

PROJECT MINUTES

Project:	New W. Edward Balmer Elementary School	Project No.:	17020
Prepared by:	Joel Seeley	Meeting Date:	8/4/20
Re:	School Building Committee Meeting	Meeting No:	63
Location:	Remote Locations	Time:	6:30pm
Distribution:	School Building Committee Members, Attendees (MF)		

Attendees:

PRESENT	NAME	AFFILIATION	VOTING MEMBER
Attended Remotely	Joseph Strazzulla	Chairman, School Building Committee	Voting Member
Attended Remotely	Melissa Walker	School Business Manager	Voting Member
Attended Remotely	Alicia Cannon	Representative of the Board of Selectmen	Voting Member
Attended Remotely	Michael LeBrasseur	Chairman, School Committee	Voting Member
Attended Remotely	Paul Bedigian	Representative of the Building, Planning, Construction Committee	Voting Member
Attended Remotely	Steven Gogolinski	Representative of the Finance Committee	Voting Member
Attended Remotely	Jeffrey Tubbs	Community Member with building design and/or construction experience	Voting Member
Attended Remotely	Peter L'Hommedieu	Community Member with building design and/or construction experience	Voting Member
Attended Remotely	Jeff Lundquist	Community Member with building design and/or construction experience	Voting Member
Attended Remotely	Andrew Chagnon	Community Member with building design and/or construction experience	Voting Member
Attended Remotely	Spencer Pollock	Parent Representative	Voting Member
Attended Remotely	Adam Gaudette	Town Manager	Non-Voting Member
Attended Remotely	Amy McKinstry	Interim Superintendent of Schools	Non-Voting Member
	Paul Anastasi	Director of Facilities	Non-Voting Member
Attended Remotely	Karlene Ross	Principal, W. Edward Balmer Elementary School	Non-Voting Member
Attended Remotely	Theresa Gould	Principal, Northbridge Elementary School	Non-Voting Member
	Gregory Rosenthal	Director of Pupil Personnel Services	Non-Voting Member
Attended Remotely	Michael Proto	Playground and Recreation Committee	
Attended Remotely	Lee Dore	D & W, Architect	
Attended Remotely	Thomas Hengelsberg	D & W, Architect	
	David Fontaine, Jr	Fontaine Bros, CM	
Attended Remotely	Rob Day	Fontaine Bros, CM	
Attended Remotely	Joel Seeley	SMMA, OPM	

Item #	Action	Discussion
63.1	Record	Call to Order, 6:30 PM, meeting opened.
63.2	Record	J. Strazzulla announced in accordance with the executive order issued by the Governor on March 10, 2020, this meeting will be held via video conference and a recording of such will be posted on the project website.
63.3	Record	<p>T. Hengelsberg presented the Playfield Irrigation Options Powerpoint, attached.</p> <p>Committee Discussion:</p> <ol style="list-style-type: none"> 1. J. Lundquist indicated support for Option 3 – Full Irrigation, as a means of protecting the Town’s investment in the fields and reducing operational costs. 2. A. Cannon indicated full irrigation was not included in the project brought to the voters and historically the Town has not watered playing fields. 3. A. Chagnon indicated providing full irrigation makes sense given the project savings to date and agrees full irrigation was not included in the scope brought to the voters. 4. S. Gogolinski indicated the committee has been very transparent with the voters on costs and adding full irrigation goes against that, also the operational cost figures for Option 1 - Base Contract are not realistic, as the Town historically does not water playing fields. 5. P. L’Hommedieu indicated full irrigation is the best long-term solution for the fields. 6. S. Pollock indicated the Vail Fields were always represented as being replaced as-is and full irrigation was not discussed. 7. J. Tubbs asked if Option 1 could be run off a well? 8. M. Proto indicated there is really no difference between Option 1 and Option 2, under either option, it is very unlikely the fields will get watered. Option 3 will ensure the fields are watered, which will also decrease the fields periodic downtime. 9. P. Bedigian indicated the fields will now front a brand new school, Option 3 will allow them to be properly maintained. <p>A Motion was made by A. Cannon and seconded by S. Gogolinski to remain with Option 1 – Base Contract. No discussion, motion failed by roll call vote (Yes: J. Strazzulla, A. Cannon, S. Gogolinski, S. Pollock; No: M. Walker, M. LeBrasseur, P. Bedigian, J. Tubbs, P. L’Hommedieu, J. Lundquist, A. Chagnon).</p> <p>A Motion was made by J. Lundquist and seconded by A. Chagnon to approve Option 3 – Full Irrigation, contingent upon the Test Wells yielding sufficient water flow. No discussion, motion passed by roll call vote (Yes: M. Walker, M. LeBrasseur, P. Bedigian, P. L’Hommedieu, J. Lundquist, A. Chagnon; No: J. Strazzulla, A. Cannon, J. Tubbs, S. Gogolinski, S. Pollock).</p> <p>A Motion was made by J. Lundquist and seconded by A. Chagnon to approve up to \$498,640 to be included in the next Change Order for Option 3 – Full Irrigation and proceed with the work, however no further expenditures past the initial Test Well cost, including hydro-fracture, is authorized should the initial Test Well yield insufficient water flow. No discussion, motion passed by roll call vote (Yes: M. Walker, M. LeBrasseur, P.</p>

Project: New W. Edward Balmer Elementary School

Meeting Date: 8/4/20

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Item #	Action	Discussion
		Bedigian, J. Tubbs, P. L'Hommedieu, J. Lundquist, A. Chagnon, S. Pollock; No: J. Strazzulla, A. Cannon, S. Gogolinski).
63.4	J. Seeley	Next SBC Meeting: 8/18/20 at 6:30pm. J. Seeley to provide direction on whether the meeting will be held at the High School Media Center or remotely.
63.5	Record	A Motion was made by J. Tubbs and seconded by J. Lundquist to adjourn the meeting. No discussion, motion passed unanimous by roll call vote.

