

March 17, 2014
W-P Project No. 12885A

Mr. Matthew A. Nazar
Director of Development Services
City of Augusta
16 Cony Street
Augusta, Maine 04330

We therefore do not believe this requirement to be applicable to this type of project.

Subject: REVISION 1 - Submission for the Proposed Malta Hill Water Storage Tank
Greater Augusta Utility District

Dear Mr. Nazar:

Thank you for meeting with us last week to discuss our application to the planning board for a water storage tank proposed by the Greater Augusta Utility District on Malta Hill. Following our meeting and the feedback you provided, we have modified our planning board submission as follows:

Bound Application with Project Narrative – We have revised our project narrative and have included 11 new copies. The revisions include changing the waiver language as requested and inclusion of supplemental information on each relevant issue. A CD is also provided with a copy of this document.

Plan Revisions – Two full size copies of the plans and a PDF version on CD will be provided directly by the District. The missing property line has been added to the plans.

Property Agreement with City – The District has communicated with the City Manager and a letter will be provided showing the City's intent to transfer the adjacent land parcel in question to the District.

Erosion Control Information and Specifications – As indicated in an email from the District to the planning board, detailed specifications and references to the erosion control measures on the property will be provided by the District.

Application Fee – The District will provide a check in the amount of \$269.20 for the minor application.

Mr. Brian Tarbuck, P.E.
March 17, 2014
Page 2 of 2



We have attempted to provide all the requested information for a Minor Development project, although the attributes of this project are unique and do not fit well into the defined tracks for Planning Department approval. Nonetheless, we have attempted to provide you with everything relevant to this type of project.

On behalf of the District, thank you very much and please let us know if anything is missing or incomplete. Thank you again.

Very truly yours,

WRIGHT-PIERCE

A handwritten signature in black ink, appearing to read 'J.P. Musich', located below the firm name.

Jeffrey P. Musich, P.E.
Project Manager

CC: B. Tarbuck, A. Begin, GAUD

DEVELOPMENT REVIEW APPLICATION

Applicant Please Read First:

It is the Applicant's responsibility to read the relevant sections of the Augusta Land Use Ordinance and provide the material required to constitute a complete application. No application will be placed on the Planning Board agenda until it has been deemed complete by staff at the Bureau of Planning. An application that includes all of the information described in this packet shall constitute a completed application. Waivers from certain standards may be requested in writing as an alternative to providing the required information.

This application form is for major development and minor development site plan applications which are:

MAJOR DEVELOPMENT: Any multi-family or non-residential development project that:

- a. creates more than 20,000 square feet of new floor space in the CD or IA zones; or
- b. creates more than 10,000 square feet of new floor area in zones not listed in a. above; or
- c. that disturbs more than 43,560 square feet (1 acre) of land; or
- d. creates more than 43,560 square feet (1 acre) of new impervious surface; or
- e. new construction that generates more than 100 trips in the peak hour for the proposed use; or
- f. proposes a new wireless communication facility that will require construction of a new tower.

MINOR DEVELOPMENT: Any multi-family or non-residential development project that:

- a. creates between 5,000 and 20,000 square feet of new floor area in the CD and IA zones; or
- b. creates between 1,000 and 10,000 square feet of new floor area in zones not listed in a. above; or
- c. that disturbs between 10,000 and 43,560 square feet of land; or
- d. creates between 10,000 and 43,560 square feet of new impervious surface; or
- e. creates four (4) or more residential units in a pre-existing single family, duplex, or multi-family structure; or
- f. new construction that generates between 35 and 99 trips in all zoning districts except CD and IA, in the peak hour for the proposed use; or
- g. any change of use where the proposed use requires 25% more on-site parking, as calculated using the parking requirements in the Land Use Ordinance, than the applicant proposes to make available on site; or
- h. proposes collocation of a wireless communication facility on an existing tower that will require construction of a new equipment shed.
- i. all uses proposing to construct a drive-through service or vehicle re-fueling pumps that do not otherwise qualify for major or minor development review.

When a proposed use qualifies as both a Development review and a Conditional Use, this single application shall be used. The staff and Planning Board review shall take both required approvals into account during a single review process.

Please note that a **complete application is required** before it will be reviewed by the Planning Board. The attached application must be submitted with the required plans, drawings, reports, and narratives as outlined in Chapter 4 of the Land Use Ordinance and Section 6.3.4 of the Land Use Ordinance.

The application review for a Major and **Minor Development** will proceed as follows:

1. Pre-Application review with Planning Staff, as necessary
2. Application submission to Planning Board.
3. Notification of abutters upon receipt of Application for Minor Development
4. Public hearing within thirty (30) days of receipt of complete application
5. Planning Board decision within thirty (30) days of the close of a public hearing.

Decisions on a Major or Minor Development are generally made in a single Planning Board meeting, however, if additional information is required, the hearing may be continued and require additional Planning Board meetings.

FEES:

1. For all applications: \$0.15 + the cost of first class postage for each abutter that will be notified as required by the ordinance.
2. For Major Development review: \$2,000 + (\$0.15 x each new square foot over 25,000). Maximum fee = \$4,000.
3. For Minor Development review: \$250 + (\$0.15 x each new square foot over 5,000). Maximum fee = \$1,000.

