUMPS WILL BE:

2 @ 225 GPM   (SERVICE)
1 @ 1,000 GPM   (FIRE)

APPROXIMATE TDH NEEDED:

- FOR PRELIMINARY CALCS ASSUME HEAD LOSS OF 5' FT THROUGH SYSTEM. (THIS IN CONSERVATIVE AS THE HEAD LOSS IN A 6' PIPE AT $Q = 225$ GPM IS ABOUT 0.5 FT PER 100 FT)

- GO FOR 50 PSI (7200 PSF) AT HIGHEST ELEVATION OF 346'

RESERVOIR: $z_R = 381$ FT, $P_R = 0$

DISTRIBUTION SYSTEM (ASSUME $H_{L_1} = 10$ FT

PUMP STATION $H_P = ?$

SUBDIVISION — ASSUME $H_{L_2} = 5$ FT

HIGHEST HOUSE: $z_H = 346$, $P_H = 50$ PSI (7200 PSF)
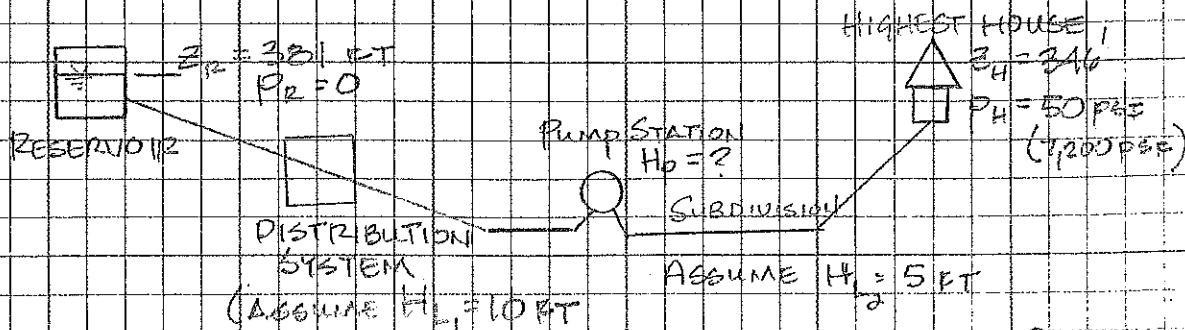
$$\frac{z_R}{} + \frac{P_R^{\,0}}{\gamma} + \frac{V_R^{2\,0}}{2g} - H_{L_1} - H_{L_2} + H_P = z_H + \frac{P_H}{\gamma} + \frac{V_H^{2\,0}}{2g}$$

BY ALGEBRA,

$$H_P = z_H + \frac{P_H}{\gamma} + H_{L_1} + H_{L_2} - z_R$$

Project		Project No.	I B H	11535 SW Durham Road, Suite C6
SANDAGER Booster			Consulting	Tigard, Oregon 97224
Pump Station		99015	Engineers	503/670-0499 ■ fax 503/670-0540 email: hbh@teleport.com

PRELIMINARY DESIGN
Calculations (CONT.)

Date: 07 OCT 99   Sheet: 3

By: R. HENRY   3 Of

TDH (CONT):

$$H_P = Z_H + \frac{P_H}{\gamma} + H_{l_1} + H_{l_2} - Z_P$$

$$= 340 \text{ FT} + \frac{7,200 \text{ PSF}}{62.4 \text{ lb/FT}^3} + 10 \text{ FT} + 5 \text{ FT} - 381 \text{ FT}$$
$$\langle 115 \text{ FT} \rangle$$

$H_P = 95 \text{ FT}$ THEREFORE, PUMP TDH ≅ 95 FT

SO... SERVICE PUMPS WILL BE APPROXIMATELY:

225 GPM @ 100 FT TDH

Project	Project No.	H B H	11535 SW Durham Road, Suite C6
SANDAGER SUBDIVISION BOOSTER PUMP STATION	99015	Consulting Engineers	Tigard, Oregon 97224 503/670-0499 ■ fax 503/670-0540 email: hbh@teleport.com

CONTROL STRATEGY & OPERATION	Date 06 JAN 00	Sheet 1
	By RMH	1 Of

Pump Cycling

Two duty pumps alternate automatically. If demand exceeds one pump capacity, other pump starts.

Fire Demand Pump

Fire demand pump is activated by falling pressure in the system.

As a hydrant is opened, pressure in system will fall. Once pressure reaches low set-point, fire pump is triggered. Duty pumps will continue to run. (Fire flow supplied will be 1,250 GPM with all 3 pumps running. If one duty pump is out of service, fire flow will be 1,000 GPM.)

When hydrant is closed, pressure will rise, causing fire pump and lag pump to shut down. The station then returns to normal operation.
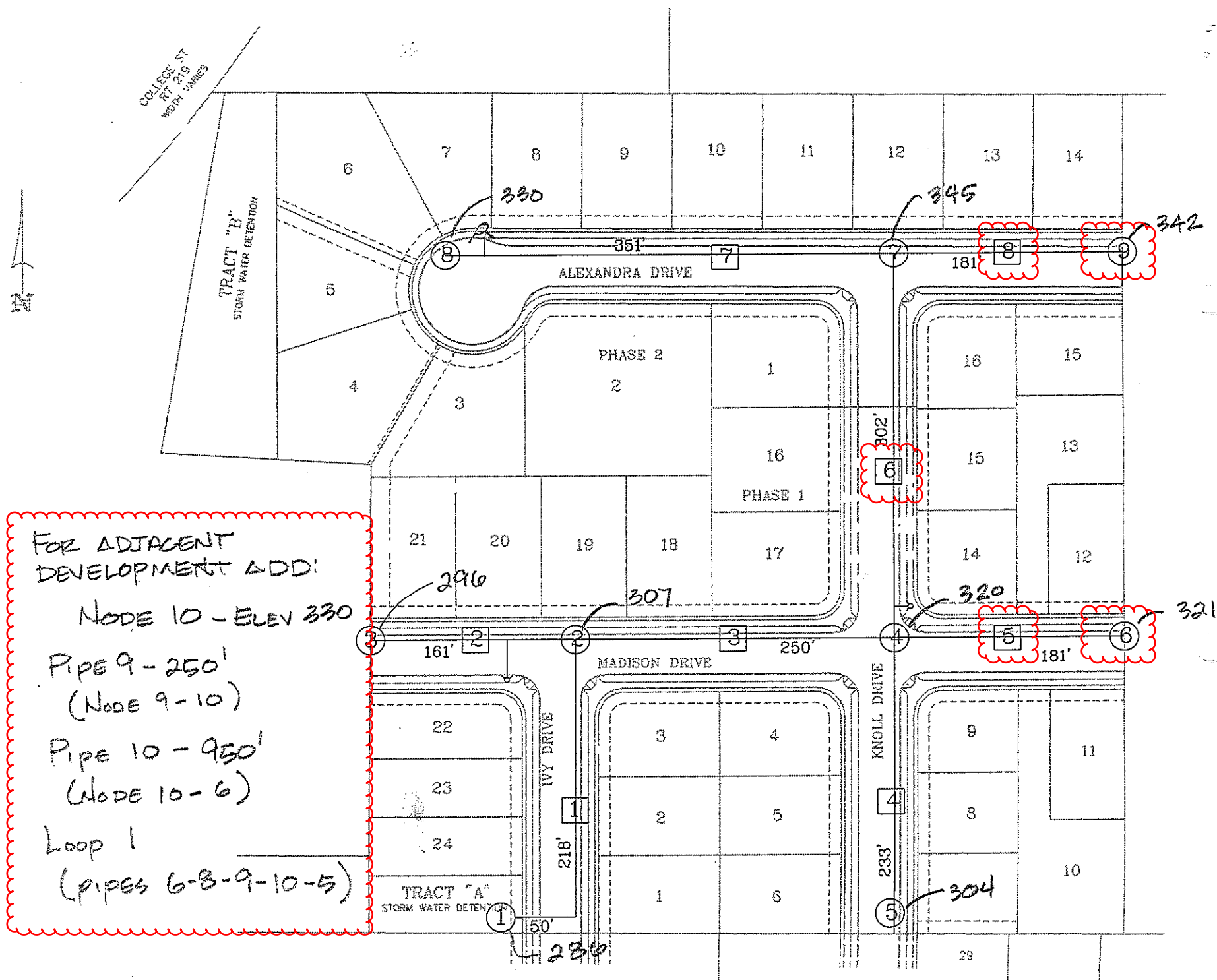
Control Pressures