Attachments: Agenda, Playfield Irrigation Options Powerpoint

The information herein reflects the understanding reached. Please contact the author if you have any questions or are not in agreement with these Project Minutes

PROJECT MEETING SIGN-IN SHEET

Project: New W. Edward Balmer Elementary School
 Prepared by: Joel Seeley
 Re: School Building Committee Meeting
 Location: Remote Locations
 Distribution: Attendees, (MF)

Project No.: 17020
 Meeting Date: 8/4/2020
 Meeting No: 63
 Time: 6:30pm

SIGNATURE	ATTENDEES	EMAIL	AFFILIATION
Attended Remotely	Joseph Strazzulla	jstrazzulla@nps.org	Chairman, School Building Committee
Attended Remotely	Melissa Walker	mwalker@nps.org	School Business Manager, MCPPO
Attended Remotely	Alicia Cannon	cannonhome0927@gmail.com	Member, Board of Selectmen, CEO
Attended Remotely	Michael LeBrasseur	mlebrasseur@nps.org	Chairman, School Committee
Attended Remotely	Paul Bedigian	bedigianps@cdsmith.com	Representative of the Building, Planning, Construction Committee
Attended Remotely	Steven Gogolinski	steve@gogolinskicpa.com	Representative of the Finance Committee
Attended Remotely	Jeffrey Tubbs	jtubbs@charter.net	Member of community with architecture, engineering and/or construction experience
Attended Remotely	Peter L'Hommedieu	plhommedieu@shawmut.com	Member of community with architecture, engineering and/or construction experience
Attended Remotely	Jeff Lundquist	j_lundquist@charter.net	Member of community with architecture, engineering and/or construction experience
Attended Remotely	Andrew Chagnon	achagnon@vertexeng.com	Member of community with architecture, engineering and/or construction experience
Attended Remotely	Spencer Pollock	spencerpollock22@gmail.com	Parent Representative
Attended Remotely	Adam Gaudette	agaudette@northbridgemass.org	Town Manager
Attended Remotely	Amy McKinstry	amckinstry@nps.org	Superintendent of Schools
	Paul Anastasi	panastasi@nps.org	Building Maintenance Local Official
Attended Remotely	Karlene Ross	kross@nps.org	Principal, W. Edward Balmer Elementary School
Attended Remotely	Theresa Gould	tgould@nps.org	Principal, Northbridge Elementary School
	Gregory Rosenthal	grosenthal@nps.org	Director of Pupil Personnel Services
Attended Remotely	Michael Proto		Playground and Recreation Committee
Attended Remotely	Lee P. Dore	lpdore@DoreandWhittier.com	Dore & Whittier Architects
Attended Remotely	Thomas Hengelsberg	thengelsberg@DoreandWhittier.com	Dore & Whittier Architects
	David Fontaine, Jr.	djrf@fontainebros.com	Fontaine Bros., Inc.
Attended Remotely	Rob Day	rday@fontainebros.com	Fontaine Bros., Inc.
Attended Remotely	Joel Seeley	jseeley@smma.com	SMMA

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THE NEW W. EDWARD BALMER SCHOOL

WHITINSVILLE, MASSACHUSETTS

SCHOOL BUILDING COMMITTEE MEETING

AUGUST 4, 2020

AGENDA

1. Irrigation System for School/ Town fields



IRRIGATION INITIAL COST SUMMARY

COST ITEM	OPTION 1 (BASE IN CONTRACT) (5) YARD HYDRANTS		OPTION 2 LOOP/QUICK-CONNECT SYSTEM WITH WELL		OPTION 3 FULL IRRIGATION WITH WELL
EXPLORATORY TEST WELLS	\$0		\$48,660 for (1) 6" exploratory bedrock well that can be used if viable GPM encountered, includes one \$15K hydrofracture injection*		\$48,660 for (1) 6" exploratory bedrock well that can be used if viable GPM encountered, includes one \$15K hydrofracture injection*
DESIGN & PERMITTING	IN CONTRACT		Well Design by Driller, no Permitting required. Irrigation Design in contract.		Well Design by Driller, no Permitting required. Irrigation Design in contract.
WELL DRILLING	\$0		\$48,660 for (1) 6" bedrock well, includes one \$15K hydrofracture operation*		\$48,660 for (1) 6" bedrock well, includes one \$15K hydrofracture operation*
PUMP & IRRIGATION SYSTEMS	(5) Hydrants + vaults, meters & valves in Contract		\$301,380		\$426,120
CREDIT TO AVOID MANUAL ESTABLISHMENT WATERING	\$0		\$0		(\$24,800)
WATERING EQUIPMENT	\$3,000		\$4,000		\$0
INITIAL COST TOTALS	\$3,000		\$402,700		\$498,640