City of Augusta
Development Review Application
 Bureau of Planning, Department of Development Services

Address of Proposed development: Malta Hill, Haskell Street, Augusta, Maine		
Zone(s): RA		
Project Name: Replacement Tank on Malta Hill		
Existing Building (sq. ft.): 10,600	Proposed Building (sq. ft.): 7,000	
Existing Impervious (sq. ft.): 10,600	Proposed Impervious (sq. ft.): 7,000	
Proposed Total Disturbed Area of the Site: 38,000 sq.ft.		
Proposed disturbance of greater than one acre requires a Chapter 500, Stormwater Management Permit from the Maine Department of Environmental Protection (DEP).		
Owner's Name/Address: Greater Augusta Utility District 12 Williams Street Augusta, Maine 04330 Phone #: 207-622-3701 Cell #: 207-485-3889 e-mail: btarbuck@AugustaWater.org abegin@AugustaWater.org	Applicant's Name/Address: Greater Augusta Utility District 12 Williams Street Augusta, Maine 04330 Phone #: 207-622-3701 Cell #: 207-485-3889 e-mail: btarbuck@AugustaWater.org abegin@AugustaWater.org	Consultant's Name/Address: Wright-Pierce 99 Main Street Topsham, Maine 04086 Phone #: 207-798-3753 Cell #: 207-522-7109 e-mail: jpm@wright-pierce.com
Tax Map #: 46 Lot #: 3B	Lot Size (acres): 3.94 acres Frontage (Feet): 75 feet	Form for Evidence of Standing (deed, purchase and sale agreement, other):
<u>For Staff Use</u>		
Fee Calculation: Major Development max fee is \$4,000; Minor Development max fee is \$1,000		
Major Development: \$2,000 + (number of sq ft over 25,000 x \$0.15) =		
Minor Development: \$250 + (number of sq ft over 5,000 x \$0.15) =		
All Development: Number of Abutters x (1oz First Class postage fee + \$0.15) =		
Total Fee:		

Signatures

Applicant: Greater Augusta Utility District

Date: _____

Owner: Greater Augusta Utility District

Date: _____

Agent: Jeffrey P. Musich P.E

Date: _____

Checklist. The checklist below must be completed by the applicant. The required material or a written waiver request must be provided.

Information Required on Plan(s) See Augusta Land Use Ordinance for greater detail	Included	Waiver Requested
a. Name of Site Plan (Sec 4.5.2.1 of the Land Use Ordinance)	X	
b. Owner(s) name and address (4.5.2.2)	X	
c. Deed reference to subject parcel (4.5.2.3)	X	
d. Engineer's name, address, signature and seal (4.5.2.4)	X	
e. Surveyor's name, address, signature and seal (4.5.2.5)	X	
f. Scale, both in graphic and written form (4.5.2.6)	X	
g. Date and Revision box (4.5.2.7)	X	
h. Zoning designation(s) (4.5.2.8)	X	
i. North Arrow (true and magnetic, dated or grid) (4.5.2.9)	X	
j. Ownership, location and present use of abutting land (4.5.2.11)	X	
k. Location map (4.5.2.12)	X	
l. Streets, existing & proposed, with curve data (4.5.2.13 & 4.6.2.5)	N/A	
m. Drainage and erosion control (4.5.2.14)	X	
n. Utilities, existing and proposed (4.5.2.15)	X	
o. Topography, 2 foot contours (4.5.2.16)	X	
p. Parcel boundaries and dimensions (4.5.2.17)	X	
q. Proposed Use of the property (4.5.2.18)	X	
r. Proposed public or common areas (4.5.2.19)	N/A	
s. Boundary Survey and associated information (4.5.2.20)	X	
t. Traffic controls, off-street parking and facilities (4.5.2.21)	N/A	
u. Proposed fire protection plans or needs (4.5.2.22)	N/A	
v. Landscaping and buffering (4.5.2.23)	N/A	
w. Outdoor lighting plan (4.5.2.24)	N/A	
x. Freshwater wetlands (4.4.1.14)	N/A	
y. River, stream or brook (4.4.1.15)	N/A	
Information Required in Written Project Narrative See Augusta Land Use Ordinance for greater detail	Included	Waiver Requested
a. Pollution – Undue water or air pollution (4.4.1.1)	N/A	
b. Water – Sufficient potable water (4.4.1.2)	N/A	
c. Municipal Water – is there adequate supply (4.4.1.3)	N/A	
d. Soil Erosion – unreasonable soil erosion (4.4.1.4)	X	
e. Road congestion and safety (4.4.1.5 & 4.5.2.21)	N/A	
f. Sewage waste disposal – adequate provisions (4.4.1.6)	N/A	
g. Solid waste – adequate provisions (4.4.1.7)	N/A	
h. Aesthetic, cultural, and natural values (4.4.1.8)	N/A	
i. Conformity with city ordinances and plans (4.4.1.9)	N/A	
j. Financial and technical ability (4.4.1.10)	N/A	
k. Surface water, shoreland, outstanding rivers (4.4.1.11)	N/A	
l. Ground water – negative impact (4.4.1.12)	N/A	
m. Flood areas (4.4.1.13)	N/A	
n. Freshwater wetlands – description of impact (4.4.1.14)	N/A	
o. Stormwater – management plans (4.4.1.16)	N/A	
p. Access to direct sunlight (4.4.1.17)	N/A	
q. State Permits – description of requirements (4.4.1.18)	N/A	
r. Outdoor lighting – description of lighting plans (4.4.1.20)	N/A	

Additional Information Required in Written Narrative See Augusta Land Use Ordinance for greater detail Where the items below duplicate the items above, identical responses are permitted and encouraged.	Included	Waiver Requested
s. Neighborhood Compatibility – description per ordinance (6.3.4.1)	N/A	
t. Compliance with Plans and Policies (6.3.4.2)	N/A	
u. Traffic Pattern, Flow, and Volume analysis (6.3.4.3)	N/A	
v. Public facilities – Utilities including stormwater (6.3.4.4)	N/A	
w. Resource protection and the environment (6.3.4.5)	X	
x. Performance Standards (6.3.4.6)	X	
y. Financial and Technical Ability (6.3.4.7)	N/A	

Application Materials

The application materials that are required for a complete application are listed below:

