To: Board of Supervisors
From: C. McGarry
Re: County Administrator's Report for September 9, 2025 Board Meeting

A. DSS Building Project: Coleman-Adams is securing all permits with building hazmat abatement and demolition anticipated to occur in the next couple of weeks, with site work to follow. Regular project meetings will begin soon and the parked vehicles at the site are expected to be moved by September 22nd or sooner if required.

B. Department of Social Services & Agency Corrective Action Plan: An agency update was issued in a September 4th press release. **(see attached)** In August, the Agency received 23 Child Protective Services referrals, 15 were validated/accepted (65%) and 8 were screened out (35%). Of the 15 validated/accepted referrals, 4 were assigned as investigations (27%) and 11 were assigned as family assessments (73%). This data is in positive contrast with Nelson's SFY2024 data, which shows that 26% of Child Protective Services referrals were validated/accepted, 74% were screened out, 0% were assigned as investigations, and 90% were assigned as family assessments. This is more in line with Piedmont Region data for SFY2024 where 42% of Child Protective Services referrals were validated/accepted, 58% were screened out, 19% were assigned as investigations, and 78% were assigned as family assessments.

Staffing has improved with a Family Service Specialist and Benefits Programs Specialists starting on 9/1/25 and recruitment for a Director, Family Services Supervisor, and Administrative Coordinator II has begun.

Agency coordination has been re-established with positive feedback from local agencies and community partners.

Staff is working towards implementation of a new Local DSS Advisory Board with initial member recruitment anticipated to begin later in September.

The Agency is continuing to work with VDSS in working through its Corrective Action Plan; personnel resignations have impacted progress in compliance with case protocols and data entry in electronic case files this past month; however, staff is working diligently with VDSS practice consultants on current cases and case backlogs.

C. Larkin Phase 1 Well Evaluation & Dillard Creek Flow Evaluation: Both reports have now been received **(see attached)** and advisement from the Board on scheduling a work session with CHA on these or an October regular meeting presentation is requested.

D. Space Needs Follow Up: Staff is following up as directed at the August 26th continued meeting, to collect information on 400 Front Street and The Nelson Center for consideration as possible solutions for the relocation of non-court related offices from the Courthouse.

E. Zoning & Subdivision Ordinance Update (Zoning & Subdivision Update | Nelson2042**) :** BOS/PC have been having joint work sessions with Berkley Group to review proposed chapters of the new Ordinance, next steps include:

- October 22, 2025 – Joint BOS/PC Work session 6 – CO 151, STRs, Outstanding Questions
- December 17, 2025 – Joint BOS/PC Work Session – Full Ordinance Review
- January 2026 – Public Open House & Review
- February 2026 – Pre-Adoption Work Session and Final Revisions
- March 2026 – PC Public Hearing & Recommendation to BOS
- April 2026 – BOS Public Hearing & Consideration of Adoption

F. Seven Stars Music Festival (Seven Stars Festival 2025**) – October 9 through October 12, 2025:** Staff and applicable agencies have been meeting weekly with 100X, LLC, the event promoters of a multi-day music festival to be held at Oak Ridge/LOCKN Farms property. The event includes various types of camping: tent, car, RV, and multiple glamping options. Event logistics are being finalized (site plans, traffic plans, Emergency Services, and security etc.) and the Temporary Event Permit has been circulated to approvers with VDH to be the final signature. The event is sold out and expected to bring in a maximum 23,500 attendees over the course of the festival. Promoters

have indicated they will be posting traffic plans on their website and will be contacting event neighbors to offer information and answer questions. Festival staff will arrive on site for site preparation on September 22nd.

G. Christmas Lights: A. Spivey has been following up to gather more information on the status of the lights, the light pole brackets and connections, and costs to operate them. **(see attached)** Should the Board decide to take on the lights, we would anticipate at a minimum, the cost to replace any bulbs on the lights currently in inventory. We do not have a total count at this time. Additional costs would include the electric service (both AEP and CVEC), as well as any costs to make the necessary repairs to the power supply on each of the poles used. Ms. Spivey heard back from Elaine Hooker, who said the Nellysford lights cost $150 for the season. The cost is estimated that the lights in Lovingston would cost about $750-$800 for the season, which is what we were billed to an account set up without our permission in early 2024 – we ended up not having to pay that bill, but we do not know if in the future, we would need to have an account set up to cover this. We are expecting updates soon from AEP and CVEC.

H. Cover the Caboose Effort- Piney River Rail Trail: Currently, we have two quotes and are seeking a third. The highest quote is turnkey including installation at $57,580 and the other is a purchased kit for $15,000 with the possibility of volunteer assembly from a local barn builder. Maintenance has just cleared trees in front of the caboose to provide a clear image for a mock-up design to be provided by one of the quoting entities.

I. NCCDF Family Assistance Program: Ms. Claire has reported that as of September 2nd, they have had 26 people contact them and get applications for more than $13,000 in assistance. Of those, they have had 17 families complete applications and receive funding for $4,700.

J. Piney River Pump Station (Phase II): The quote received on the specifications for the pump station is $263,103 and is subject to escalation for any price increases of materials or components greater than 5% after the time of quote. Manufacturing is estimated to take 24-38 weeks from when Smith and Loveless receives approved submittal data. Staff is preparing to proceed with ordering the pump station and is gathering pricing information related to installation as well as consulting with DEQ on their required coordination. The installation price from the pump station vendor's installer is $425,744, The FY26 budget currently includes $323,125 for this project.

K. Tipping Floor Replacement Project: At the October Region 2000 Authority meeting, I will be seeking approval from the Authority to approach Amherst County regarding direct hauling the County's solid waste to their landfill facility versus hauling it to the Livestock Rd. facility during floor replacement. If authorized, approval from the Amherst BOS will be sought for a Spring timeframe; coinciding with the opening of their new landfill cell. The primary concern is the hauling time from our sites to the Livestock Road facility, which impacts our ability to effectively keep up with processing the waste stream during this time. While we may be paying about $10 more per ton for disposal in Amherst (a total estimated $5,000 more), we will have savings from pausing the secondary hauling by Thompson Trucking (Transfer Station to Livestock Road) for approximately 1 month, the equivalent of about $22,000. Preliminary coordination with Amherst staff on this has been taking place in case the necessary approvals are provided.

L. Meals and Lodging Tax Collection & Lodging Entity Tracking: See Attached Charts - # of Lodging Units remains at 824. Economic Development/Tourism, IT, and Planning/Zoning staff are vetting short term rental software platforms for purchase, with Economic Development staff to be the primary user for tracking purposes.

M. Staff Reports: Department and office reports for July/August have been provided.

FOR IMMEDIATE RELEASE: September 4, 2025

JOINT RELEASE BY NELSON COUNTY DEPARTMENT OF SOCIAL SERVICES AND SHERIFF'S DEPARTMENT

Since the previous press release on August 20, 2025, Nelson County's Department of Social Services has made strides in several key areas.

The referral hotlines are being utilized and in August, the Agency received 23 Child Protective Services referrals, 15 were validated/accepted (65%) and 8 were screened out (35%). Of the 15 validated/accepted referrals, 4 were assigned as investigations (27%) and 11 were assigned as family assessments (73%).

County Administrator, Candy McGarry says "this data is in positive contrast with Nelson's SFY2024 data, which shows that 26% of Child Protective Services referrals were validated/accepted, 74% were screened out, 0% were assigned as investigations, and 90% were assigned as family assessments. This is more in line with Piedmont Region data for SFY2024 where 42% of Child Protective Services referrals were validated/accepted, 58% were screened out, 19% were assigned as investigations, and 78% were assigned as family assessments. Our staff is diligently working through all referrals and the data is reflecting that commitment", says Administrator McGarry.

The Agency is also progressing in staff fulfillment and recruiting. "A Family Services Specialist and Benefits Programs Specialist began work on September 1, 2025 and advertisements have been posted with VDSS for the vacant positions of Social Services Director I, Family Services Supervisor, and Administrative Coordinator II", reported Interim Director, Allison McGarry adding that "Family Services staff continue to complete training and engage with regional VDSS practice consultants and our neighboring agency partners for assistance."