* If GPM flow rate is not sufficient upon water discovery, hydrofracturing can be employed at \$15,000 per injection, per well, ~~up to 3 times per well.~~

IRRIGATION TOTAL COST OF OWNERSHIP SUMMARY

COST ITEM	OPTION 1 (BASE IN CONTRACT) (5) YARD HYDRANTS		OPTION 2 LOOP/QUICK-CONNECT SYSTEM WITH WELL		OPTION 3 FULL IRRIGATION WITH WELL
INITIAL COST TOTALS	\$3,000		\$402,700		\$498,640
WATER	\$12,000 – \$37,600/ YR		\$0		\$0
WATER, 50-YEAR	\$600,000 - \$1,880,000				
MAINTENANCE	\$1,000 / YR?		\$1,500 / YR?		\$2,000 / YR?
MAINTENANCE, 50-YEAR	\$50,000		\$75,000		\$100,000
OPERATIONAL LABOR	216 HR/ YEAR		162 HR/ YEAR		24 HR/ YEAR
OPERATIONAL LABOR, 50-YEAR, \$25/ HR	\$270,000		\$202,500		\$30,000
TOTAL 50-YEAR COST OF OWNERSHIP	\$923,000 - \$2,200,300		\$680,200		\$628,640
RESULTS	VARIABLE, FAIR		VARIABLE, GOOD		PREDICTABLE, EXCELLENT





IRRIGATION OPTIONS FOR SPORT FIELDS

Base Option 1 – (5) yard hydrants, basic emergency watering

- using WWC potable water from 10" main
- could use irrigation well(s)

Option 2 - Loop with hose coupling quick-connects

- using irrigation well(s)
- phased step toward full irrigation

Option 3 - Full Irrigation

- using irrigation well(s)
- Dialog with WWC indicates that potable water use not advised for irrigation options.
- All options shown are schematic diagrams only. No detailed design has been completed at this time. Design will be delegated to the subcontractor and included in the price.

IRRIGATION SYSTEM QUESTIONS

- 1). What is the true cost of an irrigation system, with and without a well? *See table following.*
- 2). Could the cost be reduced by doing a delegated design? Many of these firms design and install irrigation systems. **System will be provided with delegated design by the subcontractor's registered sprinkler designer.**
- 3). **What is the credit we'd receive from our landscape contractor who wouldn't have to use labor to move hoses during the original growth period?** *This savings is reflected in subcontractor pricing, see table following.*
- 3b). If we have an irrigation system, can we delete some field hydrants? **What's the credit for that?** *Yes, except for one at the concession shed, the field hydrants would be deleted and credited, but they are only \$250/per each.*
- 4). What is the annual consumption cost estimated to water the grass without a well? *See slides following.*

IRRIGATION SYSTEM QUESTIONS

5). How often typically will the fields need watered, and what would the annual cost be estimated for a DPW staff person do that manually (moving sprinklers) for the 50-year design life of the facility.

- *The frequency of watering depends on the season and rainfall and can vary widely.*
- *Grass needs about 1 inch of water/rainfall per week to thrive; we assumed peak watering 3x week to achieve this.*
- *Assume five cannons would need to be moved three times per watering, assume 12 minutes each move = 3 hours per watering x 3 per week x 4 per month x 6 months = 216 Person-hours x 50 years = 10,800 person-hours.*
- *There is currently no budget or staff to perform manual watering, and it is done by volunteer groups if at all.*

6). If the system only runs at night, can the WWC provide enough pressure and volume to irrigate without causing a large pressure drop in the neighborhood? *WWC did not analyze to this level. WWC recommends drilling irrigation wells.*

7). What is the net cost of the system? *See table following.*

IRRIGATION SYSTEM QUESTIONS – POST-7/21

1 + 2. Could the irrigation well be used for the watering needs of the original design [Option #1]?

Well(s) could conceivably be used for watering for any of the Options 1, 2 or 3. The well supply would be connected to a valve pit/vault that would feed the Option #1 yard hydrants.

Option #1 is the original design, including (4) yard hydrants and (1) hose bibb - (5) water outlets total.

A potable water source would still need to be provided for the Concession Building for the outside hose bibb, either tapped off the 10" water main, or from the school building. There will be no indoor plumbing in the concession building, similar to the existing structure now demolished.



IRRIGATION SYSTEM QUESTIONS – POST-7/21

3. Are the water costs calculated in the “Irrigation Total Cost of Ownership Summary” inflated since Whitinsville Water Company already told us they would not be able to supply that much water, due to drought restrictions and restrictions issued by the Commonwealth of Massachusetts?

The costs presented in the “Irrigation Total Cost of Ownership Summary” are hypothetical because neither the Town nor School water the fields now, nor is there any budget to do this watering in the future.

The costs were presented as a point of comparison to the other two options and were based on good faith estimates given several uncertain variables.

If watering were to occur, and it was a dry year that somehow did not trigger WWC-declared drought watering restrictions, it is possible to reach the upper end of the range given.