Paper Copies	Included	Waiver Requested
11 copies of the application form and narrative	X	
11 copies of the deed, Purchase & Sale agreement, or other document to show standing		
3 copies of any stormwater report	N/A	
2 copies of any traffic report	N/A	
7 reduced-sized copies of the complete plan set on 11" x 17" size paper	X	
4 full-sized copies of the complete plan set on ANSI D or E size paper		
11 copies of a letter authorizing the agent to represent the applicant	N/A	
Payment in full of application fee (Note: an abutter notification fee will be assessed after the application is determined to be complete. The fee is \$0.15 plus the cost of first class postage for each abutter that will be notified as required by the ordinance.)	N/A	
Electronic Copy		
1 CD that includes each of the application documents in Adobe PDF format	X	

For Official Use:		
<input type="checkbox"/> \$ _____ Application Fee Paid.	Received By (Initials): _____	Date: _____
<input type="checkbox"/> \$ _____ Abutter Notification Fee Paid.	Received By (Initials): _____	Date: _____

Development Narrative for Submission to the City of Augusta Planning Board for Approval of Minor Development

Project: Replacement of the Malta Hill Water Storage Tank and Demolition of the Two Existing Steel Water Storage Tanks

Owner: Greater Augusta Utility District

Date: March 12, 2014

Project Description

The Greater Augusta Utility District (GAUD), formerly the Augusta Water District, own and operate two existing welded steel water storage tanks located on Malta Hill in Augusta, Maine. The tanks are each 81.5 feet in diameter, about 50-feet high and store 1.5 million gallons of water. The tanks provide fire storage and pressure to the east side of the City of Augusta.

The District retained Wright-Pierce in 2011 to study the adequacy of the water storage system in the City in an effort to simplify the amount of storage and the location of storage facilities. A copy of the report is attached. In summary, the report recommended reducing the size of the storage system on the east side of Augusta by eliminating 4 storage tanks, two in the Riverside area and two on Malta Hill, and replacing these tanks with a single tank on Malta Hill.

The new storage tank will be 2.4 million gallons size, slightly larger in diameter and about 14 feet higher than the top of the existing storage tanks. The new tank will be located directly over the footprint of the East Malta Hill tank, reducing the amount of disturbance to the site. The West Malta Hill tank will also be demolished and the site restored with loaming and seeding. The new tank will be constructed of concrete.

The site will be secured with a new chain link fence and gate and all disturbed areas will be restored. Small sets of plans are included with this planning Board submission as well as full size construction plans.

Project Funding

The project received a low interest loan from the Maine State Revolving Loan Fund (SRF) administered through the Drinking Water Program at the Department of Health and Human Services (DHHS). This funding is in place and will be made available as soon as the project is released for competitive bidding. The loan package will be supplemented with a small portion of local funds.

Project Schedule

The project is scheduled to be bid as soon as Planning Board approval is granted. Construction will proceed through remainder of 2014 and will be substantially complete by December 2014. Demolition of the West Malta Hill tank and two small tanks in the Riverside area will begin after the new tank is commissioned and in use. Demolition work will be complete by June 2015.

Construction Planning

Construction vehicles will access the project site via Haskell Street. There is an existing gravel access road to the site that will be improved slightly to accommodate temporary construction vehicles. This road will be used to transport concrete to the site and for vehicle access for construction crews.

Demolition debris from the existing steel tanks will be transported off site in accordance with a plan developed by the demolition contractor. This plan will follow strictly prescribed state and federal laws for disposal of metal with lead paint including provisions for dust control, safe disposal and manifesting transport of materials. Because this responsibility will be driven by construction means and methods, a performance specification will be provided to the general contractors to develop a demolition plan for submission to the District for compliance with governing laws. A copy of this specification is included in this submission.

Additional Information Required in Written Narrative See Augusta Land Use Ordinance for greater detail Where the items below duplicate the items above, identical responses are permitted and encouraged.	Included	Waiver Requested
s. Neighborhood Compatibility – description per ordinance (6.3.4.1)	N/A	
t. Compliance with Plans and Policies (6.3.4.2)	N/A	
u. Traffic Pattern, Flow, and Volume analysis (6.3.4.3)	N/A	
v. Public facilities – Utilities including stormwater (6.3.4.4)	N/A	
w. Resource protection and the environment (6.3.4.5)	X	
x. Performance Standards (6.3.4.6)	X	
y. Financial and Technical Ability (6.3.4.7)	N/A	

Application Materials

The application materials that are required for a complete application are listed below:

Paper Copies	Included	Waiver Requested
11 copies of the application form and narrative	X	
11 copies of the deed, Purchase & Sale agreement, or other document to show standing		
3 copies of any stormwater report	N/A	
2 copies of any traffic report	N/A	
7 reduced-sized copies of the complete plan set on 11" x 17" size paper	X	
4 full-sized copies of the complete plan set on ANSI D or E size paper		
11 copies of a letter authorizing the agent to represent the applicant	N/A	
Payment in full of application fee (Note: an abutter notification fee will be assessed after the application is determined to be complete. The fee is \$0.15 plus the cost of first class postage for each abutter that will be notified as required by the ordinance.)	N/A	
Electronic Copy		
1 CD that includes each of the application documents in Adobe PDF format	X	

For Official Use:		
<input type="checkbox"/> \$ _____ Application Fee Paid.	Received By (Initials): _____	Date: _____
<input type="checkbox"/> \$ _____ Abutter Notification Fee Paid.	Received By (Initials): _____	Date: _____

**Supplemental Information for Proposed Malta Hill Tank
Minor Development Planning Board Submission
Greater Augusta Utility District
Augusta, Maine
March 17, 2014**

Introduction

The proposed Malta Hill Water Tank is a unique development. On this basis, we are requesting a waiver some certain requested information in the Minor Development Application currently on file with the City Planning Department

Additional Information Regarding Waiver Request for Plan Information

Item l. – The project will not require or create any new roads or streets. We therefore do not believe this requirement to be applicable to this type of project.