(Actual control pressures may be modified during pump station start-up to allow for optimum operation)
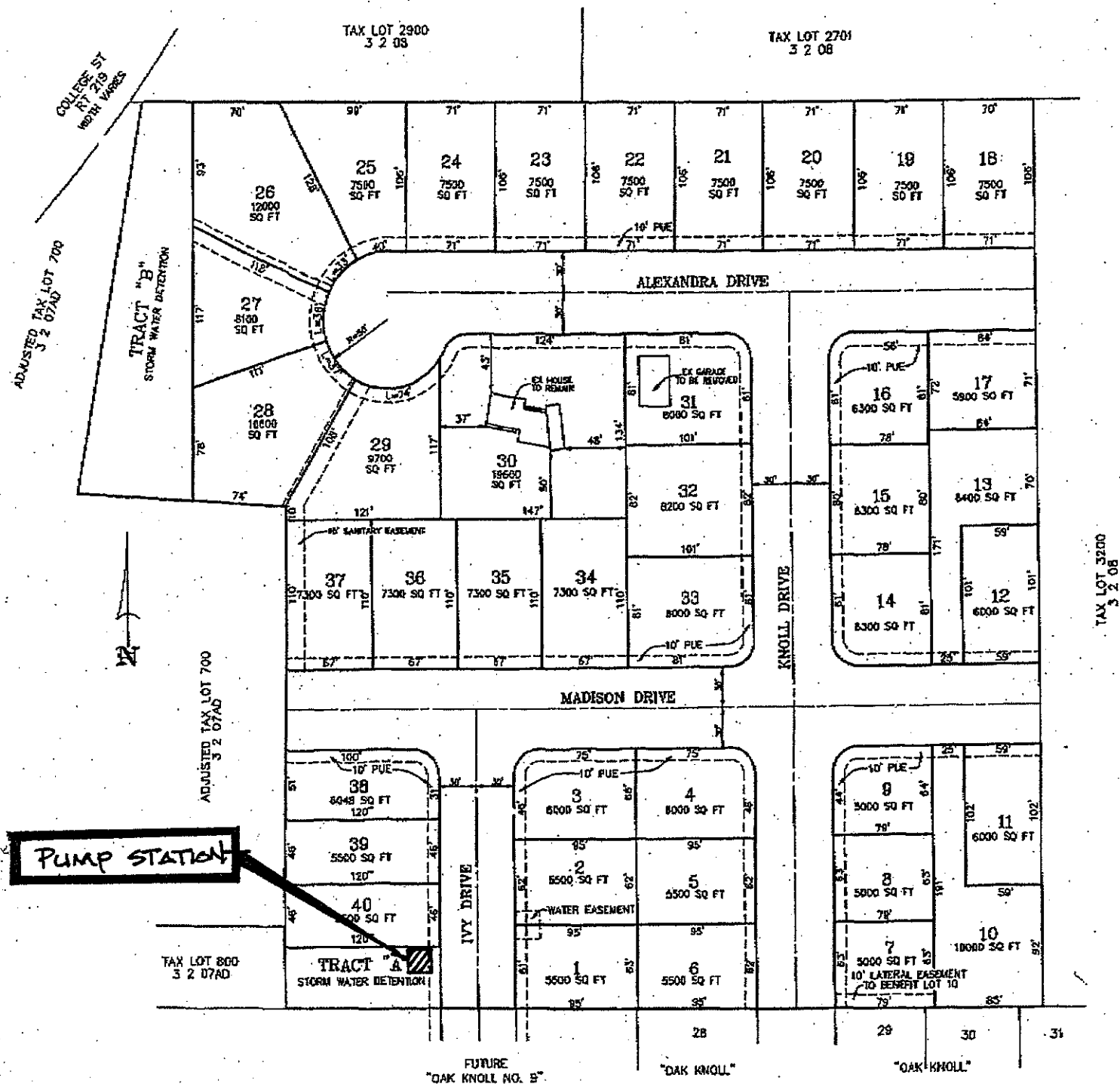
NORMAL OPERATING PRESSURE = 78 psi

LAG PUMP ON PRESSURE = 68 psi

FIRE PUMP ON PRESSURE = 63 psi (min. 30 psi in system)

FIRE PUMP OFF PRESSURE = 90 psi

COLLEGE ST RT 219 WIDTH VARIES

TRACT "B" STORM WATER DETENTION

N

6 7 8 9 10 11 12 13 14

330

345

342

351'

ALEXANDRA DRIVE

7

7

181'

8

9

5

PHASE 2

1

2

16

15

302'

6

15

13

4

3

16

PHASE 1

21 20 19 18 17

14

12

296

307

320

321

3

161'

2

2

3

250'

4

5

181'

6

MADISON DRIVE

FOR ADJACENT
DEVELOPMENT ADD:

NODE 10 - ELEV 330

PIPE 9 - 250'
(NODE 9-10)

PIPE 10 - 950'
(NODE 10-6)

LOOP 1
(PIPES 6-8-9-10-5)

22

3

4

9

11

IVY DRIVE

23

1

2

5

KNOLL DRIVE

4

8

218'

24

233'

304

TRACT "A" STORM WATER DETEN

1

50'

1

6

10

286

5

29

Appendix F: Oak Knoll Booster Pump Upgrade
Memorandum (2015)

AKS ENGINEERING & FORESTRY, LLC
12965 SW Herman Road, Suite 100, Tualatin, OR 97062
P: (503) 563-6151   F: (503) 563-6152

ENGINEERING & FORESTRY   OFFICES IN: TUALATIN, OR - VANCOUVER, WA - SALEM-KEIZER, OR

MEMORANDUM

DATE: November 16, 2015

TO: Kaaren Hofmann, PE – City Engineer

FROM: John P. Christiansen, PE – AKS Engineering & Forestry, LLC

CC: Bill Rourke - Owner

SUBJECT: Oak Knoll Booster Pump Upgrade - Revised

PROJECT: 4016 N College Street (AKS #4612)

RENEWAL DATE: 12/31/17

BACKGROUND

The owner of the property located at 4016 N College Street is pursuing the development of a single-family residential subdivision on the subject property (TL 2900 Map 3.2.08). Prior to involvement by AKS Engineering & Forestry, LLC (AKS), the owner met with the City of Newberg Planning and Engineering Staff to discuss the annexation and development process. At that time, the City identified water capacity limitations of the Oak Knoll booster pump station. The City has long-term plans for the capital improvements that support development of the subject property; however, the timing of such improvements has not yet been determined.

Hydrant flow tests were completed on existing hydrants adjacent to the subject property, (3/19/2015), which documented projected fire flow rates of 1,693 gpm and 2,272 gpm, at 20 PSI. It is our understanding that the City is satisfied with the fire flow available to the subject property.

The purpose of this memorandum is to present recommendations for upgrades to the Oak Knoll booster pumps to meet the domestic water needs of the proposed development and document the criteria by which the upgrades are designed.

EXISTING SYSTEM OVERVIEW

According to the *2004 City of Newberg Water Distribution System Plan*, the Oak Knoll water system booster pump station was constructed in 2000 to augment low system pressures for home sites within a portion of The Summit at Oak Knoll development, a 40-lot single-family residential subdivision. The Oak Knoll booster system comprises three pumps in parallel to meet low-flow (10 gpm), high flow (250 gpm), and fire-flow (1,000 gpm) demands. Based on discussions with the City, we understand the domestic pumps function in an alternating lead/lag sequence.

The boosters feed an 8" distribution line that extends through The Summit at Oak Knoll development to N. College Street (OR HWY 219) and ultimately to its terminus on the Veritas property (TL 2702). The existing 8" water main parallels the westerly and northerly boundaries of the subject property.

DESIGN CRITERIA

The *City of Newberg Public Works Design and Construction Standards* identifies that for single-family residential areas, the minimum pressure shall be 40 PSI measured at the meter and the minimum fire flow shall be 1,000 gpm with a 20 PSI residual. Since the standards do not specify a design rate for domestic use, a proportionate rate for the existing Oak Knoll booster was utilized as an estimate. Calculations are as follows:

- Existing booster domestic use capacity = 250-gpm for 40-single family homes; = 6.25-gpm/lot

The City has also expressed concern about increased line velocity resulting from the pump upgrade. The City's public work standards do not specify a maximum line velocity; therefore, a maximum line velocity of 7 fps is assumed for cement lined ductile iron pipe and is targeted for this design.

The owner has requested the booster upgrades consider domestic water demands for adjacent properties. AKS and the owner have communicated with both the North Valley Friends Church (TL 2701 and 2703) and the Veritas School (TL 2700, 2702, and 2800) to understand their existing and future water system needs. Water system demands for the North Valley Church were evaluated based on the Oregon Plumbing Specialty Code (OPSC) and are provided as an attachment to this memorandum. The Veritas School did not wish to participate in this booster pump upgrade study; however, per the request of the City, the pump upgrade study includes development anticipated at the Veritas School property.

DESIGN CALCULATIONS

The owner is proposing the development of 11 single-family residential lots. Based on the design criteria outlined above, this will result in an increased peak demand on the pumps of approximately 70 gpm.

The North Valley Friends Church provided a list of all appliances, appurtenances, or fixtures within their existing facilities. A total fixture count was calculated based on 2014 OPSC, Appendix A, Table A-2. The fixture count resulted in a water system demand of 41 gpm, per 2014 OPSC, Appendix A, Table A-3. Detailed calculations are provided as an attachment to this memorandum.

The Veritas School has developed a master plan for their campus which will be developed in two phases. Total fixture counts for each phase were provided to AKS by representatives of Veritas, via the City of Newberg. Note, some of the fixtures associated with phase 2 will replace fixtures installed with phase 1. The fixture count resulted in a water system demand of 60 gpm, per 2014 OPSC, Appendix A, Table A-3. Detailed calculations are provided as an attachment to this memorandum.

Accounting for the proposed 11-lot development, the North Valley Friends Church, and both phases of the Veritas School development, the total peak demand on the Oak Knoll booster would be as follows:

250 gpm + 70 gpm + 41 gpm + 60 gpm = **421 gpm**

Total Dynamic Head (THD) for the booster is calculated as follows:

$H_T = H_F + H_L + H_E$		
$H_F = (10.44*(L)* Q^{1.85})/ (C^{1.85} d^{4.87}) =$ Hazen-Williams		$H_L = \Sigma K(V^2)/2g$
Q = Flow (gpm)	d = Pipe Diameter (in)	K = Minor Loss Coeffient
L = Pipe Length (ft)	H_E = Energy/Static Head	V = Velocity (fps)
C = Pipe Coefficient (120 for CL DI pipe)		

Assumptions:

Length of main from Booster to subject property = ~2,000-ft

$H_L = 0$

Q = 421-gpm

Existing Booster Elevation = 290-ft

d= 8-in

Maximum Service Elevation = 340-ft

Minimum Service Pressure = 40-PSI = 92.3-ft

$$H_F = (10.44*(2,000\text{-ft})*(421^{1.85}))/(120^{1.85}\ 8\text{-in}^{4.87}) = 8.5\text{-ft}$$

$$H_E = 340\text{-ft} - 290\text{-ft} + 92.3\text{-ft} = 142.3\text{-ft}$$

$$H_T = 8.5\text{-ft} + 142.3\text{-ft} = 150.8\text{-ft} \sim \textbf{151-ft TDH}$$

The maximum line velocity will occur under fire flow conditions (1,000 gpm). The proposed development will not result in an increase to the fire flow rate; therefore, this design criteria does not apply. The line velocity for the peak domestic demand is summarized as follows:

Q=VA; where

Q = Flow Rate (cfs)

V = Velocity (fps)

A = Area (sf)

Assumptions:

Q = 421-gpm = 0.94-cfs (peak flow)

A = 8" CL DI Class 52 = 0.38 sf

$$V_{PEAK} = 0.80\text{-cfs}/0.38\text{-sf} = \textbf{2.5 fps}$$

The pump capacity of the Oak Knoll Booster station must be increased to **421 gpm @ 151 ft TDH**.