A normal year watering would be about 32% of the maximum, which was the lower end of the range given.



IRRIGATION SYSTEM QUESTIONS – POST-7/21

4. **Are the operational labor costs calculated in the “Irrigation Total Cost of Ownership Summary” based on hiring additional employee(s)?** These tasks would be performed by current staffing levels and/or volunteers, so in effect would there be any additional cost of labor?

The operational labor costs calculated in the “Irrigation Total Cost of Ownership Summary” were an effort to provide a reasonable estimate of FTE person-hours necessary to manually water the fields.

Whether an additional employee is hired or existing employees are utilized to do the watering, it represents a block of time occupied with this task, where other required tasks are not getting done.

If the labor is performed by volunteers, it gives one an idea of how much labor the Town is asking to be done by those people.



IRRIGATION SYSTEM QUESTIONS – POST-7/21

5. Why wasn't an irrigation system in the original plans put forth to the taxpayers? As a committee, do we look 'out of touch' spending half a million dollars on a 'want' vs. a 'need,' especially facing looming budget cuts due to tax revenue down between 30-60%, and the Commonwealth having the highest unemployment rate in the country?

Irrigation is an Owner choice and is never included in D+W projects as a given. We do many school projects with successful fields without irrigation. The key is to follow the specification as to planting season and seeded lawn establishment period.

An irrigation system was not part of any requirements given to us by the Working Group or School Building Committee.

We advised many times in design presentations and in the Owner's Project Requirements document that the fields were not irrigated.

Also, we believed no irrigation was possible in order to achieve one of the LEED Water Efficiency credits. When irrigation was first brought up, we clarified that sport fields are exempt from that LEED requirement.



IRRIGATION SYSTEM QUESTIONS – POST-7/21

6. In our [7/21/20] meeting, it was mentioned that if we went with town water, we could not use WWC water during times of drought. The argument was that we could [water] with a well. Based on the research that I did and my own personal knowledge, wells are also impacted by drought conditions and can run dry. It is suggested that homeowners with wells should also reduce their water usage during a drought. Was this taken into consideration?

Wells of any kind can experience the effects of a drought, but according to the well driller with whom we have been consulting for pricing, this is very rare in deeper bedrock wells.

The driller stated that wells can be impacted by over-use, if there are a lot of wells in close proximity being used for irrigation at the same time.

A general review of the MA Well Database for Northbridge indicated only one well within close proximity, on North Main Street, which appears to be a domestic well. A comprehensive well study is outside the scope of work and has not been performed.



IRRIGATION SYSTEM QUESTIONS – POST-7/21

7. I would like to better understand the estimated 50-year cost that was calculated. It seems to be significantly inflated.

Option 1 - the assumptions used in the calculation are as follows:

WATER: quantities derived from calculated water use by the irrigation consultant; a range from Peak Use (~\$37.6K) down to Average Use (32% of peak - ~\$12K) was given. Water and meter charge costs based on current WWC rates. WATER, 50-YEAR are those numbers x 50.

MAINTENANCE was a reasonable estimate based on conversation with District staff x 50 years.

OPERATIONAL LABOR - assumptions laid out in detail on Slide 5 previously in this presentation - these are reasonable, good-faith time estimates; again x 50, for 50-year cost. One could take issue with the labor rate of \$25/hour which is an assumption that an above-living-wage Town employee would be doing the watering.

TOTALS are the sum of the 50-year costs. We stand by this number as a fair and accurate estimate.

Option 2 and 3 costs are straight from FBI's sub cost estimates or, again, based on reasonable assumptions derived from conversations with the District for maintenance costs. Labor costs are good-faith estimates based upon the realities of the options.



IRRIGATION SYSTEM QUESTIONS – POST-7/21

8. There is also a potential impact to neighbors with wells if one is drawing too much from their well.
Are there neighboring wells in use?

A general overview of the MA Well Database for Northbridge indicated only one well within close proximity, on North Main Street, which appears to be a domestic well.

A comprehensive well study is outside the scope of work and has not been performed.



IRRIGATION SYSTEM QUESTIONS – POST-7/21

9. What is the approximate value of the investment the town is making in our fields at the new Elementary School, i.e.: grading improvements, drainage, subgrade, seed mix, etc.?

Drainage systems, custom sand blend, screened/amended/re-spreading of loam, topical fertilizer and seeding: \$400,000.

Pricing did not include site clearing / tree removal, cut to grade, or sub-grade prep as that is considered sitework required regardless of fields or other hard/soft-scapes.



IRRIGATION SYSTEM QUESTIONS – POST-7/21

10. What would the approximate repair and reseeding costs be if we didn't irrigate the fields during a dry summer and the grass died or became an unmanageable weed field requiring repair/ re-seeding? (A square foot # is close enough)

The cost per hydro-seed tank truck is \$2,300. A tank covers approximately 8-10k SF. This value does not include any warranty or establishment maintenance/labor (watering, mowing etc.).

FBI believes if re-seeding or repairs were required, it would likely be performed by the school or Town.



IRRIGATION SYSTEM QUESTIONS – POST-7/21

11. Please confirm that the fields at our other NPS institutions (NMS and NHS) have active irrigation systems (fed by Whitinsville Water Co).