Item r. – The State of Maine and EPA require all water storage tanks to be secure and not accessible to the public to protect the safety of drinking water supplies. No public access will be provided on the proposed property. The property will be secured with a fence. We therefore do not believe this requirement to be applicable to this type of project.

Item t. – The project will restrict all vehicle and public access other than employees of the water district. The present, very infrequent visits to the property by employees will remain unchanged after the new tank is constructed. We therefore do not believe this requirement to be applicable to this type of project.

Item u. – A fire hydrant will be installed on the property but this will be used only for maintenance. We therefore do not believe this requirement to be applicable to this type of project.

Item v. – The new storage tank will be located in more or less the same location as one of the existing water storage tanks. No new plantings or other vegetation is proposed. There will be limited clearing only to the extent required to construct the tank. All remaining forest areas will remain undisturbed. We therefore do not believe this requirement to be applicable to this type of project.

Item w. – No new lighting is proposed. As discussed, the District intends to keep the project as obscure as practical from the public's view for reasons described above.. We therefore do not believe this requirement to be applicable to this type of project.

Item x – There are no freshwater wetlands on the property. The tank will be located within existing lawns and within the disturbed area of an existing tank, that will be removed from the site.

Item y – There are no streams or brooks on the property, which is the top of a large hill.

Additional Information Regarding Waiver Request for Narrative Information

Item a. – The proposed water storage tank will not generate any pollution. The tank project will result in a net decrease in impervious area because two large storage tanks will be replaced with one storage tank.

Item b – The project will be a potable water holding tank for use by the general public for drinking and fire protection throughout the service area. There will be no access to the water supply by the public at the site for security reasons as previously described.

Item c – Same as Item b above.

Item e - The project will restrict all vehicle and public access other than employees of the water district. The present, very infrequent visits to the property by employees will remain unchanged after the new tank is constructed.

Items f,g – The site will not generate any solid waste or sewage.

Item h. – The site plan protects all natural features on the site. A small area of tree clearing will be required.

Item j – The District is in excellent financial standing and complies with all financial capacity requirements from the Maine Drinking Water Program and the Maine Public Utilities Commission. All financial records are a matter of public record. A Maine PUC report can be provided if requested.

Item l. – A geotechnical report was developed and soil boring information collected. There is no natural groundwater present on the site.

Items k,m,n - There are no freshwater wetlands or water bodies on the property. There are no streams or brooks on the property, which is the top of a large hill.

Item o. – The project will decrease impervious surface on the property substantially. Roads will remain gravel as they currently exist. No storm water provisions are proposed.

Item p. – The site will be exposed to sunlight

Item q. – The project will require approval from the Maine Drinking Water program. We expect a formal approval shortly.

Item r. - No new lighting is proposed. As discussed, the District intends to keep the project as obscure as practical from the public's view for security purposes.

Respectively submitted – Jeffrey P. Musich P.E. Wright-Pierce.

APPENDIX A
Preliminary Engineering Report

October 1, 2009
W-P Project No. 11496B

Mr. Brian Tarbuck, P.E., General Manager
Greater Augusta Utility District
12 Williams Street
Augusta, Maine 04330-5225

Subject: Phase II Service Area Evaluation- Extended Period Simulation Modeling for Malta Hill and Riverside Pressure Zones
Greater Augusta Utility District

Dear Mr. Tarbuck:

As requested, it is our pleasure to provide this additional hydraulic analysis regarding sizing and location of a new storage tank(s) in the Malta Hill and Riverside pressure zones.

Phase I Findings and Recommendations

Wright-Pierce completed a Phase I feasibility report regarding service area options for the distribution system on the east side of Kennebec River. A copy of the report is appended to this letter for reference.

The Phase I report recommended consolidating the Riverside and Malta Hill zones into a single pressure zone operated at the Malta Hill pressure zone hydraulic gradeline (El. 317.5 feet). The Phase I study also recommended splitting storage between the Riverside and Malta Hill sites. This scenario would allow for eventual elimination of the Riverside Drive valve pit. The proper size of the new Malta Hill tank would be selected under the assumption that the balance of the needed storage would be constructed at the Riverside location when budget is available or when a new coating system is required for the Riverside tank(s).

The design work would be staged to allow one Malta Hill tank to be constructed first.

The Phase I study recommended additional modeling to determine the proper diameter for the proposed tanks and the apportionment of storage between the two locations. This critical analysis is needed to assure that the tanks track properly and fill/empty on routine basis while keeping water in this portion of the distribution system fresh.



As a follow-up to Phase I, the Board authorized Wright-Pierce to proceed with the following additional tasks:

- Complete extending period simulations (EPS) modeling to determine if storage, as proposed, will trend, fill, and empty at each location in a sustained manner.
- Complete preliminary property assessments to see if land acquisition can be avoided to site the tanks once the size is determined.
- Develop capital costs for the project.
- Determine proper volume of storage for the east side of the river to meet normal and emergency storage needs in Augusta.
- Establish timing and opportunities for funding

Phase II Evaluation

Overview. The first task in Phase II was to determine the appropriate amount of storage volume for the new combined Malta Hill-Riverside service zone. In general, water system storage is designed and necessary for the following reasons:

- Storage should be designed to provide all demands which exceed the maximum day average flow rate. The volume of storage which is depleted during the daytime peak flow periods is refilled during the early morning hours when demand is lower,.
- Storage is provided for fire protection. If a fire occurred during the maximum day demand, all the water used to fight the fire would be drawn from storage volume.
- Storage provides water during emergency situations such as power failures, transmission main breaks, etc.
- Operating storage is used for cycling pumps during normal daily operation.