UPGRADE RECOMMENDATIONS

AKS engaged Triangle Pump and Equipment, Inc., the supplier of the original equipment in the Oak Knoll booster station, to evaluate the feasibility of upgrading the existing system to meet the increased demands. Triangle Pump confirmed the domestic system's booster pumps can be upgraded within the framework of the existing facility. Upgrades are anticipated to include Goulds Close-Coupled End-Suction pumps coupled with 30 HP motors. Variable-frequency drives will also be integrated into the upgrade to reduce motor wear and electrical load at pump start-up. Pump curves for the proposed pumps are provided in the submittal by Triangle Pump, which is attached to this memorandum.

CONCLUSION AND REQUEST FOR APPROVAL

As outlined above, the existing Oak Knoll water system booster pump can be upgraded to supply water to the proposed 11-lot residential development as well as support the existing North Valley Friends Church facilities and future Veritas School development. The owner is requesting approval of concept for the booster pump upgrades and confirmation that the upgrades will address the City's concerns regarding the availability of domestic water to support the proposed annexation and development.

Attachments:
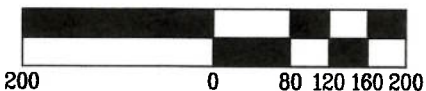Exhibit A – Water System Map – 4016 N. College Street
Existing Domestic Water Demands – North Valley Friends Church
Veritas School Domestic Water Demand Calculations
Submittal by Triangle Pump & equipment, Inc.

EX 8" MAIN

SUBJECT PROPERTY

OAK KNOLL BOOSTER

SCALE 1" = 200 FEET

200   0   80 120 160 200

NOTE: IMAGE SOURCE AND UTILITY MAPPING SOURCE IS THE CITY OF NEWBERG GIS SYSTEM. SCALE IS APPROXIMATE.

DATE: 7/22/215

WATER SYSTEM MAP
4016 N. COLLEGE STREET

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
P: 503.563.6151 F: 503.563.6152 aks-eng.com

AKS

EXHIBIT

A

DRWN: JPC
CHKD: JPC

AKS JOB:

4612

PROJECT NO. 4612   **PROJECT NAME** 4016 N College Street   **DATE/TIME** 7/16/15

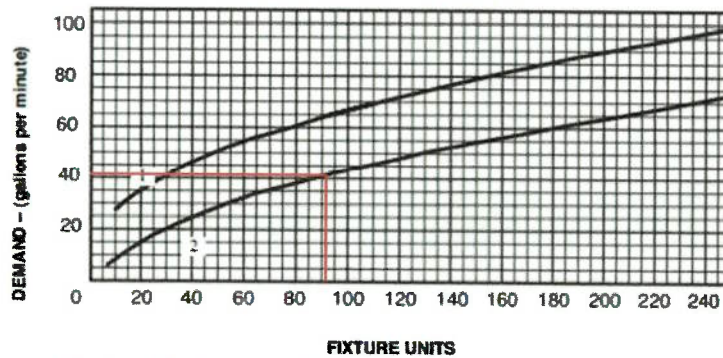**SUBJECT** Domestic Water Flow Demands Calculation   **BY** LTP

The following summarizes the domestic water system demands for the North Valley Friends Church located at 4020 N College Street, Newberg, OR.

Existing Domestic Water Demands:

FIXTURE	NUMBER	WATER FIXTURE UNITS	
		EACH	TOTAL
TOILETS	13	2.5	32.5
URINALS	3	2.0	6
SINKS	20	1.5	30
WATER FOUNTAINS	3	0.5	1.5
SHOWERS	3	2.0	6
SHOWER/TUB	1	4.0	4
HOSE BIBB (1ST)	1	2.5	2.5
HOSE BIBB (EACH ADDITIONAL)	6	1.0	6
DISH WASHER	2	1.5	3
TOTAL WATER FIXTURE UNITS			91.5

- Assumed:
  - Private values for fixtures
  - Kitchen/domestic sinks
  - Flush tank urinals
  - 1.6 GPF Gravity Tank water closets
- Total water fixture units: 91.5 per 2014 OPSC Table A-2
- Building demand determined per 2014 OPSC Chart A-3
- **Total Domestic Water Demand: 41.0 GPM**

CHART A-3
ENLARGED SCALE DEMAND LOAD

FIXTURE UNITS

For SI units: 1 gallon per minute = 0.06 L/s

TABLE A-2
WATER SUPPLY FIXTURE UNITS (WSFU) AND MINIMUM FIXTURE BRANCH PIPE SIZES[3]

APPLIANCES, APPURTENANCES, OR FIXTURES[2]	MINIMUM FIXTURE BRANCH PIPE SIZE[1,4] (inches)	PRIVATE	PUBLIC	ASSEMBLY
Bathtub or Combination Bath/Shower (fill)	½	4.0	4.0	—
¾ inch Bathtub Fill Valve	¾	10.0	10.0	—
Bidet	½	1.0	—	—
Clothes Washer	½	4.0	4.0	—
Dental Unit, cuspidor	½	—	1.0	—
Dishwasher, domestic	½	1.5	1.5	—
Drinking Fountain or Water Cooler	½	0.5	0.5	0.75
Hose Bibb	½	2.5	2.5	—
Hose Bibb, each additional[6]	½	1.0	1.0	—
Lavatory	½	1.0	1.0	1.0
Lawn Sprinkler, each head[5]	—	1.0	1.0	—
Mobile Home, each (minimum)	—	12.0	—	—
Sinks	—	—	—	—
Bar	½	1.0	2.0	—
Clinic Faucet	½	—	3.0	—
Clinic Flushometer Valve with or without faucet	1	—	8.0	—
Kitchen, domestic	½	1.5	1.5	—
Laundry	½	1.5	1.5	—
Service or Mop Basin	½	1.5	3.0	—
Washup, each set of faucets	½	—	2.0	—
Shower per head	½	2.0	2.0	—
Urinal, 1.0 GPF Flushometer Valve	¾	3.0	4.0	5.0
Urinal, greater than 1.0 GPF Flushometer Valve	¾	4.0	5.0	6.0
Urinal, flush tank	½	2.0	2.0	3.0
Wash Fountain, circular spray	¾	—	4.0	—
Water Closet, 1.6 GPF Gravity Tank	½	2.5	2.5	3.5
Water Closet, 1.6 GPF Flushometer Tank	½	2.5	2.5	3.5
Water Closet, 1.6 GPF Flushometer Valve	1	5.0	5.0	8.0
Water Closet, greater than 1.6 GPF Gravity Tank	½	3.0	5.5	7.0
Water Closet, greater than 1.6 GPF Flushometer Valve	1	7.0	8.0	10.0

For SI units: 1 inch = 25 mm
Notes:

[1] Size of the cold branch pipe, or both the hot and cold branch pipes.

[2] Appliances, appurtenances, or fixtures not included in this table shall be permitted to be sized by reference to fixtures having a similar flow rate and frequency of use.

[3] The listed fixture unit values represent their total load on the cold water building supply. The separate cold water and hot water fixture unit value for fixtures having both cold and hot water connections shall be permitted to each be taken as three-quarters of the listed total value of the fixture.

[4] The listed minimum supply branch pipe sizes for individual fixtures are the nominal (I.D.) pipe size.

[5] For fixtures or supply connections likely to impose continuous flow demands, determine the required flow in gallons per minute (gpm) (L/s) and add it separately to the demand in gpm (L/s) for the distribution system or portions thereof.

[6] Reduced fixture unit loading for additional hose bibbs is to be used where sizing total building demand and for pipe sizing where more than one hose bibb is supplied by a segment of water distribution pipe. The fixture branch to each hose bibb shall be sized on the basis of 2.5 fixture units.

The following is a summary of the water system demands for Phases I and II for the "A Time to Build Campaign" for the Veritas School, located at 401 Mission Drive in Newberg, Oregon.

Phase I

- Fixture Units – values determined by others
  - Main building: 87
  - Modular buildings: 90
  - Total fixture units: 177
- Phase I domestic water demand determined per 2014 OPSC, Chart A-3 (included on next page)
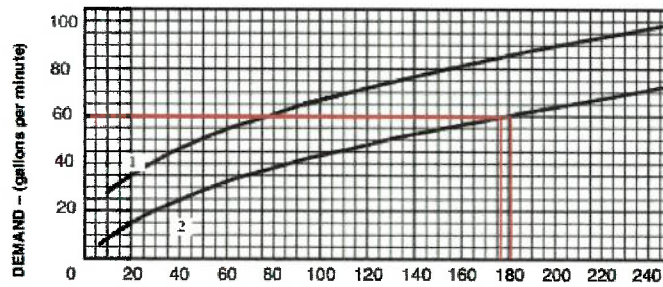
Phase I domestic water demand: 59.0 GPM

Phase II

Phase II includes main building from Phase I, with the modular buildings being removed.