Administrator McGarry expressed her appreciation for the renewed vital coordination of the Agency with community partners, such as the Sheriff's Department; with Sheriff Embrey adding "The Nelson County Sheriff's Office would like to thank Interim Nelson County DSS Director Allison McGarry for her leadership during this transitional period. The communication and collaboration between our Offices has dramatically increased, allowing all allegations of abuse and neglect towards our County's youth and elderly, to be fully investigated by members of our Office. The Nelson County Sheriff's Office is fully committed to fostering a growing relationship with members of Nelson County DSS, as together we will rebuild the community's trust."

Administrator McGarry concluded by advising that "implementation of a Local DSS Advisory Board is in its beginning phases with initial member recruitment slated to begin in late September." The Local DSS Advisory Board is appointed by the Board of Supervisors and will consist of at least five members, one from each election District, with Administrator McGarry serving as an Ex Officio, non-voting member. "Quality Advisory Board members are those who are interested in assisting the broad spectrum of community members served by DSS, who represent the general population while being protectors of their privacy and confidentiality, and who will bring their own experience and ideas to the Board" says Administrator McGarry. The County plans to begin advertising for Advisory Board members in late September and interested citizens may contact County Administration at 434-263-7000 for more information.

####

CPS only data from John King, Piedmont Region CPS practice consultant - received on 9/3/25

Nelson DSS Data for August 2025

Total Referrals Received = 23
Validated = 15
Screened out = 8
Percentage Validated = 65%
Percentage Screened Out = 35%

Nelson DSS Data for August 2025

Investigations = 4
Family Assessments = 11
Percentage Investigations = 27%
Percentage Family Assessments = 73%

Nelson SFY2024 Data

Percentage Validated = 26%
Percentage Screened Out = 74%
Percentage Investigations = 0%
Percentage Family Assessments = 90%

Piedmont Region SFY2024

Percentage Validated = 42%
Percentage Screened Out = 58%
Percentage Investigations = 19%
Percentage Family Assessments = 78%

Statewide SFY2024

Percentage Validated = 39%
Percentage Screened Out = 61%
Percentage Investigations = 24%
Percentage Family Assessments = 74%

Memorandum

To:	Candy McGarry, County Administrator, Nelson County	**Project:**	Nelson County Groundwater Well Evaluation
From:	Sandy Warner, Project Team Leader, CHA Consulting, Inc.	**Date:**	September 5, 2025
CHA PN:	093203	**RE:**	Potable Groundwater Water Source Evaluation for the Larkin Property

1.0 EXECUTIVE SUMMARY

CHA conducted a groundwater potential assessment for the Larkin Property, owned by the County, to evaluate its suitability for groundwater supply development for either public drinking water or non-potable water uses. The study included a review of onsite geologic conditions and comparison with other production wells in similar geological settings. Based on this analysis, the site was determined to have promising potential for groundwater development, particularly if a well is drilled into subsurface features such as fractures or faults.

To identify optimal drilling locations, CHA performed an electrical resistivity survey. This geophysical investigation revealed three potential subsurface targets for test well drilling. For each target, CHA provided cost estimates for initial development and future capital investment required for well field operation.

The estimated costs for each phase of development are summarized in the table below:

Task	Estimate Range of Costs Public Drinking Water Supply	Estimate Range of Costs Non-Potable Water Supply
Well Site Preparation	$20,500-$40,000	$20,500-$40,000
Well Site Local Approval and VDH Approval for Drilling Locations	$5,000	$3,500
Drilling Well for Target 1	$15,000-$20,000	$15,000-$20,000
Drilling Well for Target 2	$15,000-$20,000	$15,000-$20,000
Drilling Well for Target 3	$15,000-$20,000	$15,000-$20,000
48-hour Drawdown Testing and Water Quality Sampling on Target 1	$12,500	$5,000-$7,000*

Task	Estimate Range of Costs Public Drinking Water Supply	Estimate Range of Costs Non-Potable Water Supply
48-hour Drawdown Testing and Water Quality Sampling on Target 2	$12,500	$5,000-$7,000*
48-hour Drawdown Testing and Water Quality Sampling on Target 3	$12,500	$5,000-$7,000*
Preliminary Engineering Report and VDH Office of Drinking Water Permitting	$50,000	$25,000*
Total Estimated Development Costs	$158,000-$192,500	$109,000-$149,000

*A 48-hour drawdown test and water quality sampling would not be required if the well is not being used for drinking water. However, we would recommend completing at least an 8-12 hour test in order to gain understanding about the capacity and sustainability of the well and conduct a limited water quality assessment. Likewise, the VDH Office of drinking water permitting would not be required, but a PER to evaluate what distribution, treatment or other improvements are required to utilize the water for non-potable uses would be recommended.

2.0 BACKGROUND AND OBJECTIVES

In 2024 CHA Consulting Inc. completed a Water and Sewer Capacity Analysis for the Nelson County Larkin property that showed additional water source(s) would be needed to support future residential and recreational site development included in the master plan for the site. This analysis estimated an additional 81,940 GPD (or approximately 0.082 MGD) of water is needed to support future development of the property. As a follow-up to the 2024 analysis, CHA evaluated the Larkin property for groundwater supply wells to support future development of this property. Figure 1 provides an overview of the Larkin Property Location.

The following objectives formed the basis of the evaluation of the groundwater wells sites on the property for development a groundwater source:

1. Evaluate the geologic factors on site and well records in the general vicinity of the property to estimate potential well yields

2. Conduct a geophysical electrical resistivity survey to determine potential subsurface fractures for drilling test water wells.
3. Evaluate potential costs for drilling test wells and performing water quality sampling and drawdown yield tests on those wells.
4. Estimate permitting costs for a groundwater supply well.

3.0 GROUNDWATER YIELD ASSESSMENT FOR THE LARKIN PROPERTY

3.1 Well Yield Requirements

To meet the estimated daily water demand of 81,940 gallons, a well must produce approximately 60 gallons per minute (gpm) if operated continuously. However, Virginia's water regulations require that wells be rated based on a "safe yield," defined as 55% of the flow measured during a 48-hour performance test. Therefore, to achieve a rated capacity of 60 gpm, the 48-hour test must demonstrate a flow of at least 110 gpm. Achieving this may require multiple wells.

3.2 Geologic Context

The Larkin Property is located in Nelson County, within the Piedmont Province of Virginia. Groundwater in this region is influenced by topography and subsurface geologic structures such as fractures, faults, and bedding planes. The site is underlain by granite and gneissic rocks, covered by 30 to 100 feet of soil and weathered rock. Figure 2 shows the geologic map of the property, and Table 1 summarizes the rock units.

Table 1: Geologic Units Within Larkin Property Groundwater Study Area

Unit Name	Primary Rock Types	Groundwater Aquifer Significance
Yal	Alkali Feldspar Leucogranite	Flow through weathered rock and fractures.
Ybg	Biotite Monzogranite-Quartz Monzodiorite	Flow through weathered rock and fractures.
Yma	Layered Quartzofeldspathic Augen Gneiss And Flaser Gneiss.	Flow through weathered rock and fractures.

3.3 Nearby Well Yields

In Virginia's Piedmont region, groundwater well yields typically range from 3 and 20 gpm, though higher rates are possible in areas with significant fracturing. Several nearby communities in

Nelson County rely on wells for a portion of their public water supply. Table 2 lists wells in a similar geologic context near the Larkin Property, including production data and construction details where available.