It has been confirmed by the District that the Middle School and High School have functioning, active irrigation systems, with water supplied by WWC.

The high school's upper field is 18 acres and the middle school is 14 acres.

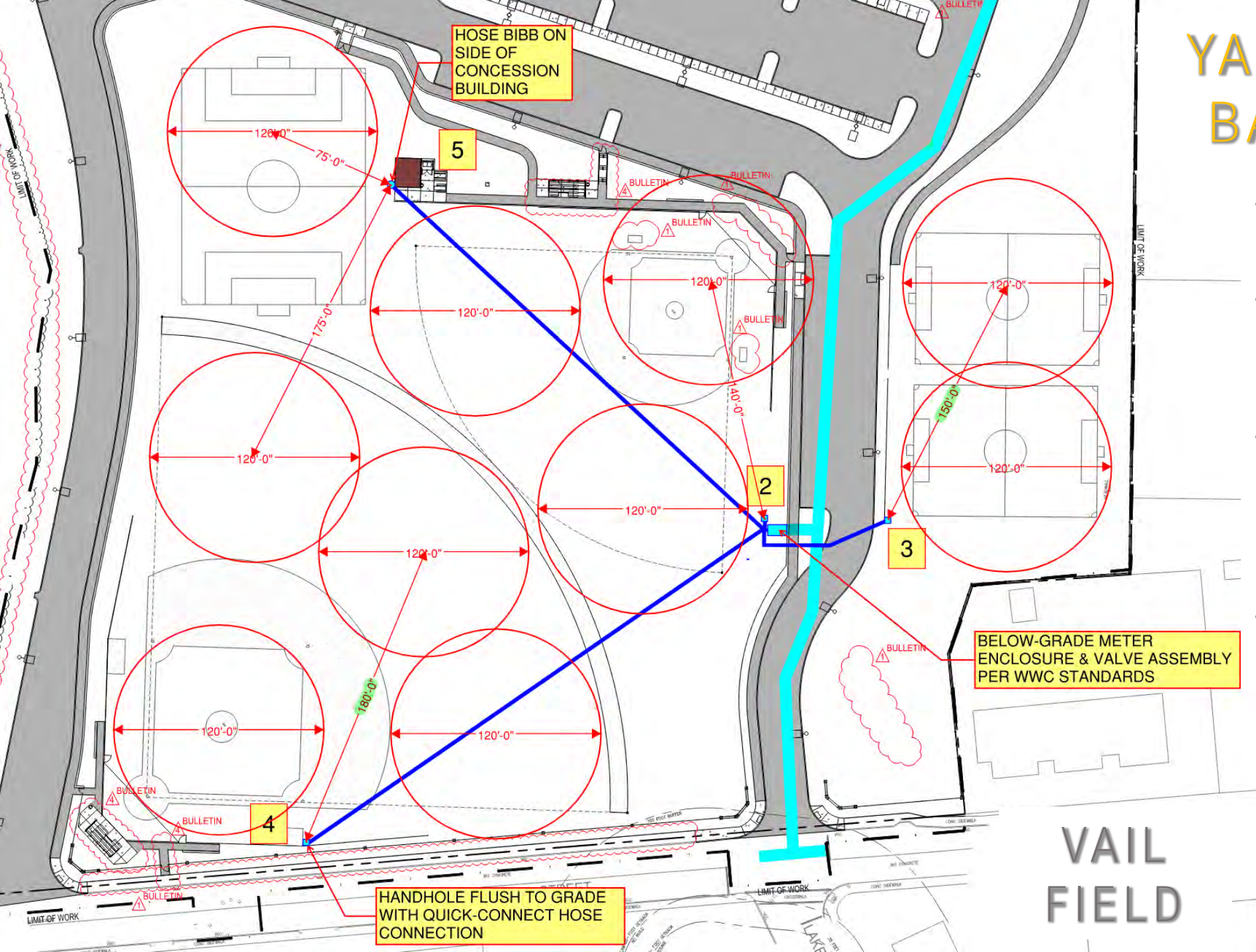
*The systems are run from May until September. All watering is done at night starting at 9:00 PM. The middle school has 18 zones running at about 15 minutes a zone. The high school has 36 zones running for 20 minutes. **Every zone has about 4 sprinkler heads. They're run daily and** fields are monitored every day. If rain is coming, the system is shut off a few days prior.*

The average cost of watering from FY'12 to FY'20 has been \$8,774 for the Middle School and from FY'12 to FY'16 has been \$14,490 for the High School (there appear to be unexplained problems with the HS data after 2016).