FIXTURE	NUMBER	WATER FIXTURE UNITS	
		EACH	TOTAL
WATER CLOSET	20	2.5	50.0
URINAL	7	2.0	14.0
LAVATORY	26	1.0	26.0
DRINKING FOUNTAIN	9	0.5	4.5
TOTAL WATER FIXTURE UNITS			94.5

- Assumed:
  - Public values for all fixtures
  - 50% of required water closets replaced by urinals in male restrooms
  - Flush tank urinals
  - 1.6 GPF flush tank water closets
- New water fixture units for Phase II: 94.5 per 2014 OPSC, Table A-2 (included on next page)
- New domestic water demand for Phase II: 42.0 GPM per 2014 OPSC, Chart A-3
- Total Phase II water fixture units (Phase I main building + new for Phase II): 181.5
- Total Phase II domestic water demand determined per 2014 OPSC, Chart A-3

Phase II domestic water demand: 60.0 GPM

CHART A-3
ENLARGED SCALE DEMAND LOAD

For SI units: 1 gallon per minute = 0.06 L/s

TABLE A-2
WATER SUPPLY FIXTURE UNITS (WSFU) AND MINIMUM FIXTURE BRANCH PIPE SIZES[3]

APPLIANCES, APPURTENANCES, OR FIXTURES[2]	MINIMUM FIXTURE BRANCH PIPE SIZE[1,4] (inches)	PRIVATE	PUBLIC	ASSEMBLY
Bathtub or Combination Bath/Shower (fill)	½	4.0	4.0	--
¾ inch Bathtub Fill Valve	¾	10.0	10.0	--
Bidet	½	1.0	--	--
Clothes Washer	½	4.0	4.0	--
Dental Unit, cuspidor	½	--	1.0	--
Dishwasher, domestic	½	1.5	1.5	--
Drinking Fountain or Water Cooler	½	0.5	0.5	0.75
Hose Bibb	½	2.5	2.5	--
Hose Bibb, each additional[6]	½	1.0	1.0	--
Lavatory	½	1.0	1.0	1.0
Lawn Sprinkler, each head[5]	--	1.0	1.0	--
Mobile Home, each (minimum)	--	12.0	--	--
Sinks	--	--	--	--
Bar	½	1.0	2.0	--
Clinic Faucet	½	--	3.0	--
Clinic Flushometer Valve with or without faucet	1	--	8.0	--
Kitchen, domestic	½	1.5	1.5	--
Laundry	½	1.5	1.5	--
Service or Mop Basin	½	1.5	3.0	--
Washup, each set of faucets	½	--	2.0	--
Shower per head	½	2.0	2.0	--
Urinal, 1.0 GPF Flushometer Valve	¾	3.0	4.0	5.0
Urinal, greater than 1.0 GPF Flushometer Valve	¾	4.0	5.0	6.0
Urinal, flush tank	½	2.0	2.0	3.0
Wash Fountain, circular spray	¾	--	4.0	--
Water Closet, 1.6 GPF Gravity Tank	½	2.5	2.5	3.5
Water Closet, 1.6 GPF Flushometer Tank	½	2.5	2.5	3.5
Water Closet, 1.6 GPF Flushometer Valve	1	5.0	5.0	8.0
Water Closet, greater than 1.6 GPF Gravity Tank	½	3.0	5.5	7.0
Water Closet, greater than 1.6 GPF Flushometer Valve	1	7.0	8.0	10.0

For SI units: 1 inch = 25 mm

Notes:

[1] Size of the cold branch pipe, or both the hot and cold branch pipes.

[2] Appliances, appurtenances, or fixtures not included in this table shall be permitted to be sized by reference to fixtures having a similar flow rate and frequency of use.

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[5] For fixtures or supply connections likely to impose continuous flow demands, determine the required flow in gallons per minute (gpm) (L/s) and add it separately to the demand in gpm (L/s) for the distribution system or portions thereof.

[6] Reduced fixture unit loading for additional hose bibbs is to be used where sizing total building demand and for pipe sizing where more than one hose bibb is supplied by a segment of water distribution pipe. The fixture branch to each hose bibb shall be sized on the basis of 2.5 fixture units.

GOULDS
WATER TECHNOLOGY
a xylem brand

Submittal Data

3656 M&L Bronze Fitted
End Suction Cast Iron Pumps
MODEL : 14BF2P5B0

Hydraulic Data					Motor Data	3656/3756 M L Group	Qty.
Maximum Flow	Flow at Duty Point	Maximum TDH	TDH at Duty Point	NPSH$_R$	Voltage / Phase / Enclosure	Model	
862 US g.p.m.	425 US g.p.m.	169 ft	151 ft	5 ft	460V 3PH PE-TEFC	14BF2P5B0	1

Submittal Prepared for: _____ Job: _____

Engineer: _____ Contractor: _____

Submittal Prepared by: _____ Company: _____

Submittal Date: 2015-10-28 Approved by: _____ Date: _____

Engineering Data

Pump Code: 14BF2P5B0

Pump Size: 3 x 4 - 13

Pump Max Horsepower: 29.915 hp

Pump Horsepower at Rating Point: 21.52 hp

Pump Shut Off Head: 169 ft

Motor Speed: 1780 rpm

Max. Temperature: 212 °F

   Liquid: Water, pure

Motor Code: C15732PE

System Input Power: 3~ 460 V

Motor Rated Horsepower: 25.00 hp

Max. Frequency 60

Electrical Enclosures: TEFC/Prem ...

Motor Standard: NEMA

Suction Flange Standard: ANSI

Suction Flange Rating: Class 125

Suction Size: 4"

Discharge Flange Standard: ANSI

Discharge Flange Rating: Class 125

Discharge: 3"

Approximate Net Weight: 527 lb

Impeller Size: 12$^9/_{16}$"

Impeller Construction: Closed

Impeller Type: Radial impeller

Impeller Material:

   ASTM B584, Modified C87500-Lead Free

Sense of Rotation: Clockwise from the drive end

Shaft Seal: Carbon/Ceramic/BUNA

Standard Equipment / Capability:

The 3656 and 3756 M & L-Group pumps from Goulds have been designed with technical benefits to meet the needs of users in a variety of water supply, recirculation, and cooling applications.
- The model 3656 offers close coupled design for space saving and simplified maintenance.
- The model 3756 offers a bearing frame mounted design for flexibility of installation and drive arrangements.
- SAE drive sizes 1 through 5 available on all pumps.
- Back pull-out to reduce maintenance down time.
- Standard Type 21 mechanical seal for both reliability and availability. Carbon/ceramic/ BUNA standard, with other faces and elastomers available.
- Available in packed stuffing box design with TeflonTM impregnated packing, split Teflon lantern ring, tapped flush connection and 2 piece investment cast interlocking gland, all standard.
- Available in all iron or bronze fitted construction for application versatility.
- Replaceable wearing components include stainless steel shaft sleeve and casing and hub wear rings to maintain peak efficiency.
- Enclosed impeller design, dynamic balancing and renewable wear rings reduce losses affecting performance and pump life.
- 125 Class ANSI flange suction/ discharge connections and casing rotation for piping connection versatility.
- NPT threaded connections are supplied on 1 1/2 x 2 – 10 and 2 1/2 x 3 – 8 models.
- Optional rigid carbon steel bedplate, sheet metal coupling guard and T. B. Woods spacer coupling for 3756 models.
- Standard NEMA motor frame, JM shaft extension (mechanical seal) JP shaft extension (packed box), C face mounting, single phase or three phase, 3500 or 1750 RPM for 60 Hz, 2900 or 1450 RPM for 50 Hz. Open drip-proof and totally enclosed fan cooled.
- Optional explosion proof and high efficiency motors are available.

3656 M&L Bronze Fitted
End Suction Cast Iron Pumps

MODEL : 14BF2P5B0

Hydraulic Data					Motor Data	3656/3756 M L Group	Qty.
Maximum Flow	Flow at Duty Point	Maximum TDH	TDH at Duty Point	NPSH$_R$	Voltage / Phase / Enclosure	Model	
862 US g.p.m.	425 US g.p.m.	169 ft	151 ft	5 ft	460V 3PH PE-TEFC	14BF2P5B0	1

Submittal Prepared for: _____   Job: _____
Engineer: _____   Contractor: _____
Submittal Prepared by: _____   Company: _____
Submittal Date: 2015-10-28   Approved by: _____   Date: _____

GOULDS
WATER TECHNOLOGY
a xylem brand

Unit Dimensions

3656 M&L Bronze Fitted
End Suction Cast Iron Pumps

MODEL : 14BF2P5B0

Hydraulic Data					Motor Data	3656/3756 M L Group	Qty.
Maximum Flow	Flow at Duty Point	Maximum TDH	TDH at Duty Point	NPSH$_R$	Voltage / Phase / Enclosure	Model	
862 US g.p.m.	425 US g.p.m.	169 ft	151 ft	5 ft	460V 3PH PE-TEFC	14BF2P5B0	1

Submittal Prepared for: _____ Job: _____
Engineer: _____ Contractor: _____
Submittal Prepared by: _____ Company: _____
Submittal Date: 2015-10-28 Approved by: _____ Date: _____

Dimension	Value	Dimension	Value
AB max	5⁷⁄₈	H	¹⁄₂
B	10³⁄₄	L	12³⁄₄
CP max	33¹⁄₄	P max	13¹⁄₄
D	7	R	3³⁄₄
DC max	9¹⁄₂	Suction	4" ANSI
DD	8¹⁄₈	W	5
Discharge	3" ANSI	X	9
Drain	0.375 NPT	Y	3
E	5¹⁄₂	Z	7¹⁄₂
F	4³⁄₄		
G	¹⁄₄		

AKS

Appendix G: Oak Knoll Booster Capacity Evaluation and Water Service Connection – Veritas Memorandum (2018)

AKS
ENGINEERING & FORESTRY

BEND, OR
3052 NW Merchant Way, Suite 100
Bend, OR 97703
(541) 317-8429

KEIZER, OR
4300 Cherry Avenue NE
Keizer, OR 97303
(503) 400-6028

TUALATIN, OR
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
(503) 563-6151

VANCOUVER, WA
9600 NE 126th Avenue, Suite 2520
Vancouver, WA 98682
(360) 882-0419

www.aks-eng.com

Memorandum

Date:	8/24/2018
To:	Kaaren Hofmann, PE – City Engineer, Newberg
From:	John P. Christiansen, PE – AKS Engineering & Forestry, LLC
Project:	**Veritas School (AKS #4612-01)**
Subject:	**Oak Knoll Booster Capacity Evaluation and Water Service Connection**
Site Location:	26288 NE Bell Road, Newberg, OR 97132

RENEWAL DATE: 12/31/19

Purpose:

The purpose of this memorandum is to provide calculation and documentation on how the existing Oak Knoll Booster Station can support the requested domestic water service for the Veritas School located at 26288 NE Bell Road.

Background:

Veritas is a private school located at the northerly boundary of the City of Newberg, southeasterly of the intersection of N College Street (HWY 219) and NE Bell Road. The current facility is comprised of seven modular structures, three of which include plumbing fixtures. Additional detail on the routing of the existing water system is shown in the attached Composite Utility Plan by MSS INC, dated 6/12/2017. Fixture counts are provided in Table 1 below. Domestic water for the school is purchased in bulk and delivered to an on-site holding tank. A booster pump draws water from the tank to feed the site domestic water system. An 8" public water line was installed to and into the site in 2013 and extends approximately 540-FT east of N College Street, ending with a fire hydrant. The public water line is fed by the Oak Knoll Booster Pump located approximately 1,100 feet south of the subject property on Ivy Drive.