Table 2: Public Water Supply Wells In the Vicinity of Larkin Site

Water System		Average Annual Production 2011-2019[1]		Well Diameter (inches)	Well Depth Casing(ft)/Total (Ft)	Well Yield (GPM)
		MGY	MGD			
Lovingston	NC#2-Payne Well	3.6	0.0099	6	50/300	28
	Peverrill Well	Inactive[3]				
	Well #9 - Dawson	3.6	0.0099	NA[2]	50/325	20
	Drug Store Well	Inactive				
	Social Services Well	Inactive				
Shipman Area	State Shed Well	1.50	0.0041	6	55/405	16
	Brown Well	1.00	0.0027	6	58/305	16
	Ryan School Well	Inactive				
Colleen Area	Bowling Well #1	7.9	0.0208	8	58/300	88
	Bowling Well #2	NA	NA	8	83/300	18
	Bowling Well #3	NA	NA	8	58/300	NA
	Bowling Well #4	Inactive				
	Bowling Well #5	Inactive				
	Bowling Well #6	Inactive				
	Rainbow Well #2	5.1	0.0140	6	40/140	NA
Tye River Elementary	Well 1	NA	NA	NA	NA	7.5
	Well 2	NA	NA	NA	NA	12
Scenic Hills Subdivision	Well 1	Inactive waterworks				
	Well 2	Inactive waterworks				
Lake Nelson Campground	NA	NA	NA	NA	NA	20

Notes: [1] Virginia Groundwater Extraction Non_Domestic Wells 2009 through 2019_WFL1; [2]NA = Not Available; [3]Inactive = Well is currently not in use. The well may have been abandoned or may be capped in case of future development.

3.4 Recharge and Sustainability

Groundwater recharge in the Tye River watershed is estimated to be approximately 16.99 inches/year (USGS, 1997). To support a withdrawal of 82,000 gallons/day (or 29.93 million gallons/year), a recharge area of approximately 36 acres is needed. The actual recharge zone will be influenced by fracture orientation, not necessarily forming a circular area around the well.

The Larkin Property spans 309 acres, suggesting sufficient land area for groundwater development. However, depending on well placement and subsurface conditions, off-site private wells could be affected.

3.5 Summary of Groundwater Yield Assessment for the Larkin Property

To meet future water demands for the Larkin Property future development, two wells rated at 55 gpm or higher would be sufficient. Based on regional geology and nearby well performance, targeting subsurface fractures and secondary porosity features will be key to successfully locating high-yield wells. A geophysical study was performed in order to identify those potentially high-yield subsurface features.

4.0 ELECTRICAL RESISTIVITY GEOPHYSICAL SURVEY

CHA, in collaboration with our teaming partner, Geoscience Professionals, completed an electrical resistivity survey of the central portion of the property to identify potential targets for test well drilling. The geotechnical report in Attachment A provides a detailed description of the study, the methods used to collect the resistivity data and the results of the survey. In summary, data for four resistivity lines were collected at the site on June 3-5, 2025. Lines 1 and 2 were oriented approximately southwest to northeast and Lines 3 and 4 were oriented southeast to northwest. Each line employed a six-meter spacing between electrodes. The lines varied in number of electrodes from 35 electrodes to 53 electrodes and varied in length from 204 meters to 312 meters. The electrodes on each line were assigned a unique identifier consisting of the line number followed by a dash and the electrode number and recorded using a handheld GPS. Linear inversion techniques were applied to the data to fit the apparent resistivities collected in field to an earth model that approximates the actual resistivities in the section.

All four of the resistivity lines display low resistivities in the shallow subsurface, which is typical of moist soils. Below the low-resistivity soil, the bedrock surface is characterized by an abrupt increase in resistivity as bedrock typically contains much less moisture than soil. Fracture zones

tend to be characterized by vertical low-resistivity zones within the high-resistivity bedrock. Potential drilling targets tend to be characterized by vertical low-resistivity zones within the bedrock.

The report found three well locations with water producing potential. These are presented in Table 3 in order of priority. Their locations are shown in Appendix A: Figure 6.

Table 3: Well Targets Identified by Electrical Resistivity Survey

Target	Electrode Designation
1	2-48
2	3-56
3	4-74

5.0 POTENTIAL COSTS FOR GROUNDWATER SUPPLY DEVELOPMENT

CHA has evaluated the potential costs for groundwater supply development on the Larkin Property as both a potable drinking water source and a non-potable source. These include the costs for drilling test wells and performing water quality sampling and drawdown yield tests on those wells. A non-potable well has fewer permitting, drawdown testing and water quality testing requirements. These requirements could be done at a later date in order to convert the water source from a non-potable source to a potable one.

5.1 Test Well Site Approval – Local Health Department and Virginia Office of Drinking Water

Nelson County will be required to coordinate with the local Nelson County Health Department and the Virginia Department of Health Office of Drinking Water to obtain approval of selected test well sites in accordance with 12 VAC 5-590-200.B and local land use regulations. This typically involves an on-site visit from the inspector at the Office of Drinking Water to conduct a preliminary evaluation of the well's susceptibility to contamination. The application includes a site map that demonstrates the planned targets will meet the offset requirements (from septic systems, and sewer lines for instance). This approval letter is valid for 12-months. This process typically takes about 30 days and would cost an estimated $5,000 or less including permitting application fees.

If the well will only be used for non-potable uses, coordination with the state Office of Drinking Water is not required, so the permitting costs would be reduced to approximately $3,500.

5.2 Site Preparation

Targets 1 and 2 are located along the ridge of a moderate slope in a wooded area. Site preparation will be required in order to provide access to the targets with a drilling rig. One road could be constructed to provide access to both targets. Lidar data indicates that there may be an older logging road that could be improved, but regardless, trees would need to be cleared to build a road wide enough for a drill rig, and the soil would need to be compacted and stabilized so the equipment could access the target sites. In addition, some areas may need to add gravel to provide traction for the equipment. At the target sites themselves, trees will need to be cleared from approximately a 10-20 foot area in order to allow the drilling mast to be raised. Target Site 3 may be able to be access with a shorter road since the trees on the adjacent high school property have been cleared.

Table 4: Site Preparation Costs[1]

Site Preparation Subtasks	Estimate Costs (Range)	Estimated units	Total
Tree Clearing along new access roads and Well Drilling Sites	$500-$5000	1	$500-$5000
Road Grading and Compacting	$1000-$1500/day	10 days	$10,000-$15,000
Gravel or Matting for Stabilization where needed	--	--	$10,000-$15,000
			$20,500-$40,000

[1]These are estimates based on a conceptual road, actual costs will vary once needed quantities of each subtask is further refined. Utilizing County Resources may also lower the costs of outside contracting to develop the access to the well targets.

5.3 Test Well Drilling and Construction

The following ranges are based on recent quotes provided by well drillers for other projects similar in nature. The table includes a cost estimate for a well requiring 400 feet of drilling and 75 feet of casing, based on the per-foot estimates provided. Each well would cost approximately $15-$20K for a total of $45-$60K if all three targets are drilled.

Table 4.1. Summary of Well Drilling Cost Estimates

	Low Range	High Range
Drilling Cost (Per Foot)	$29.50	$40.00
Casing Cost (Per Foot)	$30.00	$41.50
Well Estimate[1]	$15,050	$20,112.50

[1]Includes a well set up fee of $1,000.

5.4 Drawdown Test and Water Quality Testing

The Virginia Water regulations require a 48-hour drawdown test in order to permit a public water supply well. During this test, the well driller will pump the well for 48-hours continuously and keep a record of the groundwater levels during the test. The pumping rate will vary, but the driller will work to match the rate of the water coming into the well, and then sustain that rate for the rest of the test. In addition, fecal coliform testing and other bacteriological testing is required through out the test. Once the test is nearly complete additional water quality samples will be collected. The cost for the drawdown test is up to $10,000 per well, and the water quality analysis typically costs around $2500. It is possible to complete a shorter well test and/or test for a limited amount of water quality parameters to evaluate the well's feasibility, but additional testing would be required to obtain a permit for operating the well as a public water supply. If the well were to be utilized for non-potable uses, then a 48-hour drawdown test and extensive water quality testing is not required. However, a drawdown test for a shorter duration (8-12 hours) would be needed in order to rate the sustainable capacity of the well and limited water quality sampling would be needed to determine any infrastructure needs for the water's end use. The costs for non-potable testing would range from $5,000-$7,000.