In the case of the Augusta system, a loss of the river crossing mains could create an emergency condition on the east side of the river.

All storage components described above should be available while continuing to provide at least 20 pounds per square inch (psi) of pressure in the system. This pressure is equivalent to the volume of water stored 46 feet above the highest water service that does not have a limited service agreement. This storage volume is referred to as the “available” or “active” storage.



The existing storage system consists of twin 1.5 million gallon (MG) tanks at Malta Hill and twin 150,000 gallons tanks at Riverside for a total storage volume of 3,300,000 gallons in the proposed zone.

Storage Volume Analysis. A brief analysis was completed to determine the proper storage volume for the combined Malta Hill and Riverside service area, based on maintaining a minimum pressure of 20 psi in the higher elevations of the service area. Once the desired volume is determined, the model will be used to apportion this volume between the two tank sites to assure that the tanks track together. The full volume of a tank situated on Malta Hill was assumed to be useable or active storage, assuming the base elevation of the current tanks is retained for the new tank. If a fire were to completely drain the tank, approximately 55 residences around the Malta Hill area could experience low pressure during an extreme fire emergency. This is a common problem when considering appropriate storage volumes for existing sites in urban areas and should be manageable.

Three conditions were considered to determine the appropriate storage volume for the service zones:

- Condition 1 - Storage to meet a 3-hour fire condition occurring on a maximum-day;
 - Condition 2 - Storage to meet a maximum-day condition in the service zone; and
 - Condition 3 - Storage to meet a fire condition and the maximum-day demands in the service zone for a period of 3 hours.
1. Fire Protection Storage Volume - The Insurance Services Office (ISO) recommends that the maximum amount of fire protection necessary for a public water supply is equal to 3,500 gallons per minute (gpm) for 3 hours or 630,000 gallons. This flow and storage recommendation is appropriate in the Malta Hill service area where there are commercial and industrial land-use zones.
 2. Equalization Storage for Peak-Hour Storage Fluctuation on a Maximum-day Condition - The maximum-day demand in the entire GAUD system was estimated to be about 3.5 MGD in 2008. The portion of this demand relative to the Malta Hill and Riverside Zones is estimated conservatively to be about 35% of the total or about 1,225,000 gallons per day.
 3. Emergency Storage - Storage should be available to meet emergencies. Because the East side of Augusta relies entirely on the river crossing for supply, some amount of emergency storage is needed in the storage system. The average-day demand in Augusta is about 1.8 MGD for the entire system. For the Malta Hill zone, a 24-hour emergency volume for an average-day condition is appropriate. This equals 630,000 gallons for the Malta Hill zone



The required active storage for the proposed service area is tabulated in Table 1 for three alternative conditions.

1. Condition 1 assumes that if a fire were to occur on the maximum-day, the fire flow and hourly fluctuation volume of the available storage would be simultaneously available.
2. Condition 2 provides 24 hours of storage at the maximum-day demand plus emergency storage; and
3. Condition 3 provides volume to include three hours of the maximum-day demand, fire protection storage and emergency.

TABLE 1
REQUIRED ACTIVE STORAGE VOLUMES
IN A COMBINED MALTA HILL-RIVERSIDE SERVICE AREA
GREATER AUGUSTA UTILITY DISTRICT

STORAGE REQUIREMENTS	Present Total Storage Capacity (gallons)	Present Active Storage Capacity (gallons)	Required Active Storage Capacity (gallons)	Active Storage Deficit (Surplus) (gallons)
Condition 1 - Storage for 3-hour fire @ 3,500 gpm plus 20% Maximum-Day Demand for Peak-hour Demand Fluctuations	3,300,000	3,300,000	1,505,000	(1,795,000)
Condition 2 - Storage for one Maximum Summer Day Demand plus emergency	3,300,000	3,300,000	1,855,000	(1,445,000)
Condition 3 - Storage for 3-hour Fire @ 3,500 gpm plus Maximum-Day Demand for 3-hours, plus emergency	3,300,000	3,300,000	1,413,000	(1,887,000)

On this basis, a total active storage volume of about 1.9 MG appears appropriate for the combined service zone.



Hydraulic Analysis. The District's hydraulic model was used to conduct extended period simulations (EPS) of tank cycling to determine the best apportionment of the 1.9 MG between the two sites in the new combined service zone. EPS's were conducted for each of the following alternatives under a simulated, maximum-day condition using an Augusta-specific diurnal water-use curve.

- Alternative 1: 0.6 MG tank at the Riverside Site and 1.3 MG tank at the Malta Hill Site
- Alternative 2: 0.9 MG tanks at both Riverside and Malta Hill sites
- Alternative 3: 1.3 MG tank at the Riverside Site and 0.6 MG tank at the Malta Hill Site

The results were compared against present-day conditions using the model. The economics of retaining all of the storage volume at Malta Hill and retaining the Riverside zone in its current configuration to were compared to the costs or relocating the entire 1.9 MG at one of the two sites.

Table 2 presents simulated tank trending for each scenario over a 24-hour simulation period.

TABLE 2

**TANK TRENDING VARIATIONS FOR STORAGE FACILITIES
GREATER AUGUSTA UTILITY DISTRICT**

Tank	Alternative No. 1	Alternative No. 2	Alternative No. 3
Riverside Tank	+0.5/0.5	+2.0/-0.6	+4.0/-1.0

Notes:

(1) Positive values indicate Riverside tank gradeline above Malta Hill gradeline and negative values indicate Riverside tank gradeline below Malta Hill gradeline.