Veritas School Domestic Water Summary:

Domestic Demand: The water fixtures in the existing buildings result in 55.5 fixture units as summarized in Table 1 below. From 2017 Oregon Plumbing Specialty Code (OPSC), Appendix A, Chart A 103.1(2) the building fixture count results in a load of approximately 30-GPM.

TABLE 1		
Fixture Type	**Qty**	**FC**
Water Closet	9	2.5x9 = 22.5
Urinal	3	5.0x3 = 15.0
Lavatory	8	1.0x8 = 8.0
Sink (washup)	5	2.0x5 = 10.0
Total		**55.5**

Line Sizing: The existing on-site water system is constructed of approximately 400-LF of 1.5" PEX pipe and a backflow device. Headloss through the water service line was determined using OPSC Appendix A, Chart A 105.1(1) and was calculated to be 14-PSI over the 400-FT length. It is

noteworthy that this calculation assumes the 30-GPM demand runs through the entire 400-FT length of the system. In actuality, the water demand decreases along the length of the service a connections are made to individual buildings. The headloss of 14-PSI is conservative. The double check valve assembly would result in an additional 4-PSI loss at 30-GPM per the Watts Series 007 data sheet. The total headloss through the on-site water system is estimated to be 18-PSI.

Service Elevation: All buildings have a finished floor elevation of 343.5-FT

Evaluation of Existing Booster Pump Capacity:

Description: The existing Oak Knoll Booster Pump Station includes two domestic water pumps (250-GPM each) and one fire pump (750-GPM). Under normal conditions, the domestic pumps operate in an alternating scenario with each pump sized to support the domestic load. In the event of a fire or other high load on the system, the fire pump and one domestic pump operate in parallel to deliver a combined flow of approximately 1,000-GPM. The following analysis documents how the existing booster pump station has capacity to support the current domestic water system load at the Veritas School.

Domestic Demand/Flow: In reviewing the original design report for the Oak Knoll Booster Pump Station (Sandager Subdivision), the system was designed to serve 56-single family units (SFU) with a total load of 225-GPM. However, the final pumps selected were 250-GPM to improve fire flow under a condition of power failure. This leaves 25-GPM of excess capacity during normal operations. The current domestic load from Veritas is 30-GPM bringing the total load to 255-GPM which is only 2% higher than the design capacity of the pump. Therefore, the domestic pumps have capacity to support the current domestic load from the Veritas School.

It is also noteworthy that only 40-SFU of the 56-SFU included in the original design of the pumps, have been constructed. The remaining 16-SFU are allocated to a future development located on a property east of the Oak Knoll Subdivision (TL 3200 Map 3 2 08).

Fire Flow: The City of Newberg completed flow tests on two hydrants connected to the 8" main that is served by the Oak Knoll Booster. The first hydrant is located near the southwestern corner of the subject property, along N College Street; the second is located along the site's southern boundary, approximately 540-FT east of N College Street. The results of the hydrant flow test are summarized in Table 2.

TABLE 2			
Location	Static (PSI)	Observed Flow (GPM)	Residual (PSI)
West	60	1,110	42
East	65	1,010	55

Service Pressure: The Oak Knoll Booster was designed to deliver 50-PSI to the highest elevation service connected to the pump; elevation 346-FT. The buildings at the Veritas site have a finished floor elevation of 343.5-FT, lower than the maximum service elevation. Furthermore, the flow test of the on-site hydrant documented a static water system pressure of 65-PSI. The elevation of the port on the tested hydrant is approximately 343-FT. Based on the original design and the observed static pressure the existing City water line can be expected to deliver 50 to 65-PSI to the subject property. The on-site piping and fixtures are anticipated to result in an 18-PSI headloss; therefore, the residual water pressure at the most downstream point in the system can be expected to be approximately 32 to 47-PSI.

Conclusion:

Based on the information presented above, the existing Oak Knoll Booster pump has capacity to support the current domestic water system demands of the Veritas School.
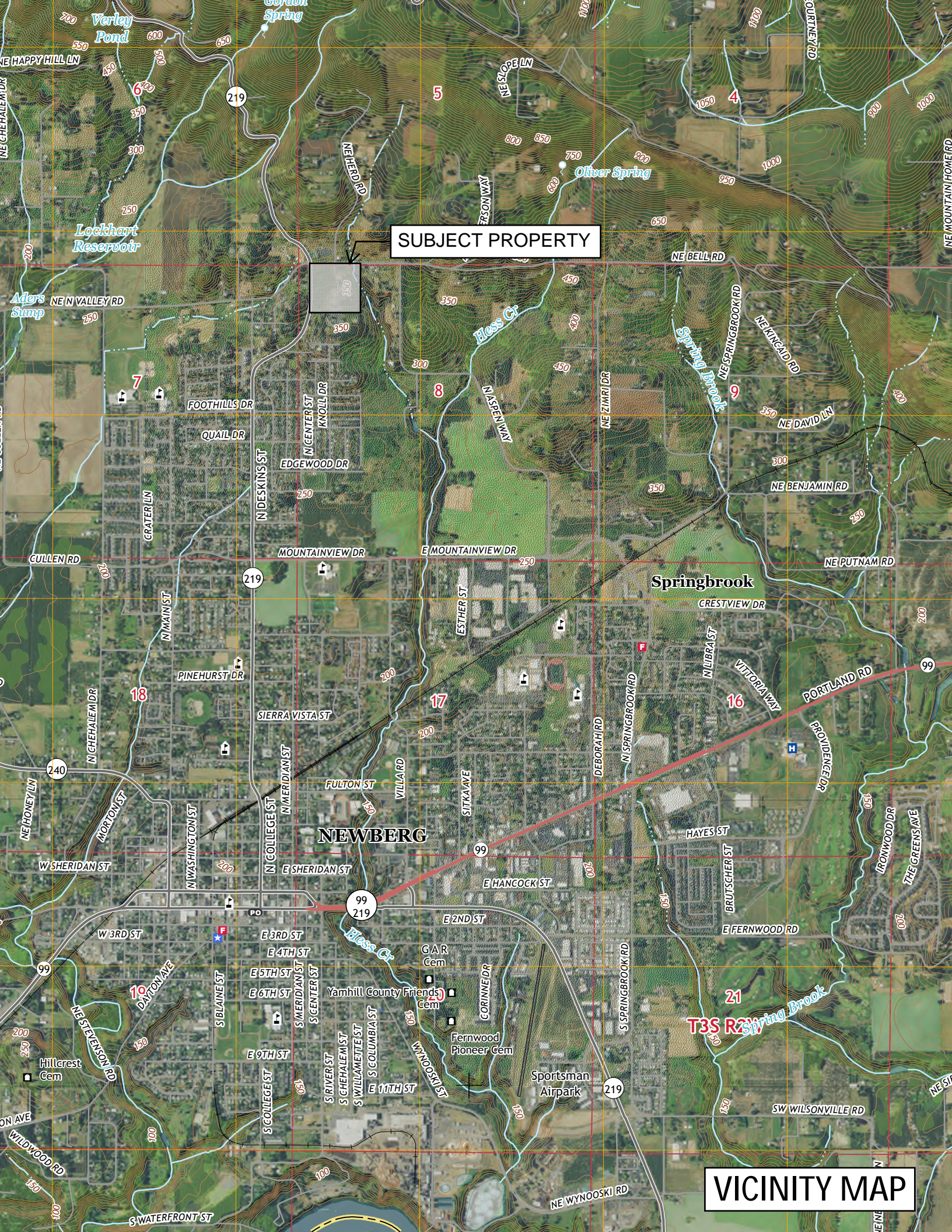
Attachments:

- Vicinity Map
- Exhibits from Oregon Plumbing Specialty Code, Appendix A
- Composite Utility Plan by MSS INC, dated 6/12/2017
- Hydrant flow test future Veritas School Site, from the City of Newberg, dated 3/31/2015.
- Sandager Subdivision Water Booster Pump Station Design Calculations by HBH Consulting Engineers, dated 1/10/2000.

Vicinity Map

SUBJECT PROPERTY

VICINITY MAP

**Exhibits from
Oregon Plumbing Specialty Code, Appendix A**

TABLE A 103.1
WATER SUPPLY FIXTURE UNITS (WSFU) AND MINIMUM FIXTURE BRANCH PIPE SIZES[3]

APPLIANCES, APPURTENANCES, OR FIXTURES[2]	MINIMUM FIXTURE BRANCH PIPE SIZE[1,4] (inches)	PRIVATE	PUBLIC	ASSEMBLY[6]
Bathtub or Combination Bath/Shower (fill)	½	4.0	4.0	–
¾ inch Bathtub Fill Valve	¾	10.0	10.0	–
Bidet	½	1.0	–	–
Clothes Washer	½	4.0	4.0	–
Dental Unit, cuspidor	½	–	1.0	–
Dishwasher, domestic	½	1.5	1.5	–
Drinking Fountain or Water Cooler	½	0.5	0.5	0.75
Hose Bibb	½	2.5	2.5	–
Hose Bibb, each additional[7]	½	1.0	1.0	–
Lavatory	½	1.0	1.0	1.0
Lawn Sprinkler, each head[5]	–	1.0	1.0	–
Mobile Home, each (minimum)	–	12.0	–	–
Sinks	–	–	–	–
Bar	½	1.0	2.0	–
Clinical Faucet	½	–	3.0	–
Clinical Flushometer Valve with or without faucet	1	–	8.0	–
Kitchen, domestic	½	1.5	1.5	–
Laundry	½	1.5	1.5	–
Service or Mop Basin	½	1.5	3.0	–
Washup, each set of faucets	½	–	2.0	–
Shower per head	½	2.0	2.0	–
Urinal, 1.0 GPF Flushometer Valve	¾	3.0	4.0	5.0
Urinal, greater than 1.0 GPF Flushometer Valve	¾	4.0	5.0	6.0
Urinal, flush tank	½	2.0	2.0	3.0
Wash Fountain, circular spray	¾	–	4.0	–
Water Closet, 1.6 GPF Gravity Tank	½	2.5	2.5	3.5
Water Closet, 1.6 GPF Flushometer Tank	½	2.5	2.5	3.5
Water Closet, 1.6 GPF Flushometer Valve	1	5.0	5.0	8.0
Water Closet, greater than 1.6 GPF Gravity Tank	½	3.0	5.5	7.0
Water Closet, greater than 1.6 GPF Flushometer Valve	1	7.0	8.0	10.0

For SI units: 1 inch = 25 mm

Notes:

[1] Size of the cold branch pipe, or both the hot and cold branch pipes.