6.0 PERMITTING PROCESS FOR PUBLIC DRINKING WATER WELLS

If the facility decides to convert the wells to public drinking water wells, additional water quality testing and yield testing would be required. In addition, the facility would need to obtain a construction permit for any water treatment equipment and/or water distribution lines and a separate operating waterworks permit. A temporary Operating Permit in some cases is issued for 12-18 months to allow a facility to operate while obtaining all the monitoring data required for

an Operating Permit. At a minimum, the facility would be required to complete steps 1-4 below to obtain the temporary Operating Permit.

The construction and operating permitting process includes the following steps:

1. Completion of a Preliminary Engineering Conference (PEC)
2. Submittal and approval of a Waterworks Business Operations Plan (WBOP)
3. Submittal and approval of a Preliminary Engineering Report (PER)
4. Submittal of a Permit Application
5. Submittal, review and approval of Final Plans, Specifications, and Design Criteria
6. Issuance of a Construction Permit
7. Final inspection of construction by ODW
8. Issuance of a new or amended Operation Permit

The process for having the well approved would include:

1. A 48-hour Well Yield Test that includes 20 samples collected for Bacteriological Analysis performed by a DCLS (Division of Consolidated Laboratories) approved Laboratory. (See Section 5.4)
2. In addition to monitoring the microbial characteristics of the well source, a variety of chemical, radiological and physical parameters must be checked during well development in order to ensure adequate water quality. The specific parameters required for testing and the number of samples required will be determined by VDH-ODW. Tests may include analysis of metals, inorganic chemicals (including nitrate, nitrite, and cyanide), physical parameters, radiological contaminants, (such as uranium and radium), and volatile organic chemicals (such as fuels and solvents), and synthetic organic chemicals (including pesticides and herbicides). (See Section 5.4)
3. A sampling and analysis plan would be developed, which typically involves four quarters of sampling to ensure that water quality for the well is consistently within public drinking water standards.

The estimate cost for preparing the permit application, including completing a preliminary engineering report (PER) for the treatment system required for operation would be $50,000. This permitting process is not required for non-potable water use, but it is recommended that a PER

be completed to determine any infrastructure needs associated with the non-potable water system. The estimated cost for the limited engineering study would be $25,000.

7.0 LIST OF ACRONYMS & KEY TERMS

Aquifer: An underground formation that stores and transmits water. How much water the aquifer can store and transmit is a characteristic of the how much pore space is in the formation and how connected those pore spaces are. At this facility, the formation is metamorphic bedrock with very limited porosity, but can have fractures that are larger in size and transmit more water.

Recharge: Surface water that infiltrates through the soils and into the aquifer. This term is also to describe water entering the well after pumping the well.

PPM: Parts per million. One part per million is generally illustrated a drop of water in an Olympic sized swimming pool.

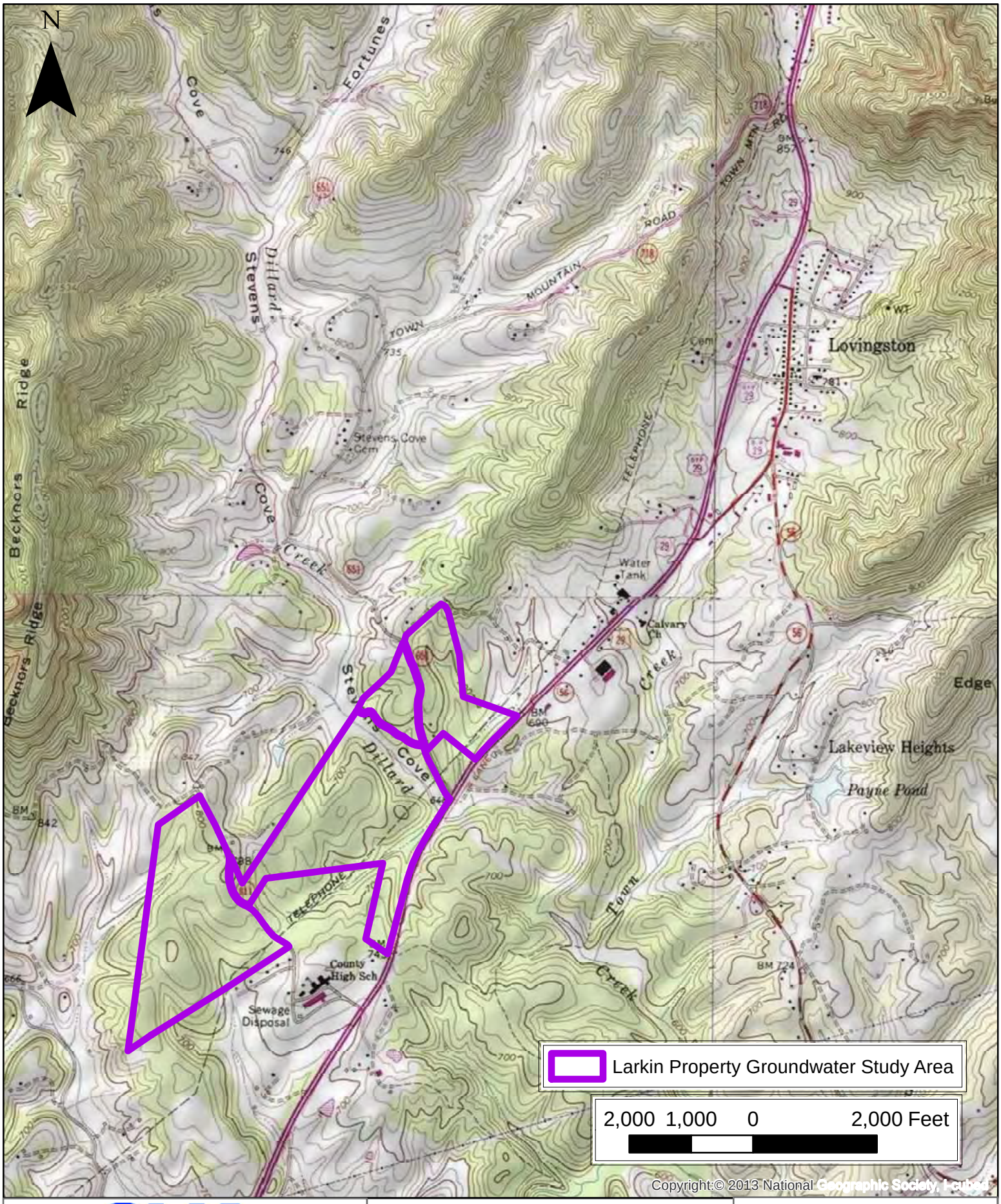
gpm – Gallons Per minute

8.0 REFERENCES

1. University of Richmond, 2020: GIS Dataset “Virginia Groundwater Extraction Non_Domestic Wells 2009 through 2019_WFL1”, accessed August 2025.