The data in Table 2 suggest that Alternative 1 is the optimal solution. This alternative represents a new 600,000 gallon tank on the Riverside site and a 1.3 MG tank at the Malta Hill site. The trending for the Riverside tank can be further improved by increasing the diameter of the water main on Riverside Drive. These two tank sizes are also economically sized for construction purposes within the commercially available size options available within the constraints at the two sites.

Outer Riverside Drive has the potential for an additional groundwater supply. If a well were developed near the Riverside Tank, an altitude valve would likely be required to prevent overflowing and promote turnover in the Riverside Tank and to force flows to the Malta Hill tank during pumping. These conditions were modeled to consider any future water supply impacts from the north of the study area.



Siting Issues and Existing Property Constraints. The property maps at both the Malta Hill and Riverside sites were checked to see if the sites could accommodate new tanks as proposed. Additional siting work is needed to confirm the best arrangement for the tanks. Since only one tank will be constructed where two currently exist, a tank could be demolished and replaced at each site while retaining the second tank as a active facility during construction. No acquisition of additional property is envisioned at either site to site the new facilities.

Estimate of Project Cost

The capital cost estimates presented in Table 3 and Table 4 are based on constructing a new 1.3 MG tank at Malta Hill and a new 600,000 gallon tank at Riverside. The cost estimates assume that one of the two tanks would be demolished to provide sufficient space to site the new prestressed concrete tanks at each site. Projected costs include internal mixing systems to promote circulation of water in each tank to prevent freezing and to reduce water age. These are popular retrofits.

These costs also include the installation of an altitude valve at the Riverside Tank as discussed. Although it may not be needed, a buried valve vault and provisions to add a valve are suggested to force exchange of water with the Riverside tank and improve tracking between the two sites as proposed.

The costing information is indexed to ENR_{August 2009}. An appropriate inflator should be added to these budget numbers if you have a specific timeline in mind for construction or we need to account for inflation for an SRF application

The cost information in Tables 3 and 4 is revealing from several perspectives. The cost per gallon for treatment at the Riverside site is very high. This is due to the increasing cost of concrete tanks as tanks get skinnier and higher. The Malta Hill tank, which has roughly the same diameter and height, is an optimum cost per gallon configuration.

TABLE 3

**OPTION 1 ESTIMATED COST TO CONSTRUCT
NEW 1,300,000 GALLON TANK AT MALTA HILL
GREATER AUGUSTA UTILITY DISTRICT**

Option 1	Estimated Capital Cost for Pre-stressed Concrete Tank
Tank, Foundation, Miscellaneous Metal Accessories	\$850,000
Demolition of One Tank	\$40,000
Site Work	\$120,000



Estimated Project Construction Cost	\$1,010,000
Project Administration and Contingencies (35% of Construction Cost)	\$350,000
Total Estimated Project Cost	\$1,360,000

TABLE 4

**OPTION 1 -ESTIMATED COST TO CONSTRUCT
 NEW 600,000 GAL TANK AT RIVERSIDE
 GREATER AUGUSTA UTILITY DISTRICT**

Option 1	Pre-stressed Concrete Tank
Tank, Foundation, Miscellaneous Metal Accessories	\$780,000
Demolition of One Tank	\$25,000
Site Work	\$80,000
Estimated Project Construction Cost	\$885,000
Project Administration and Contingencies (35% of Construction Cost)	\$310,000
Total Estimated Project Cost	\$1,195,000

Table 5 presents the cost if the entire 1.9 MG is stored in a single tank at Malta Hill. Under this scenario, the District would retain the two existing Riverside tanks and the Riverside Drive valve pit. The existing Riverside Drive tanks would be repaired and repainted.

Table 6 compares the two options. On this basis, it appears that constructing a single storage tank at Malta Hill and repainting the existing tanks at Riverside Drive makes the best economic sense for the District.



TABLE 5

**OPTION 2 - ESTIMATED COST TO CONSTRUCT NEW
 900,000 GALLON TANK AT MALTA HILL
 RETAIN AND REPAINT THE RIVERSIDE TANKS**

Option 2	Estimated Capital Cost for Pre-stressed Concrete Tank
New prestressed concrete tank, foundation, and miscellaneous metal accessories	\$950,000
Demolition of one tank at Malta	\$40,000
Site work	\$200,000
Cost to rehabilitate and repaint the twin Riverside Tanks	\$200,000
Estimated Project Construction Cost	\$1,390,000
Project Administration and Contingencies (35% of Construction Cost)	\$486,000
Total Estimated Project Cost	\$1,888,000

TABLE 6

COST COMPARISON OF OPTION 1 AND OPTION 2

Option	Estimated Project Cost
Option 1 - New Storage Tank at Malta Hill and Riverside	\$2,555,000
Option 2 - Consolidate Storage at Malta Hill and Retain Riverside Tanks	\$1,888,000

Summary of Findings

Our findings and recommendations can be summarized as follows:

- The optimum storage volume for the combined Riverside and Malta Hill Zone is 1.9 million gallons of active storage. The two zones were recommended for consolidation in Phase I but construction costs suggest that constructing all of the new storage at Malta Hill makes the best economic sense.
- One new 1.9 MG pre-stressed concrete storage tanks is recommended to replace the two existing steel tanks at Malta Hill. The use of concrete will decrease maintenance costs



and promote a more sustainable, lower cost storage system over time. This investment will eliminate a planned maintenance investment of \$800,000 scheduled for the Malta Hill tanks in 2010. Investing this money in a tank system that doesn't require periodic repainting makes sense at this particular location.