[2] Appliances, appurtenances, or fixtures not included in this table shall be permitted to be sized by reference to fixtures having a similar flow rate and frequency of use.

[3] The listed fixture unit values represent their total load on the cold water building supply. The separate cold water and hot water fixture unit value for fixtures having both cold and hot water connections shall be permitted to each be taken as three-quarters of the listed total value of the fixture.
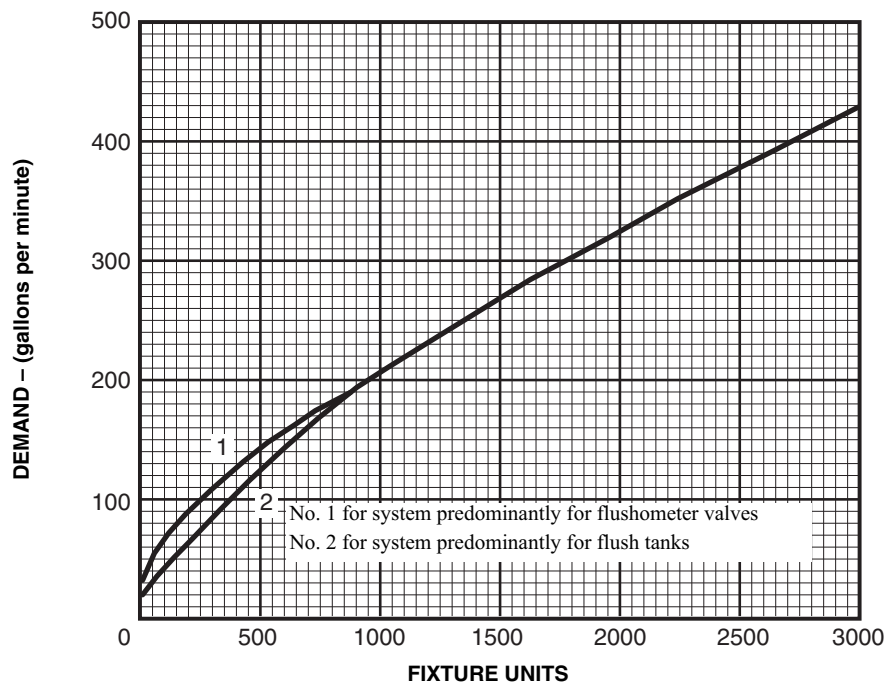
[4] The listed minimum supply branch pipe sizes for individual fixtures are the nominal (I.D.) pipe size.

[5] For fixtures or supply connections likely to impose continuous flow demands, determine the required flow in gallons per minute (gpm) (L/s) and add it separately to the demand in gpm (L/s) for the distribution system or portions thereof.
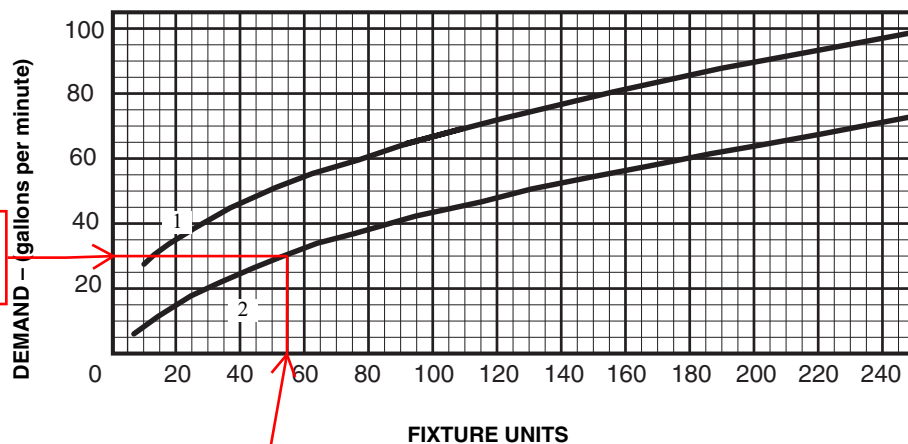
[6] Assembly [Public Use (see Table 422.1)].

[7] Reduced fixture unit loading for additional hose bibbs is to be used where sizing total building demand and for pipe sizing where more than one hose bibb is supplied by a segment of water distribution pipe. The fixture branch to each hose bibb shall be sized on the basis of 2.5 fixture units.

CHART A 103.1(1)
ESTIMATE CURVES FOR DEMAND LOAD

DEMAND – (gallons per minute)

FIXTURE UNITS

No. 1 for system predominantly for flushometer valves
No. 2 for system predominantly for flush tanks

For SI units: 1 gallon per minute = 0.06 L/s

CHART A 103.1(2)
ENLARGED SCALE DEMAND LOAD

DEMAND – (gallons per minute)

DEMAND =
30-GPM

FIXTURE UNITS

FC = 55.5

For SI units: 1 gallon per minute = 0.06 L/s

CHART A 105.1(1)

FRICTION LOSS IN HEAD (pounds-force per square inch) PER 100-FOOT LENGTH

For SI units: 1 inch = 25 mm, 1 gallon per minute = 0.06 L/s, 1 pound-force per square inch = 6.8947 kPa, 1 foot = 304.8 mm, 1 foot per second = 0.3048 m/s

     2017 OREGON PLUMBING SPECIALTY CODE

Composite Utility Plan by MSS INC
Dated 6/12/2017

GENERAL NOTES

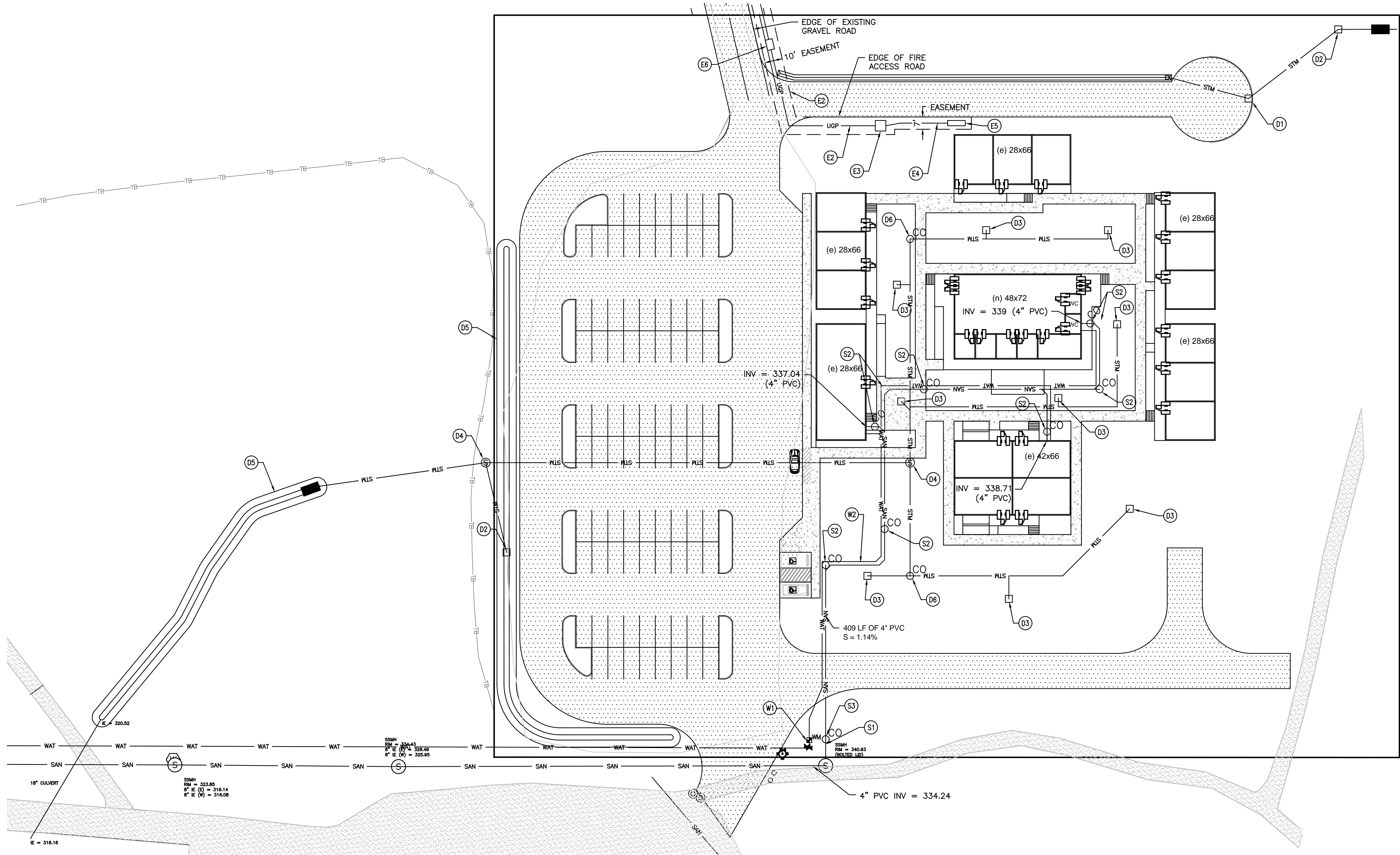- PROVIDE TRENCH BACKFILL AND PIPE BEDDING PER CITY OF NEWBERG STD DWG 201A AND 201B.

- ALL PLUMBING SHALL BE INSTALLED IN ACCORDANCE WITH IPC REQUIREMENTS. PROVIDE ADDITIONAL CLEANOUTS (NOT SHOWN) ON SEWER & STORM LINES AT 100' MAX SPACING OR FOR EVERY 135° OF PIPE BENDS.

ELECTRICAL NOTES

- ALL ELECTRICAL NOTES AND CONDUIT LOCATIONS ARE FOR COORDINATION PURPOSES ONLY. VERIFY ALL WIRING CONNECTIONS, SIZES AND REQUIREMENTS WITH THE ELECTRICAL PLANS PRIOR TO CONSTRUCTION. IN THE EVENT OF ANY CONFLICT THE REQUIREMENTS NOTED ON THE ELECTRICAL PLANS SHALL APPLY.