2. Draper Aden & Associates, 2009. “Region 2000 Local Government Council Regional Water Supply Plan”.

FIGURES



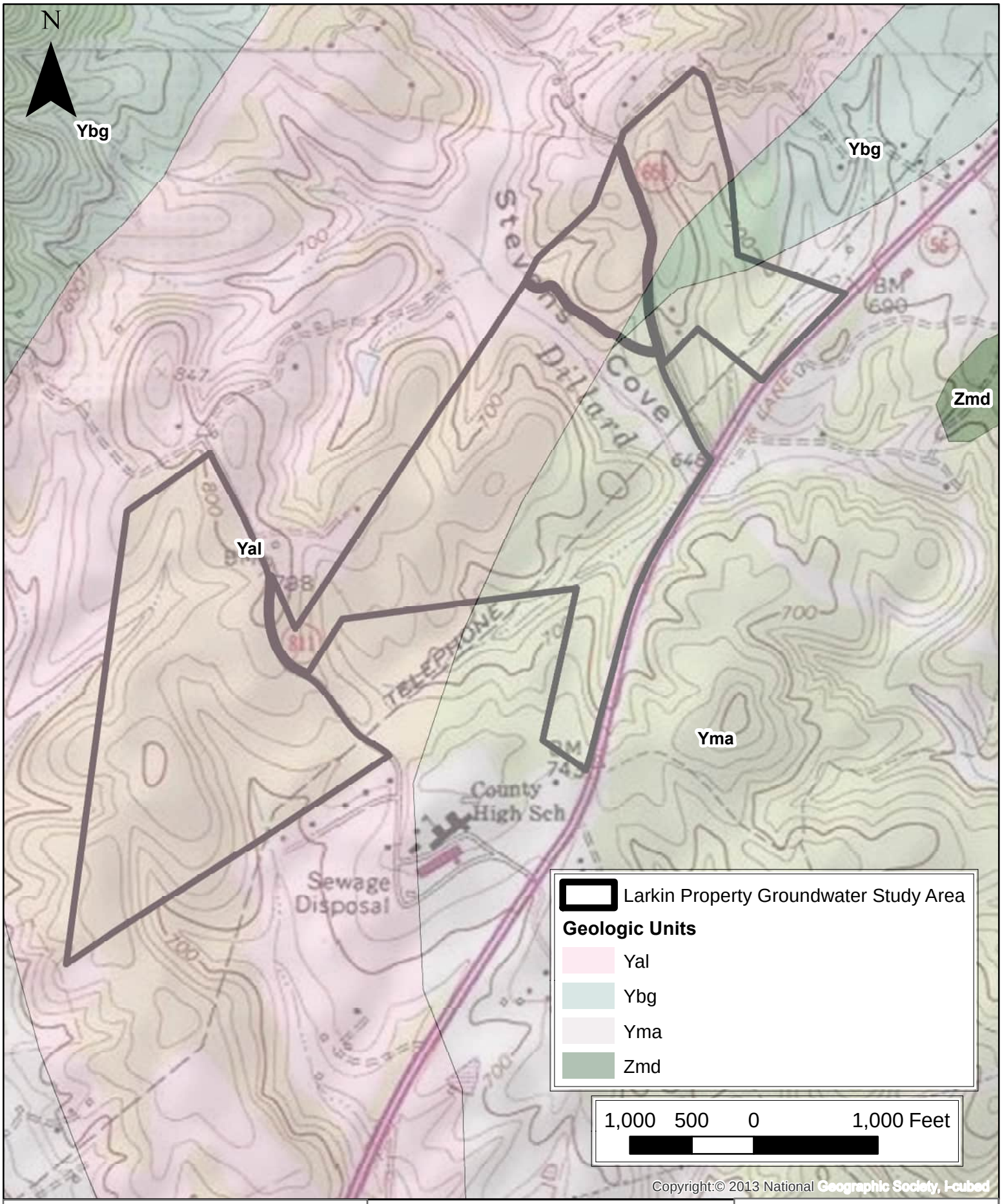
1341 Research Center Drive, Suite 2100 • Blacksburg, VA 24060
Main: (540)552-5548 • www.chasolutions.com

Site Location Map
Larkin Property
Groundwater Evaluation

Date: AUG 2025

Project: 93203

Figure 1



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Geologic Map
Larkin Property
Groundwater Evaluation

Date: AUG 2025

Project: 93203

Figure 2

Appendix A

Electrical Resistivity Study

40 Nancy Court
Christiansburg, VA 24073
Phone: (540) 998-8861
info@geoscience-pros.com
www.geoscience-pros.com

Water Supply Well Study at the Larkin Well Site

Nelson County, Virginia

prepared for

Ms. Sandra Warner
CHA
1341 Research Center Dr Suite 2100
Blacksburg, VA 24060

June 12, 2025

40 Nancy Court
Christiansburg, VA 24073
(540) 998-8861
info@geoscience-pros.com

June 12, 2025

Ms. Sandra Warner
CHA
1341 Research Center Dr Suite 2100
Blacksburg, VA 24060

RE: Water Supply Well Study at the Larkin Well Site, Nelson County, Virginia

Dear Ms. Warner,

GeoScience Professionals has completed the water supply well study at the Larkin Well site in Nelson County, Virginia. The objective of this study was to use resistivity imaging techniques to identify prospective drilling targets. The following report documents our methodologies and findings.

We value our professional relationship with CHA and hope that you will contact us with any similar needs in the future. If you have any questions regarding this report, or if we can be of any further service to you, please do not hesitate to contact us.

Best regards,

Warren T. "Ted" Dean, P.G.
President

Table of Contents

List of Figures

Executive Summary

GeoScience Professionals, LLC (GSP) was retained by CHA to conduct a water supply well study at the Larkin well site in Nelson County, Virginia. The objective of this study was to identify one or more drilling targets for water supply wells. The study area consists of approximately 140 acres on the west side of US 29 north of Nelson County High School.

No detailed geologic maps have been published for the site. The state-wide geologic map of Virginia indicates that the site is underlain by Proterozoic age alkali feldspar leucogranite. The published geologic map does not depict any of the local geologic structures that could help in siting water supply wells. The topography of the site and surrounding area was examined for topographic patterns that might reveal faults or fracture zones, but no patterns are observable.

To provide continuous imaging of the subsurface beneath the site for evaluation of geologic features, two-dimensional surface resistivity imaging methods were employed. Two-dimensional resistivity methods provide cross-sectional images of the resistance of subsurface materials to electric current, from which geologic conditions can be inferred.

Data for four resistivity lines were collected at the site between June 3 and June 5, 2025. Fracture zones tend to be characterized by low-resistivity zones within the high-resistivity bedrock. Potential drilling targets tend to be characterized by vertical or near-vertical low-resistivity zones within the bedrock. The most promising drilling targets are those with a very high contrast in resistivity between the low-resistivity zones and that of the surrounding bedrock. Three drilling targets were identified at electrodes 2-48, 3-56, and 4-74. These targets were ranked according to their perceived likelihood of productivity, but this ranking is subjective and the actual yield of the wells may not follow this order.

1. Introduction

GeoScience Professionals, LLC (GSP) was retained by CHA to conduct a water supply well study at the Larkin well site in Nelson County, Virginia. The objective of this study was to identify one or more drilling targets for water supply wells. The study area consists of approximately 140 acres on the west side of US 29 north of Nelson County High School (Figure 1).

2. Geologic Setting

No detailed geologic maps have been published for the site. The state-wide geologic map of Virginia indicates that the site is underlain by Proterozoic age alkali feldspar leucogranite (Figure 2). The published geologic map does not depict any of the local geologic structures that could help in siting water supply wells. The topography of the site and surrounding area was examined for topographic patterns that might reveal faults or fracture zones, but no patterns are observable (Figure 3).

3. Resistivity Imaging

To provide continuous imaging of the subsurface beneath the site for evaluation of geologic features, two-dimensional surface resistivity imaging methods were employed. Two-dimensional resistivity methods provide cross-sectional images of the resistance of subsurface materials to electric current, from which geologic conditions can be inferred. Electrical resistivity is a parameter intrinsic to the material describing how easily it can transmit electrical current. High values of resistivity imply that the material is very resistant to the flow of electricity; low values of resistivity imply that the material transmits electrical current very easily.

3.1. Principles of Resistivity

Experiments by George Ohm in the early 19th century revealed the empirical relationship between the current flowing through a material and the potential required to drive that current. This relationship is described by

$$V = IR$$

where V is voltage in volts, I is the current in amperes, and R is the proportionality constant. Rearranging the equation to

$$\frac{V}{I} = R$$

gives resistance with the units of volts divided by amperes, or ohms.

The resistance of a material is dependent not only on the property of the material but also the geometry of the material. Specifically, a longer travel path for the current or smaller cross-sectional area would cause the resistance to increase. The geometry-independent property used to quantify the flow of electric current through a material is resistivity, given by

$$\rho = \frac{RA}{L}$$

where ρ is resistivity, R is resistance, A is the cross-sectional area through which the current flows, and L is the length of the current flow path. With all length units expressed in meters, the units associated with resistivity are ohm-meters.