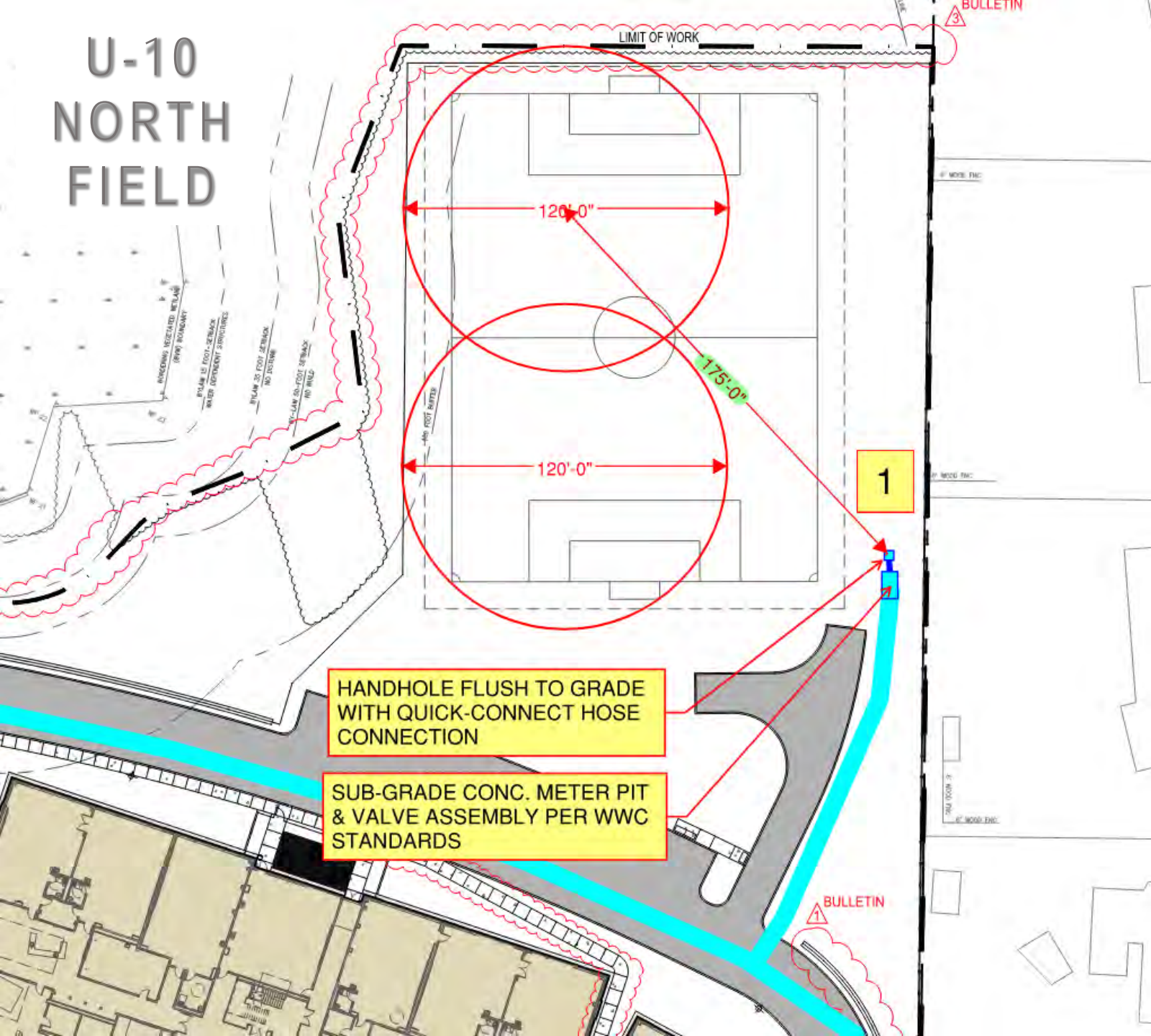


YARD HYDRANTS: BASE OPTION 1

- Basic watering during dry periods
- One yard hydrant hose connection per field group; (5) total
- Use curtailed/ prohibited during declared “dry periods” (odd/even days) or drought/ water emergencies
- Very inefficient watering method, poor coverage