- ADHERE TO PGE DTL 6/C721 FOR BACKFILL, MATERIAL AND CLEARANCES.

E1 NEW DROP ON EXISTING POWER POLE ALONG BELL ROAD. CONTRACTOR TO COORDINATE. SEE SHEET C401.

E2 PROVIDE TRENCHING, BACKFILL & CONDUIT FOR PRIMARY UNDERGROUND FEED PER UTILITY'S REQUIREMENTS. PROVIDE PULL STRING.

E3 PROVIDE & INSTALL TRANSFORMER VAULT PER UTILITY REQUIREMENTS. INSTALL BOLLARDS PER DTL 1/C721 AS SHOWN. PROVIDE ADEQUATE CLEARANCES FOR TRANSFORMER PER PGE DTL 7/C721. TRANSFORMER SHALL BE 5' (MIN) FROM DRIVING SURFACES OR HAVE FIXED & REMOVABLE BOLLARDS INSTALLED PER PGE REQ'S.

E4 PROVIDE & INSTALL TRENCHING, BACKFILL & CONDUIT FOR SECONDARY UNDERGROUND FEED PER UTILITY'S REQUIREMENTS. PROVIDE PULL STRING.

E5 600A SERVICE PANEL PER ELECTRICAL PLANS

E6 PROVIDE & INSTALL SECTIONALIZING POWER VAULT PER UTILITY REQUIREMENTS.

WATER NOTES

W1 INSTALL 1" WATER METER AND BACKFLOW PREVENTION DEVICE PER CITY OF NEWBERG STANDARDS.

W2 INSTALL 1-1/2" PEX BUILDING SERVICE LINE

SANITARY NOTES:

S1 EXISTING 15 FOOT LONG 8" SANITARY STUB

S2 INSTALL CLEANOUT PER CITY OF NEWBERG STD. DWG 210.

S3 INSTALL CLEANOUT AND 8"X4" ECCENTRIC REDUCER AT END OF EXISTING 8" SEWER STUB

STORM DRAIN NOTES (SEE STORM SHEETS FOR PLAN AND PROFILES):

D1 CONSTRUCT TRAPPED LYNCH STYLE CATCH BASIN WITH A CONCRETE COLLAR PER DETAIL SHEET C720

D2 CONSTRUCT TRAPPED LYNCH STYLE CATCH BASIN WITHOUT A CONCRETE COLLAR PER DETAIL SHEET C720

D3 CONSTRUCT 12"x12" NDS CATCH BASIN PER DETAIL ON SHEET C722. INSTALL 12"x12" NDS SQUARE GRATE (PART NO. 1212/ADA COMPLIANT)

D4 STANDARD STORM SEWER MANHOLE

D5 DRAINAGE SWALE

D6 INSTALL CLEANOUT PER CITY OF NEWBERG STD. DWG 210

Plan Labels

EDGE OF EXISTING GRAVEL ROAD
10' EASEMENT
EDGE OF FIRE ACCESS ROAD
EASEMENT

(e) 28x66
(e) 28x66
(e) 28x66
(e) 28x66
(n) 48x72 INV = 339 (4" PVC)
(e) 28x66
(e) 42x66

INV = 337.04 (4" PVC)
INV = 338.71 (4" PVC)

409 LF OF 4" PVC S = 1.14%
4" PVC INV = 334.24

18" CULVERT

VERITAS SCHOOL SITE DEVELOPMENT
NEWBERG, OREGON
COMPOSITE UTILITY PLAN
26500 NE BELL ROAD NEWBERG, OR 97132

REGISTERED PROFESSIONAL ENGINEER
OREGON
PETER J. SEABERS
RENEWAL: 6/30/2018

BUILDING PERMIT SET
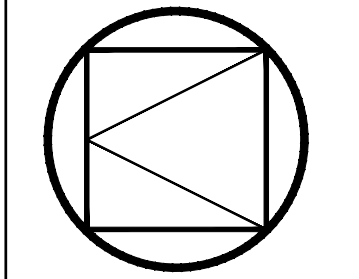
JOB #	FILE	DRAW
17001	UTIL	AS
SCALE	DATE	
AS SHOWN	06.12.17	

C400
5 OF 11 SHEETS

LEGEND

PROPERTY BOUNDARY	
ADJACENT PROPERTY LINES	
CENTERLINE	
EASEMENT LINES	
BUILDING	
CURB	
SIDEWALK	
FENCE	×—×
WATERLINE	WAT
SANITARY SEWER	SAN
STORM DRAIN LINE	STM
OVERHEAD POWER	OHP
UNDERGROUND POWER	UGP
RETAINING WALL	
PROPOSED PAVING	

PROPERTY CORNER	
CONTROL POINT	
STORM MANHOLE	
STORM CATCHBASIN	
STORM/SEWER CLEANOUT	CO
FLOW DIRECTION ARROW	
STORM CULVERT END	
SEWER MANHOLE	
WATER METER	

CONCRETE PAVING	
ASPHALT PAVING	
GRAVEL SURFACE	
EXISTING MAJOR CONTOURS	30
EXISTING MINOR CONTOURS	30
MAJOR CONTOURS	30
MINOR CONTOURS	30

WATER VALVE	
WATER METER	
POWER/UTILITY POLE	
STREET LIGHT	
STREET SIGN	
GAS VALVE	GV
GAS METER	GM
TEL/COMM PED/RISER	TEL

SCALE IN FEET
0   30   45   60
1 inch = 30 ft.

Hydrant Flow Tests by the City of Newberg
Dated 3/31/2015

Engineering Department
503-537-1273

City Attorney Office
503-537-1206

City of
NEWberg

414 E. First Street
Newberg, OR 97132

March 31, 2015

RE: Hydrant flow test future Veritas School site.

Flow tests were taken at the future Veritas School site located at the intersection of Hwy 219 and Bell Rd on March 9th 2015. Two fire hydrants were used in this test and were described as "West Hydrant" being near the Church driveway off Hwy 219 and "East Hydrant" being at the northeast corner of the church parking lot.

The water line in this area is served through a three pump booster pump station located in the Oak Knoll Subdivision. Pumps were monitored while the flow tests were being performed. The discharge pressure maintained between 78 and 81 PSI with an inlet pressure of 40 PSI during the testing. During the tests both pumps #1 &# 2 ran at 50% while the fire booster pump (#3) ran at 80%, which is the preset maximum for this pump.

The west hydrant results were, 43 PSI pilot reading with a total of 1110 GPM, static PSI of 60 and a residual of 42 PSI.

The east hydrant results were, 36 PSI pilot reading with a total of 1010 GPM, static PSI of 65 and a residual of 55 PSI.

Sincerely,

Brian Kershaw
Engineering Tech 3

FLOW TEST REPORT

Location _4020 college st. Newberg_ Date _3-9-15_

Test Made By _Derrick Runey_ Time _9:35 Am_

Representative of _A&A drilling_

Witness _Brian karshaw_

State Purpose of Test _Flow check_

Consumption Rate During Test _Unknown_

If Pumps Affect Test, Indicate Pumps Operating _3 booster pumps_

Flow Hydrants ___A_1___ ___A_2___ ___A_3___

Size Nozzle _2.5"_

Pilot Reading _36_ Total GPM _1010_

GPM _One thousand ten_

Static B _65_ psi Residual B _55_ psi

Projected Results: at 20 psi Residual _2272_ gpm; or at _____ psi Residual _____ gpm

Remarks _EAst fire Hydrant_

Location Map: Show line sizes and distance to next cross connected line. Show valves and hydrant branch size. Indicate North. Show flowing hydrants–label A_1, A_2, A_3. Show location of Static and Residual–label B.

Indicate B. Hydrant _____ Sprinkler _____ Other (identify) _____

HOT TAPPING and LINE STOPPING SERVICES

A&A
Drilling Service Inc.
www.aadrilling.com

FLOW TEST REPORT

Location _4020 college st. Newberg_ Date _3-9-15_

Test Made By _Derrick Rumey_ Time _9:35 AM_

Representative of _A&A drilling_

Witness _Brian kershaw_

State Purpose of Test _Flow check_

Consumption Rate During Test _unknown_

If Pumps Affect Test, Indicate Pumps Operating _3 booster pumps_

Flow Hydrants ___ A_1 ___ A_2 ___ A_3

Size Nozzle _2.5"_

Pilot Reading _43_ Total GPM _1110_

GPM _Eleven hundred ten_

Static B _60_ psi Residual B _42_ psi

Projected Results: at 20 psi Residual _1693_ gpm; or at ___ psi Residual ___ gpm

Remarks _West Fire hydrant_

Location Map: Show line sizes and distance to next cross connected line. Show valves and hydrant branch size. Indicate North. Show flowing hydrants–label A_1, A_2, A_3. Show location of Static and Residual–label B.

Indicate B Hydrant___ Sprinkler___ Other (identify)___

HOT TAPPING and LINE STOPPING SERVICES

Pump Station Site

Property to be served with increased booster pump.
(11-12 units).

8" Fire Line to future School

WEST FIRE HYDRANT

APPROX.
EAST FIRE HYDRANT

HWY 219 (N. COLLEGE ST.)
HILLSBORO-SILVERTON HWY

Ivy Drive Water Booster
Pump Station Service Area

Legend:

- Pump Station Service Area
- 41 — Existing Homes Served
- 15 — Future Homes Served (install valve)
- 280' Contour
- Contours
- Water Line
- ● Water Valve
- ▢ City Limit

O:/Engineering/Surveying/PumpStationService.pdf
8/13/04

Exhibit 2

Snyder Springs (900 ft. MSL)

Skelton Springs (890 ft. MSL)

Atkinson/Reynolds Springs (550 ft. MSL)

Oliver Springs (650 ft. MSL)

Highest Point in URA (580 ft)

Approximate Contour for siting of Zone 2 Reservoir (450 ft. MSL)

Approximate Contour for siting of Zone 3 Reservoir (530 ft. MSL)

Approximate Contour for siting of Zone 4 Reservoir (650 ft. MSL)

North Valley Rd. Reservoirs

Oak Knoll (Ivy Dr.) Booster Pump Station

North Valley Rd.

Phase 6

Phase 5

Bell Rd.