Resistivity data are collected by inducing an electric current into the ground between two electrodes and measuring the potential at other electrodes. Numerous configurations of electrode placement are commonly employed, each with unique data characteristics. The configuration utilized for this study was the dipole-dipole array with strong gradient (Stummer et al., 2004). For the dipole-dipole array, a current is applied to two adjacent electrodes positioned a predetermined distance apart (distance *a*). The voltage across two other electrodes is measured simultaneously with the applied current. The two sets of electrodes are always spaced distance *a* apart, and the distance between the current and voltage electrodes is always a multiple of *a* (*n*•*a*).

3.2. Field Methods

Data for four resistivity lines were collected at the site between June 3 and June 5, 2025. Field data were collected using a SuperSting R8 IP® multi-electrode resistivity system manufactured by

Advanced Geosciences Inc. Data were collected using the dipole-dipole array with injected current of up to 2,000 milliamps. For each electrode configuration in the array, measurements were repeated a minimum of two times or until the error between measurements was less than or equal to two percent.

Because the topography did not reveal fracture or fault patterns, the resistivity lines were collected in a variety of orientations to intercept potential fracture zones at may have no expression in the topography. All of the resistivity lines consisted of 84 electrodes spaced six-meters (19.7 feet) apart for total line lengths of 498 meters (1,633 feet) each. The electrodes on each line were assigned a unique identifier consisting of the line number followed by a dash and the electrode number. For example, the first electrode on Line 1 is 1-1, the first electrode on Line 2 is 2-1, etc. The locations of every fifth electrode were marked in the field with a vinyl wire stake flag labeled with the electrode identifier. These electrode locations were also recorded with a handheld GPS and plotted onto a color relief terrain model of the site (Figure 4). The elevations of the electrodes were digitized from the terrain model of the area and were incorporated into the resistivity data so that the resulting resistivity sections would approximate the local topographic relief.

3.3. Inversion Modeling

The resistivity measurements collected in the field are called apparent resistivities. They may differ from the actual resistivities because of passage through inhomogeneous materials and the distance of travel through the media. Therefore, linear inversion techniques were applied to the data. Linear inversion modeling fits the apparent resistivities to an earth model that approximates the actual resistivities in the section. The inversion modeling is completed by calculating apparent resistivity from the earth model for comparison to the measured data. If the comparison is within reasonable limits, the earth model can be accepted as an approximation of subsurface conditions. Details of the inversion process may be found in Lines and Treitel (1984), Loke and Barker (1995), and Loke and Barker (1996).

The modeling software allows the removal of bad data points when initially reading the data file, and during the efforts to bring the model to a reasonable solution. The models for all four data sets solved to less than a root mean square error of six percent with minimal data trimming, indicating high-quality, reliable field data.

4. Results and Recommended Drilling Targets

The primary factors affecting the resistivity of earth materials are porosity, water saturation, clay content, and mineralogy. In general, the minerals making up soils and rock do not readily conduct electric current and thus most of the current flow takes place through the material's pore water. The relatively high levels of pore water in soils and other unconsolidated materials tend to result in low resistivity values for the upper subsurface. Rock contains significantly less pore water than soils resulting in generally higher resistivity values at depth.

Another significant factor affecting resistivity is material grain size. Resistivity tends to be correlated to grain size so that fine-grained materials such as clay or shale tend to have lower resistivity than course-grained materials such as sand, gravel, sandstone, etc.

All four of the resistivity lines display low resistivities in the shallow subsurface which is typical of moist soils. Below the low-resistivity soil, the bedrock surface is characterized by an abrupt increase in resistivity because bedrock typically contains much less moisture than soil (Figure 5). Fracture zones tend to be characterized by low-resistivity zones within the high-resistivity bedrock. Potential drilling targets tend to be characterized by vertical or near-vertical low-resistivity zones within the bedrock. The most promising drilling targets are those with a very high contrast in resistivity between the low-resistivity zones and that of the surrounding bedrock. Such a feature is displayed on Line 2 beneath electrodes 2-47 and 2-48 (Figure 5). Though the resistivity contrast is not as large as we would like to see, we consider this the most promising drilling target and have identified it as Target #1. Because the feature has a slight dip to the west, we have identified the target at electrode 2-48.

A similar but slightly weaker resistivity contrast is displayed on Line 3 beneath electrodes 3-33 and 3-34. Because this feature displays a slight dip to the west, we have identified this drilling target at 3-56 as Target #2.

A third potential target is located at the northern end of Line 4 beneath electrodes 4-71 through 4-75. Because this target is at the tapered end of the resistivity section we cannot tell if this zone is vertically extensive. As such, this target is deemed the least prospective of the targets and is designated Target #3 at 4-74. It should be noted that the ranking of these targets is subjective based on the pattern of resistivities and our previous experience. This ranking does not mean that

the higher ranked targets will necessarily produce more water than the lower ranked targets. All of these recommended drilling locations are presented in map view on Figure 6.

5. Limitations

This study was conducted by qualified professionals with extensive experience in the collection, processing, and interpretation of geophysical data. However, no scope of work or extent of professional experience can guarantee successful well drilling.

6. References

Lines, L.R., and S. Treitel, 1984. A review of least-squares inversion and its application to geophysical problems, Geophysical Prospecting, Vol. 32, Pages 159-186.

Loke, M.H., and R.D. Barker, 1995. Least-squares deconvolution of apparent resistivity pseudosections, Geophysics, Vol. 60, No. 6, Pages 1682 1690.

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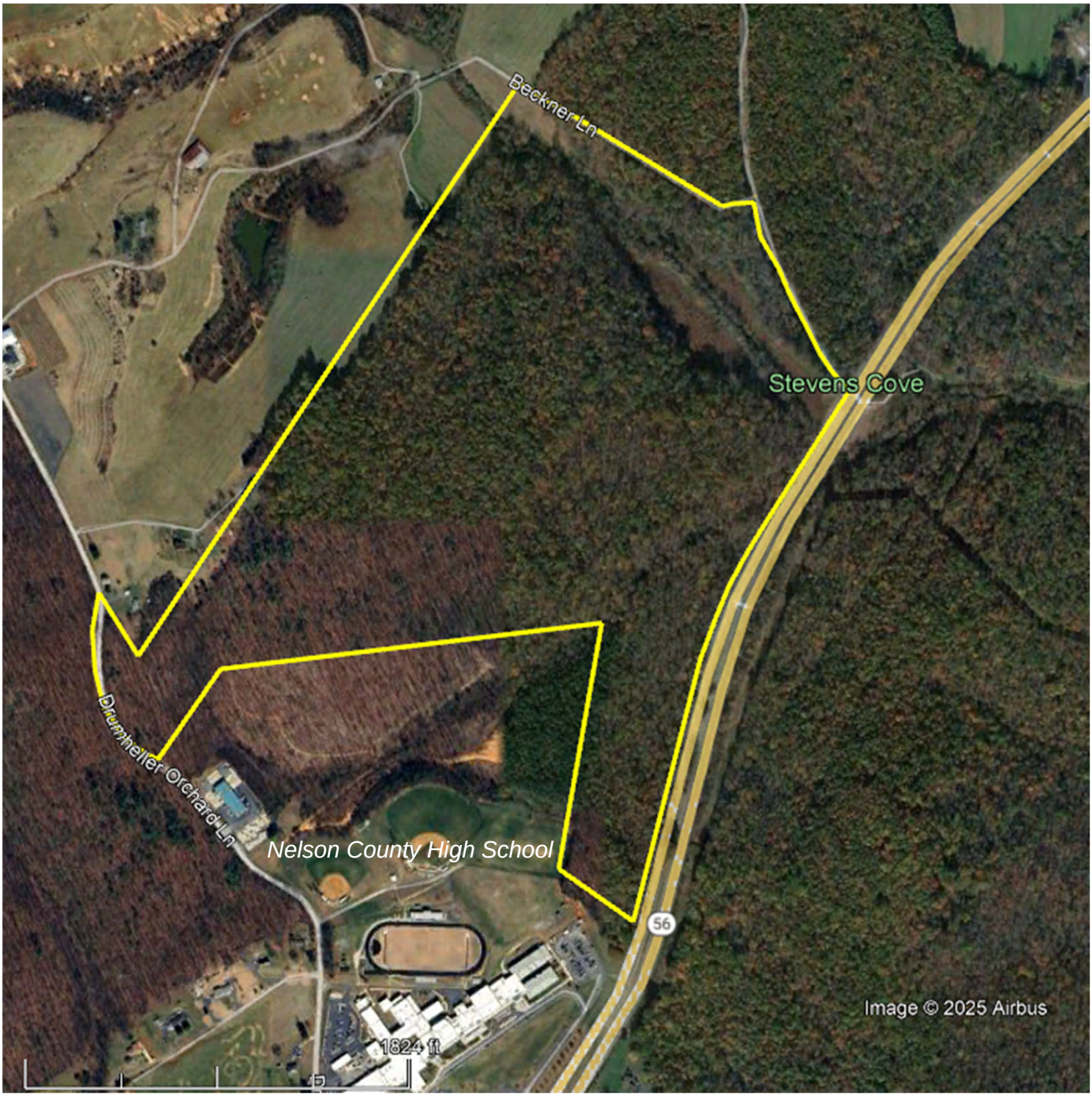
Virginia Division of Mineral Resources, 1993. Geologic Map of Virginia: Virginia Division of Mineral Resources, scale 1:500,000.