U-10 NORTH FIELD



YARD HYDRANTS: BASE OPTION 1

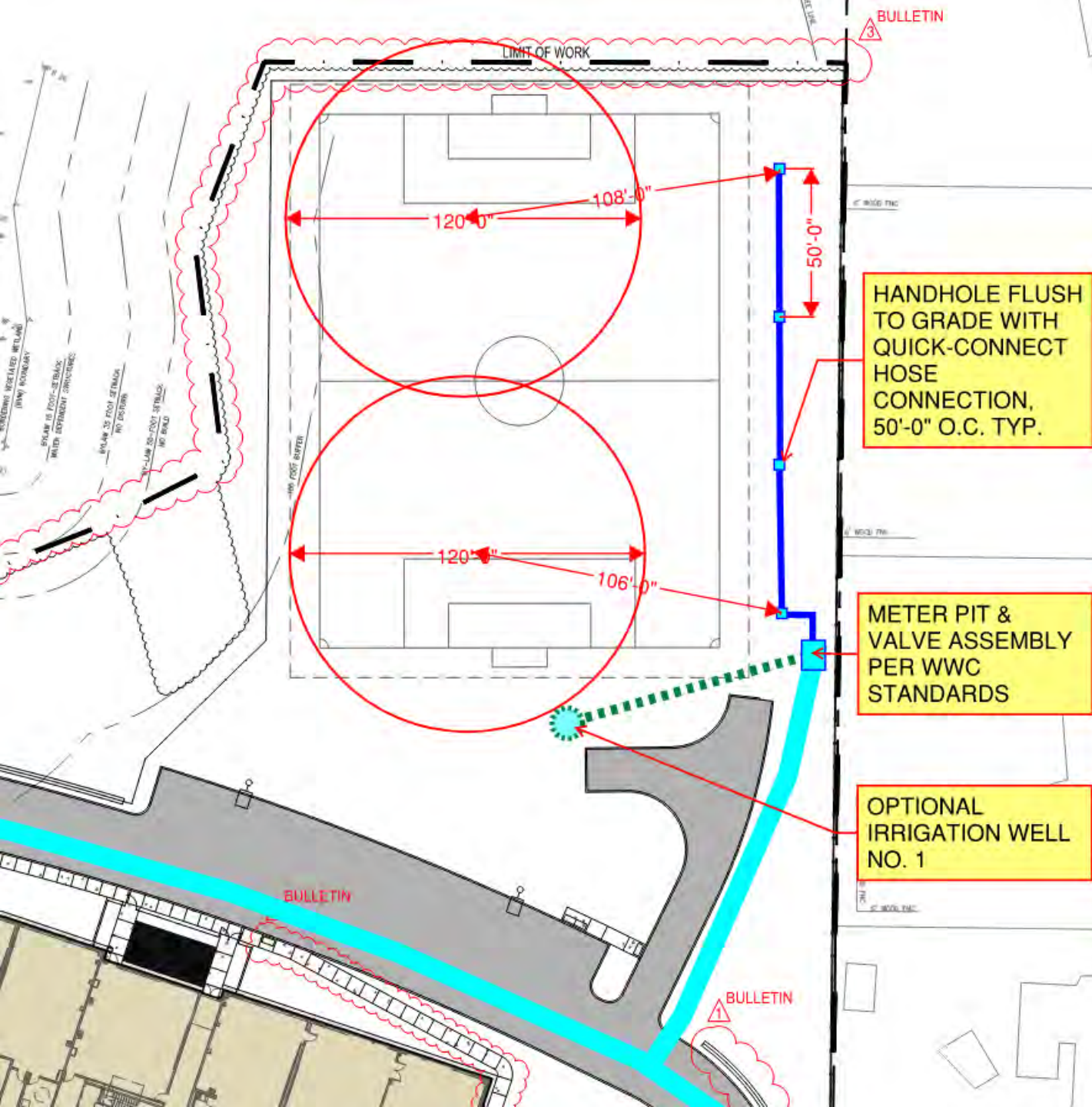
- Ongoing cost of potable water purchased from WWC
- Assumes a large amount of volunteer labor to move hoses and sprinklers
- long hoses = friction/pressure loss
- Recreation Commission owns no hoses or sprinkler equipment



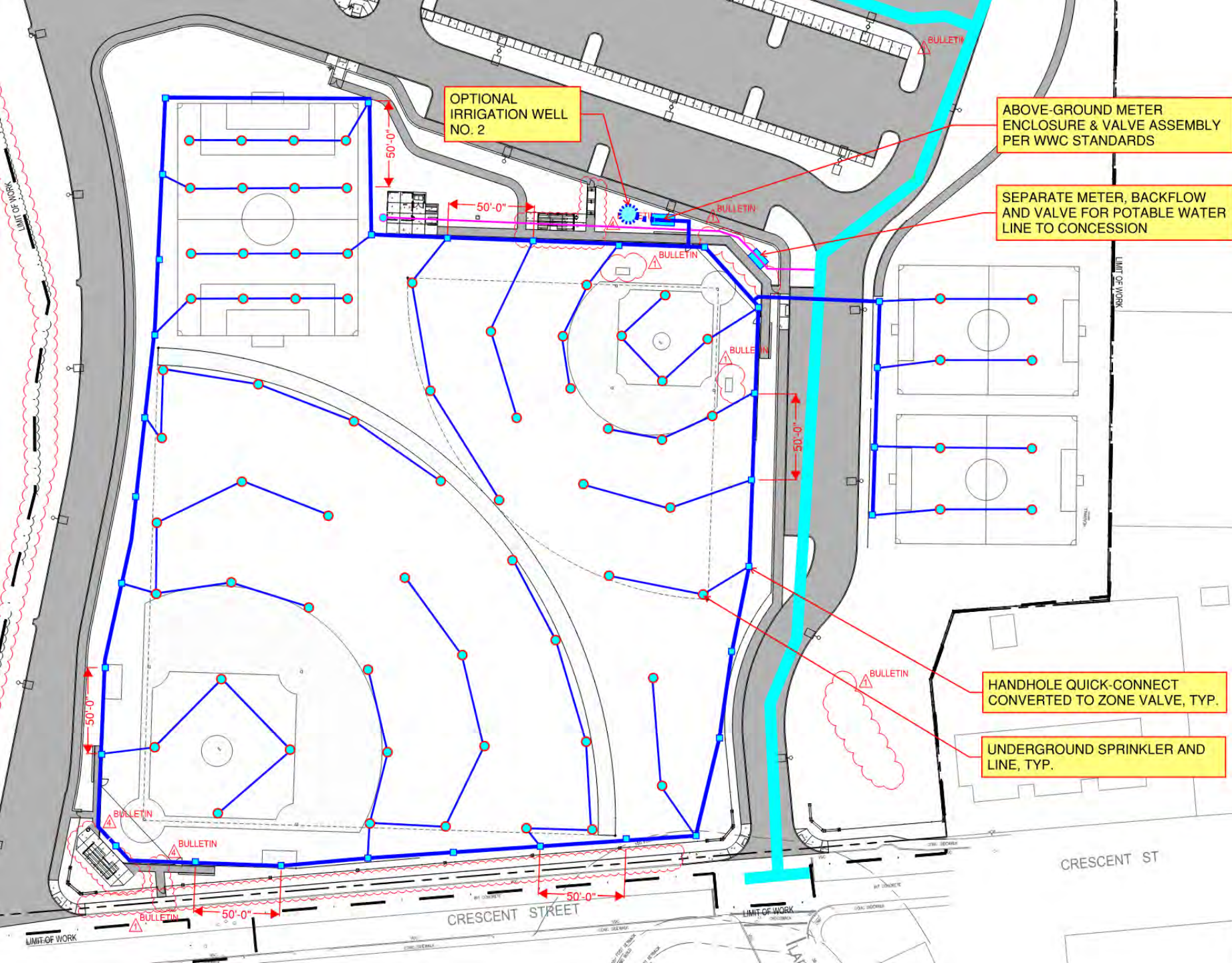
- **“Phased Option”** – loop infrastructure now for full irrigation system later
- Quick-connect hose bibbs in **hand holes at 50’ on center**
- Install controller wire in loop for later use
- Surface watering with hoses and rotary sprinkler guns
- Shorter hose runs, more convenient hookups, less friction loss, less labor
- Quick-connects can be easily converted to in-ground sprinkler branch runs