4

3

2

Phase 1

Mountainview Dr.

Crestview Dr.

College St.

Main St.

Villa Rd.

Southern Pacific RR

Phase 4

Springbrook Rd.

Approximate Contour (300 ft. MSL)

Approximate Contour (380 ft. MSL)

Approximate Contour (460 ft. MSL)

Otis Springs

Corral Creek Rd. Reservoir (overflow elevation 402.6 ft. MSL)

State Hwy 99 W

9th St.

Phase 3

Hillsboro-Silverton Hwy. 219

Phase 2

Wynoski St.

Water Treatment Plant

Well Field

Willamette River

Legend

- ● Existing Reservoirs
- ■ Existing Water Treatment Plant
- Existing Water System
- City Limits
- Urban Growth Boundary (UGB)
- Urban Reserve Area (URA)
- ● Potential Site for New Zone 1 Storage
- ● New Zone 2-3 Reservoir
- ▽ Zone 2 PRV
- ▣ Zone 2-3 Pump Station
- Zone 2-3 Central Supply
- Zone 2-3 NVR Supply
- New 24" Springbrook Trunk Phase 1
- New 24" Springbrook Trunk Phase 2
- New 24" Springbrook Trunk Phase 3
- New 24" Springbrook Trunk Phase 4
- New 24" Springbrook Trunk Phase 5
- New 24" Springbrook Trunk Phase 6
- Zone 2
- Zone 3
- Zone 4

N
W E
S

1 inch equals 2,000 feet

0   1,000   2,000   4,000 Feet

Figure 7-2

2025 Recommended System Improvements

2004 City of Newberg Water Distribution System Plan

CH2MHILL

City of Newberg

File Path: \\rosa\proj\Newberg\180295\Newberg_GIS_Data\MapDocuments\7_1_2025_Improve.mxd, Date: November 14, 2003 10:58:20 AM

JT Smith filed a federal lawsuit against the city prior to the current council's term. This filing prevented the city from negotiating a solution to this issue.

The lawsuit was terminated by the court in its original filing. JT Smith decided not to approach the city to negotiate, but instead chose to re-file the federal lawsuit. The city had no part in the filing of either lawsuit.

About 1 month ago I was contacted by JT Smith to discuss mediation of some sort. I contacted Will and the city attorney, and we agreed to see what they had in mind.

JT Smith wanted to see if we were interested in negotiating. I expressed that I personally would like to negotiate, and I believed that the city and council would probably agree, but they would most likely need to drop the lawsuit first so that we can discuss this directly with them and not through the lawyers.

They said that they would consider it and let us know.

In their published article they stated that I was in favor of negotiating, but the city staff and council was opposed.

Since the city council had no knowledge of this discussion, JT Smith would have had to have direct discussions with each councilor and city staff to ascertain the will of the council and staff.
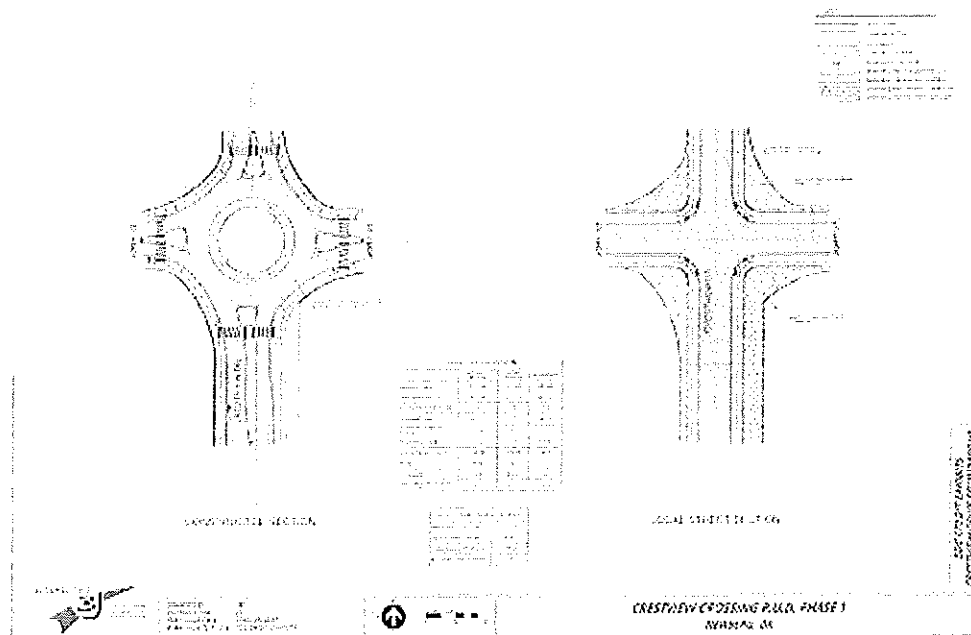
I regret that JT Smith jumped to this conclusion and-- I Move to direct staff to indicate to JT Smith that the city is willing to enter negotiations with JT Smith after they drop the federal lawsuit.

J.T. Smith Unlocks Newberg's Workforce Housing Potential: The City Council's Broken Promise to Community Growth

Created by Karcy Noonan

Published 10/11/24 AT 3:37 PM EDT

f in ☺   ✉ 💬

The infrastructure widening for the J.T. Smith Companies, Crestview.   (PHOTO: J.T. SMITH COMPANIES)

J.T. Smith Companies, one of the Pacific Northwest's most prolific residential developers, is in the final phase of a new development in Newberg, Oregon. As a mixed-use development of both residential and commercial spaces, the development is supplying much-needed workforce housing to Newberg and the Portland Metro Area's communities. They are now in the thick of a two-year-long federal dispute over the city's

housing are essential to mending the broken supply of affordable real estate. With an estimated need for <u>800 new workforce housing units</u> for the coming decades, there is a significant disparity in homes people can afford to live in. "We are trying to supply workforce housing to combat an out-of-whack scale of affordability," explains Jesse.

Similar to the recently concluded *<u>Sheetz v. County of El Dorado</u>*, J.T. Smith's federal case challenges the city based on their alleged violation of the Takings Clause of the Fifth Amendment, which states '... nor shall private property be taken for public use, without just compensation.'

"This is an incredibly long and frustrating process. For two years now, we have taken on the growing costs of interest and legal fees – now over $160,000 – and we are working against a public agency for whom it's best to sit back and do nothing. Newberg taxpayers are continuing to fund unnecessary legal fees for a frivolous lawsuit that has already been agreed to in part. With mediation, we could solve the unnecessary spending of legal fees," Jesse says, referring to their decision to file their case for full reimbursement in Oregon's federal courts, including interest and legal fees.

The Supreme Court's recent unanimous ruling in favor of California's George Sheetz has set a strong precedent for future suits against city ordinances, whose conditions often block new housing developments through extravagant fees. While the Mayor of Newberg, Bill Rosacker, has been open to mediation with J.T. Smith, the rest of the City Council and City Manager have been resistant despite the company's sustained efforts.

J.T. Smith Companies welcomes open discussion with the Council over their deserved reimbursement credits and additional fees. The company is committed to its mission of creating more affordable housing for the residents of Oregon and Washington and looks forward to further realizing its vision with the help of the Newberg City Council, through mediation.

Because of the new Newberg development's prime location, J.T. Smith's over-building charges have progressed much further than larger pipes for their waterlines. "Part of the over-building involved widening the highway itself. We took it from a rural condition – with roadside ditches – to a right-turn pocket, curb, sidewalk, and landscaping with underground and overhead utilities such as traffic signals," explains John Wyland, Chief Operating Officer at J.T. Smith.

Since they filed their initial case over two years ago in August 2022, the city has allegedly refused to pay the $2.394 million that J.T. Smith has sunk into over-building and mounting interest fees. However, the city initially agreed to a portion of the request totaling $420,000 of credits to be paid to J.T. Smith, as revealed in an email exchange between the company and a city manager that took place in 2022.

Despite the acknowledged $420,000 due by the city, despite a federal judge overruling the city's first Motion to Dismiss on the shaky grounds that J.T. Smith's suit was frivolous, and despite J.T. Smith's comprehensive itemized credit claims sent to the city, there is still no sign of the multimillion-dollar reimbursement that would actively drive down housing prices in a city whose cost of living is 120.7% the national average.

"Everyone is aware of the housing crisis in this country, particularly in the Pacific Northwest. The city's refusal to pay credits is just a slap in the face of affordable housing," Jesse Nemec, Senior Development Manager at J.T. Smith claims. The new neighborhood holds some of Newberg's least expensive new single-family homes. As a mixed-use property, the development stands as an example of sustainable urban planning, fostering community through seamlessly integrating various land uses and connecting diverse tenants within a single property.

With a Newberg home's average sale price of $475,000, the average homeowner must clear a monthly total of $4,000. For lower-income households, apartment rentals come to $1,500/month. New developments dedicated to the in-between class of workforce

alleged refusal to reimburse the company almost $2.4 million in Systems Development Charge (SDC) credits.

As of now, the Newberg development has built 190 single-family homes, 51 apartment units, and 50,000 sqft. of retail commercial space, with another 196 multi-family homes to be built in the coming months. Located immediately adjacent to OR-99W, the 30-acre property will serve as a gateway into the city for both North Newberg and Portland commuters.

J.T. Smith Companies was established in 1993 by Jeff and Teresa Smith and steadily grew into one of the top local developers of multi-family homes. With a current portfolio of 783 units, they pride themselves on their expertise, resourcefulness, and innovation in land development, residential building, and asset management. The new development will dedicate units to affordable family housing near the commercial center.

Part of the normal procedures for constructing properties and their infrastructure is for local jurisdictions – in this case, the Newberg City Council – to condition the building of infrastructure larger than what is needed to account for the future needs of the city. For instance, if a developer requires an 8" diameter line for their water distribution system, the city will require them to build a 12" water line, for which the cost difference will be reimbursed through a process called System Development Charge (SDCs) credit process.

SDCs are one-time charges exacted from private property building permits used to fund municipal development projects. Through these SDC exactions, a fund is cultivated for Newberg to use for reimbursement, improvement, and compliance costs. In J.T. Smith's first meeting with the Mayor of Newberg in 2022, they were made privy to the total amount sitting in the city's SDC fund – specifically allotted fees such as constructing public infrastructure – approximately $60 million.

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