7. Figures



N

Report Title: *Water Supply Well Study at the Larkin Well Site, Nelson County, Virginia*	*Figure 1. Air photo depicting the approximate site boundary.*
File Name: *Larkin pt.ppt*	
Date: *06/12/25*	Project No: *P25-04*

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Yal

ALKALI FELDSPAR LEUCOGRANITE

Leucocratic, coarse grained to megacrystic, equigranular to porphyritic granite contains white alkali feldspar phenocrysts and interstitial blue quartz, with accessory biotite, pyroxene, and garnet (USGS, 2025).

0 2 miles

N

Report Title: *Water Supply Well Study at the Larkin Well Site, Nelson County, Virginia*	*Figure 2. A portion of the published geologic map of the site depicting the local geology. After Virginia Division of Mineral Resources (1993) and U.S. Geological Survey (2025).*
File Name: *Larkin pt.ppt*	
Date: *06/12/25* Project No: *P25-04*	

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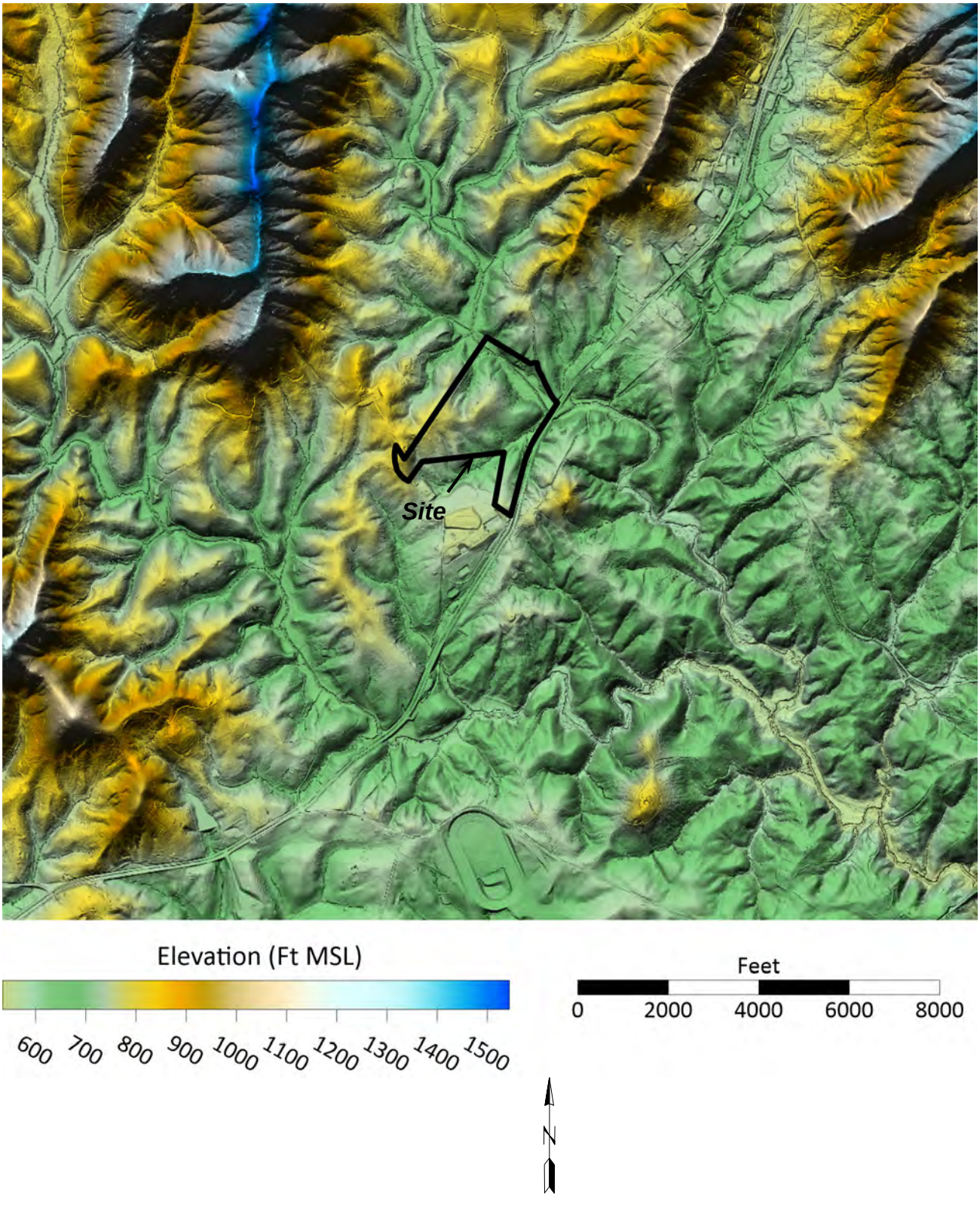
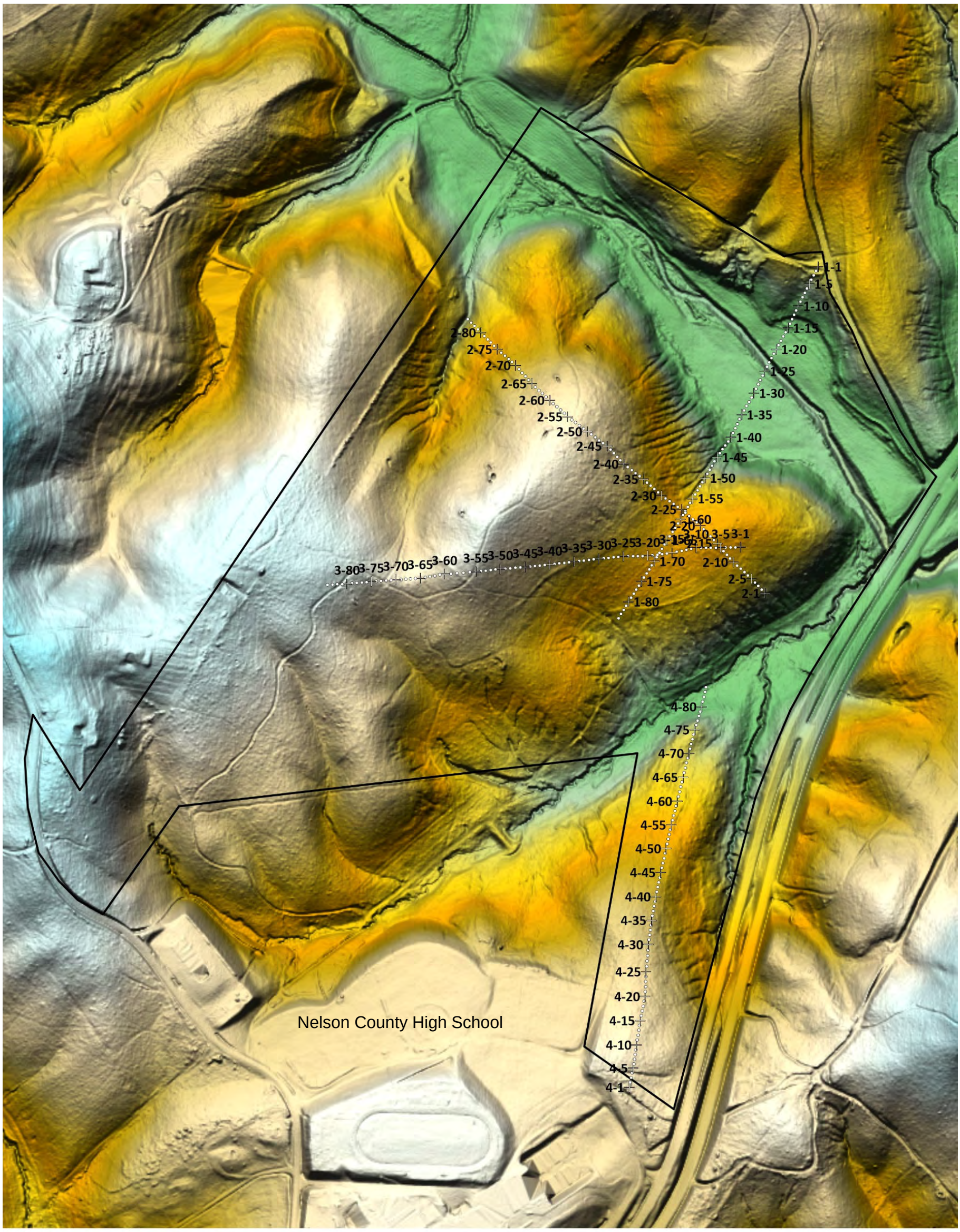
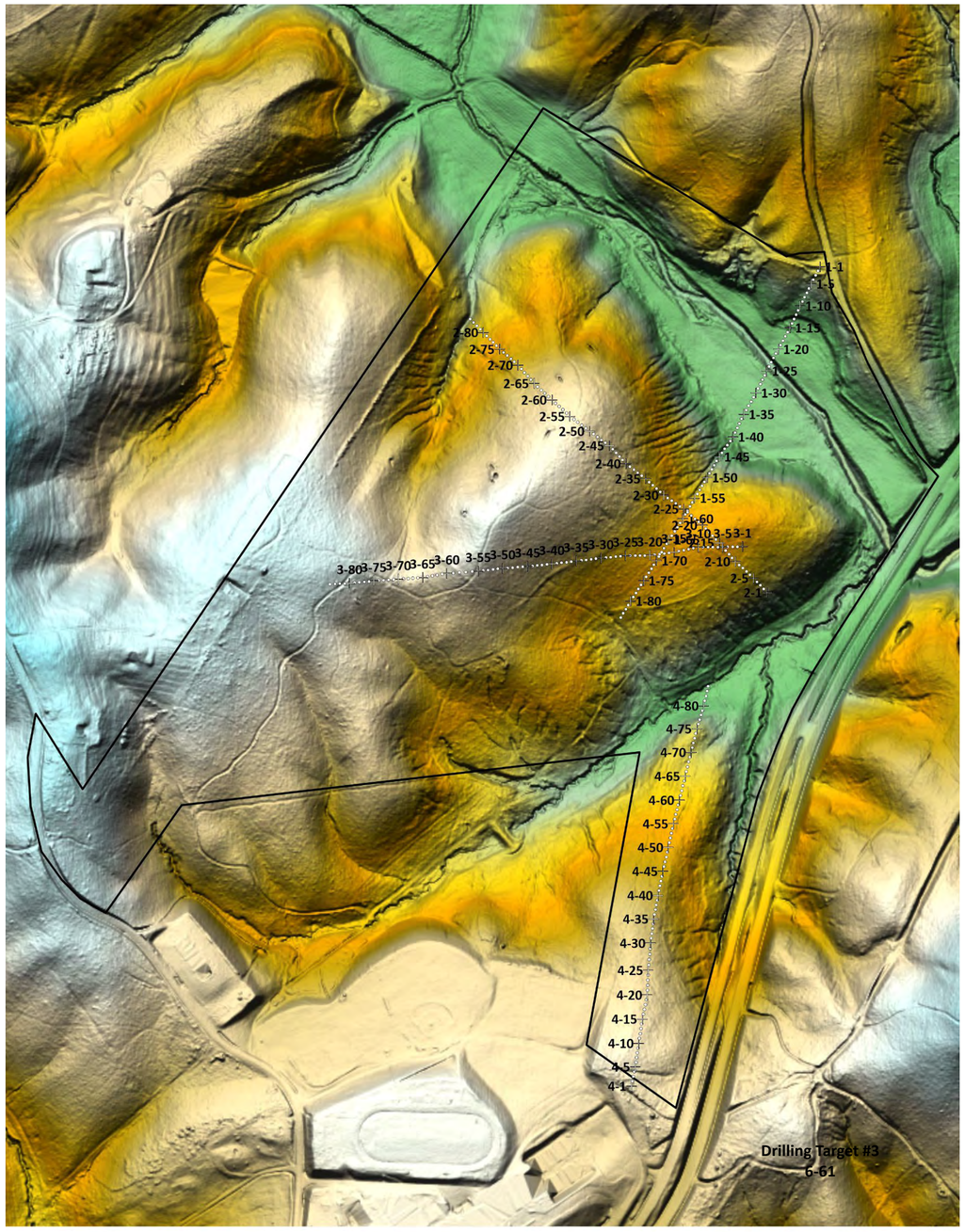