IRRIGATION OPTION 2: LOOP WITH QUICK- CONNECTS

- Basic watering during dry periods
- Recommended to drill irrigation wells with this option
- Still an inefficient watering method; better access to couplings but still poor coverage



IRRIGATION OPTION 3



- “Complete Option” – loop infrastructure is trunk for full irrigation system
- Quick-connect in hand holes converted to zone valves
- Installed underground lines and sprinklers
- Automatic, timed, zoned
- Seasonal maintenance required
- Assumes irrigation wells



(2) U-6 FIELDS	Monthly peak demand (cu ft)	
May	4483	75% of monthly peak
June	4483	75% of monthly peak
July	5977	100% of monthly peak
August	5977	100% of monthly peak
September	4483	75% of monthly peak
October	4483	75% of monthly peak
Total (6 mo annual Est Peak Demand)	29,885 cu ft	

U-10 +VAIL FIELDS	Monthly peak demand (cu ft)	
May	89,889	75% of monthly peak
June	89,889	75% of monthly peak
July	119,853	100% of monthly peak
August	119,853	100% of monthly peak
September	89,889	75% of monthly peak
October	89,889	75% of monthly peak
Total (6 mo annual Est Peak Demand)	599,263 cu ft	

WATER CONSUMPTION CALCULATION

Performed by General Irrigation Engineering (GIE) of Westwood, MA

← (2) U-6 soccer fields west of the school, which are planned to be irrigated using the school's potable water supply and will be connected to the school (9,415 SF area)

← U-10 field (north) and the Vail Fields: (3) U-8 soccer fields, and large and small baseball fields (188,790 SF total area), the source of the water which we are currently inquiring about.

- These are PEAK FLOW numbers!
- Normal expected flows are more like 30-32% of these peak calculations
- That said, we have to plan for the peak.

Questions to Whitinsville Water Co.:

- Could WWC supply this peak demand to the school fields for irrigation?
- Even if they could supply the water, would it be subject to a drought restriction if a water emergency were declared? If so, to what degree?

Refer to email from Randy Swigor in packet

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Total (6 mo annual Est Peak Demand)	599,263 cu ft	

WATER CONSUMPTION CALCULATION

Rough cost calculation:

(2) U-6 Fields:

Peak 29,885 cu ft / 100 x \$4.83 per 100 cu ft = \$1,444

Meter charge (Assume 1.5") \$73.88 x 6 mos = \$443

Meter install/ de-install charge (estimate) \$200

Annual Maintenance (estimate) \$500

Total (Peak year) \$2,587

Total (Average year - 32%) \$828

U-10 + Vail Fields:

Peak 599,263 cu ft / 100 x \$4.83 per 100 cu ft = \$28,945

Meter charge (Assume 2") 120.48 x 6 mos = \$723

Meter install/ de-install charge (estimate) \$200

Annual Maintenance (estimate) \$1500

Total (Peak year) \$31,368

Total (Average year - 32%) \$10,038

OPTION 1

WATER CONSUMPTION CALCULATION

U-10 + Vail Fields - Consumption and Cost for Manual watering by surface hoses and water cannons:

Watering via hoses and cannons is about 20% less efficient.

Peak 599,263 cu ft x 1.20 = 749,032 cu ft

U-10 + Vail Fields:

Peak 749,032 cu ft / 100 x \$4.83 per 100 cu ft =	\$36,178
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Meter charge (Assume 2") 120.48 x 6 mos =	\$723
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Meter install/ de-install charge (estimate)	\$200
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<u>Annual Maintenance (estimate)</u>	<u>\$500</u>
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Total (Peak year)	\$37,600
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Total (Average year - 32%)	\$12,032
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Drone overview of building site, 7/16/20



QUESTION AND ANSWER