- The existing Riverside Steel Tanks would be rehabilitated and retained. The cost of replacing these tanks was significantly higher than repainting them. The tanks should be reviewed at the next painting cycle to determine if replacing them at that time is cost competitive to repainting.
- The benefits of removing the valve pit on Riverside Drive and putting the Riverside Drive Tanks and Malta Tanks on the same hydraulic grade simply weren't cost effective.
- After the Malta Hill Tank is placed in service, the District can determine the best time in the future to consolidate this zone with the Riverside zone as the system grows northerly or as the next maintenance cycle for the Riverside zones approaches. The new coating system for the Riverside tanks should last 15-20 years.
- The estimated total cost to construct the Malta Hill tank and rehabilitate the Riverside tanks is \$1,888,000.

Closing

Thank you for the opportunity to participate in this project. Please let us know if you or the Board has subsequent questions or if a meeting is needed to review our findings. Thanks again.

Very truly yours,

WRIGHT-PIERCE

Jeffrey P. Musich, P.E.
Vice President

JPM/GLS/ckl

APPENDIX B
Property Survey Plan
(Submitted under a separate cover)

APPENDIX C
Proposed Construction Plans

APPENDIX D
Demolition Plan

SECTION 02050ADEMOLITIONPART 1 - GENERAL1.1 DESCRIPTION

A. Work Included:

1. The Contractor shall furnish all labor, materials, tools, equipment and apparatus necessary and shall do all work required to complete the tank demolition, removal, and alterations of existing facilities as indicated on the Drawings, as herein specified, and/or as directed by the Engineer.
2. Demolition and alteration work within occupied areas shall be accomplished with minimum interference to the occupants and to the plant which shall be in continuous operation during construction.
3. All equipment, piping, and other materials that are not to be relocated or to be returned to the Owner shall become the property of the Contractor and shall be disposed of by him, away from the site of the work and at his own expense.
4. All demolition or removal of existing structures, utilities, equipment, and appurtenances shall be accomplished without damaging the integrity of existing roadways, pavement, fencing, utilities, structures, equipment, and appurtenances to remain, to be salvaged for relocation or stored for future use.
5. Such items that are damaged shall be either repaired or replaced at the Contractor's expense to a condition at least equal to that which existed prior to the start of his work and as deemed acceptable by the Owner.
6. Unless otherwise indicated, all items labeled to be "removed", "demolished" or "remove/demolish" shall be removed and disposed of off-site in accordance with all Local, State and Federal Regulations.
7. The Contractor will be required to demolish four welded steel standpipes as described herein. Existing engineering drawings for all of these tanks are available from the Owner for reference.
8. Each tank has been tested for lead based paint with all having varying levels of lead based paint adhering to portions of the welded steel. The ground around the tanks at each site has been tested for lead with varying levels. The reports presenting the results of the testing are referenced in Specification Section 00800 and contained in Appendix A and B. The Contractor will be required to address the removal, cleanup, handling and disposal of lead based paint material from the tank demolitions in accordance with all Local, State and Federal Regulations.
9. In addition, tank inspection reports are available from the Owner for three of the tanks (Malta Hill East and the two Riverside Drive Tanks) to evaluate the condition of the interior of the tanks and accumulated sediments that will be disposed of off-site by the Contractor. These reports are referenced in Specification Section 00800.

B. Related Work Specified Elsewhere: (When Applicable)

1. Summary of Work, Section 01010.

2. Coordination Section 01050.
3. Construction Schedule, Section 01310
4. Use of Explosives, Section 01546.
5. Earthwork, Section 02200.
6. Appendix B: A Hazardous Materials Assessment for Lead-Based Paint & Lead in Soils at Water Towers Haskell Street & Riverside Drive, Augusta Maine, dated February 7, 2014 by Northeastern Test Consultants.
7. Appendix B: Katahdin Analytical Services, dated February 5, 2014, analytical results for 4 soil samples obtained at the Haskell Street tank site.

1.2 JOB CONDITIONS

A. Condition of Structures:

1. The Owner assumes no responsibility for the actual condition of structures to be demolished.
2. Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner as far as practicable. However, variations within the structures may occur due to Owner's removal and salvage operations prior to the start of demolition work (where applicable).

1.3 UTILITIES

- A. Utility Locations: Utility locations shown on the plans are approximate only, based on information supplied by the utility companies.
- B. Coordination with Utilities: The Contractor shall make all necessary arrangements and perform any necessary work to the satisfaction of affected utility companies and governmental divisions involved with the discontinuance or interruption of affected public utilities and services.

1.4 REGULATORY AGENCIES

- A. The Contractor shall make all necessary arrangements and/or notifications, perform any necessary work and have the required certifications to the satisfaction of all Local, State and Federal Agency regulation required to address the removal, cleanup, handling, testing and disposal of lead based paint material from the tank demolitions.

1.5 SUBMITTALS

A. Plans and Schedules – Demolition, Contaminated Soil:

1. Submit 4 copies of a Demolition Plan identifying the proposed methods and operations of demolition to the Engineer for review 15 working days prior to the start of any work per Section 01340. Demolition Plan shall comply with applicable abatements methods contained in Maine Solid Waste Management Rules Chapter 424 Lead Management Regulations
2. Provide 4 copies of a Lead Based Paint Work Plan identifying the proposed methods and operations to contain/capture, remove, cleanup, handle, test and dispose of lead based paint chips/material and any contaminated soils associated with the tank demolitions to the Engineer for review 15 working days prior to the start of any work per Section 01340.
3. Include a detailed schedule/sequence for demolition, handling lead based paint materials/soil contamination and removal work associated with the tank

- demolitions and coordination to shut-off, cap and continue utility services, as required.
4. The detailed schedule/sequence shall insure the uninterrupted progress of the Owner's operations.
 5. Provide Items outlined in Paragraph 1.5. B as part of submittal.
 6. No claims for delays in starting work due to submission or resubmission of incomplete or unacceptable Plans or schedules/sequences, as deemed by the Engineer will be entertained by Owner.
- B. Permits, Approvals, Notifications – Demolition, Contaminated Soil:
1. Provide 4 copies of all permits, approvals, notifications and/or other similar correspondences received from affected utilities and governmental regulatory agencies involved with the discontinuance or interruption of affected public utilities, and/or services due to tank demolition, as required.
 2. Provide 4 copies of all notifications, certifications, disposal manifests and/or other similar documentation needed to comply with Maine Solid Waste Management Rules Chapter 424 Lead Management Regulations.

1.6 PROTECTIONS

- A. Provide barriers to prevent entry of areas of demolition, demolition excavations and/or lead based paint exposure by unauthorized personnel.
- B. Ensure the safe passage of persons around the areas of demolition, demolition excavations or potential lead based paint exposure.
- C. Conduct operations to prevent injury to adjacent buildings, structures, other facilities and persons.
- D. Erect temporary, covered passageways or covering around tanks to contain/capture paint chips and prevent wind-blown debris from spreading lead contamination.
- E. Provide coverings over existing soils around tank to prevent additional lead soil contamination caused by demolition operations.
- F. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of structures to be demolished and adjacent facilities to remain.

1.7 DAMAGE AND CONTAMINATION

- A. The Contractor shall promptly repair damages to adjacent facilities and/or cleanup lead soil contamination caused by demolition operations at no cost to the Owner.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

3.1 PERFORMANCE

- A. After demolition cleanup, remove, test, dispose and manifest off site lead based paint chips/material and lead contaminated soils in accordance with all applicable local and state laws, ordinances and code requirements.

- B. After demolition cleanup, remove and dispose of non-salvageable material in accordance with all applicable local and state laws, ordinances and code requirements.
- C. Cleanup and store lead based materials daily as they accumulate.
- D. Cleanup and dispose of demolition materials daily as it accumulates.
- E. Carefully remove, store and protect from contamination and damage all materials to be salvaged.
- F. Buildings and Adjacent Property:
 - 1. Protect all buildings and property, adjacent to equipment to be removed from damage by erecting suitable barriers or wind-blown containment covers or by other suitable means.
 - 2. Leave such buildings and property in same condition as prior to demolition operations as deemed by Owner.
- E. Maintaining Traffic:
 - 1. Ensure minimum interference with roads, streets, driveways, sidewalks and adjacent facilities.
 - 2. Do not close or obstruct streets, sidewalks, alleys or passageways without permission from authorities having jurisdiction.
- F. Architectural, structural, mechanical, process and electrical demolition, removal and alteration are indicated in the corresponding sections.
- G. Mechanical/Process Demolition:
 - 1. Mechanical/Process demolition in general shall consist of the dismantling and removal of existing piping, tanks, pumps, motors, equipment and other appurtenances as specified, and indicated on the Drawings.
 - 2. It shall also include, where necessary, the cutting of existing piping for the purpose of making connections thereto.
 - 3. Piping not indicated to be removed but which may interfere with construction shall be removed to the nearest solid support, capped and left in place. Where piping that is to be removed passes through the wall of existing structures, it shall be cut off and properly capped on each side of the wall.
 - 4. When piping is to be altered or removed underground, the remaining piping shall be properly capped or plugged.
 - 5. Abandoned underground piping shall be left in place unless it interferes with new structures or unless otherwise noted on the Drawings.
- H. Salvage:
 - 1. Salvaged items shall be stored on site for the Owner in an acceptable and protected location and manner.
- I. Tank Cleaning: (unless indicated otherwise on the Drawings):
 - 1. Contractor shall give Owner 14 days minimum notice prior to beginning work in tanks requiring draining and cleaning; which are to be renovated as part of this Project. The Owner will be responsible for removal and disposal of the liquid contents of the existing tanks. The Owner will do a "hose down" clean of the walls and floors of existing tanks (once), after being notified by the Contractor of the intent to begin demolition work.
 - 2. If the demolition work does not commence within the Contractor's approved Plan schedule, the tank(s) may be placed back in operation by the Owner. It will then be the Contractor's responsibility to drain and clean the tanks.

3. When the existing tank(s) are empty (drained and "hosed down" by the Owner), the Contractor shall clean the tank walls, floor and ceiling using a high pressure steam cleaning device.
- J. Maintain Treatment: During demolition, maintain treatment as outlined in Section 01010, Summary of Work.
- K. Demolition Plan Sequence: The Demolition Plan sequence shall conform to the reviewed and approved Project schedule, and restrictions outlined in Section 01310, Construction Schedule and other applicable Specification Sections.
- L. Pest Control:
 1. Provide pest control when needed or when directed by the Engineer.
 2. Exterminate and prevent migration of rodents to adjoining buildings in accordance with the requirements of the state or local health department.

END OF SECTION

SECTION 01562DUST CONTROLPART 1 - GENERAL1.1 DESCRIPTIONS

A. Work Included:

1. Furnish and apply water or calcium chloride on the road surfaces within the construction site, when required to control dust and when directed by the Engineer.
2. When dust control is not included as a separate item in the Contract, the work shall be considered incidental to the appropriate items of the Contract.

PART 2 - PRODUCTS2.1 MATERIALS

A. Water for Sprinkling:

B. Clean, free of salt, oil, and other injurious matter.

C. Calcium Chloride:

1. Meet the requirements of AASHTO M144.

PART 3 - EXECUTION3.1 APPLICATION

A. Water:

1. Apply water by methods approved by the Engineer.
2. Use approved equipment including a tank with gauge equipped pump and spray bar.

B. Calcium Chloride:

1. Apply at a rate sufficient to maintain a damp surface but low enough to assure non-contamination of water courses.
2. Apply water prior to calcium chloride addition.

END OF SECTION