Report Title: *Water Supply Well Study at the Larkin Well Site, Nelson County, Virginia*	*Figure 3. A color relief terrain model of the topography of the site and surrounding area.*	GEOSCIENCE -PROFESSIONALS- *Hydrogeology • Engineering Geology • Geophysics* 40 Nancy Court Christiansburg, VA 24073 Phone: (540) 998-8861 www.geoscience-pros.com
File Name: *Larkin pt.ppt*		
Date: *06/12/25* Project No: *P25-04*		



Report Title: *Water Supply Well Study at the Larkin Well Site, Nelson County, Virginia*	*Figure 4. A color relief terrain model of the site depicting the four resistivity lines.*	GEOSCIENCE PROFESSIONALS *Hydrogeology • Engineering Geology • Geophysics* 40 Nancy Court Christiansburg, VA 24073 Phone: (540) 998-8861 www.geoscience-pros.com
File Name: *Larkin tb pt,pptx*		
Date: *06/12/25* GSP Proj. No.: *P25-04*		



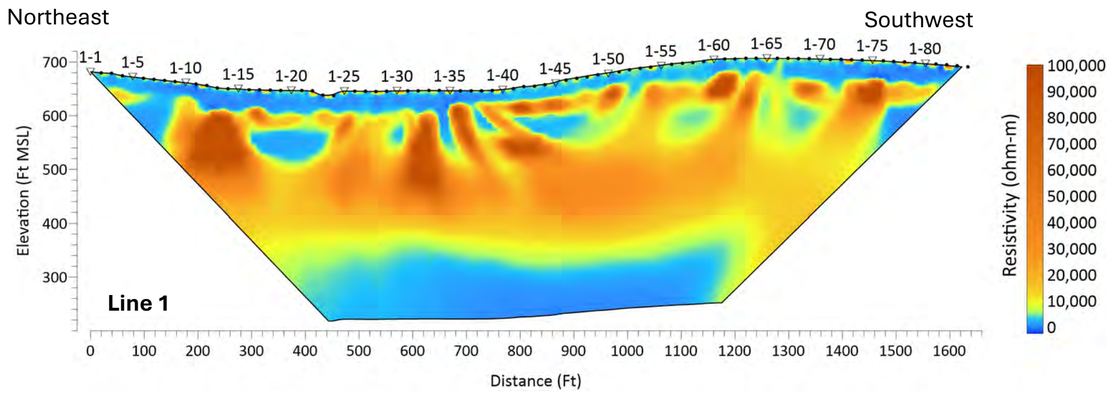
Elevation (Ft MSL)

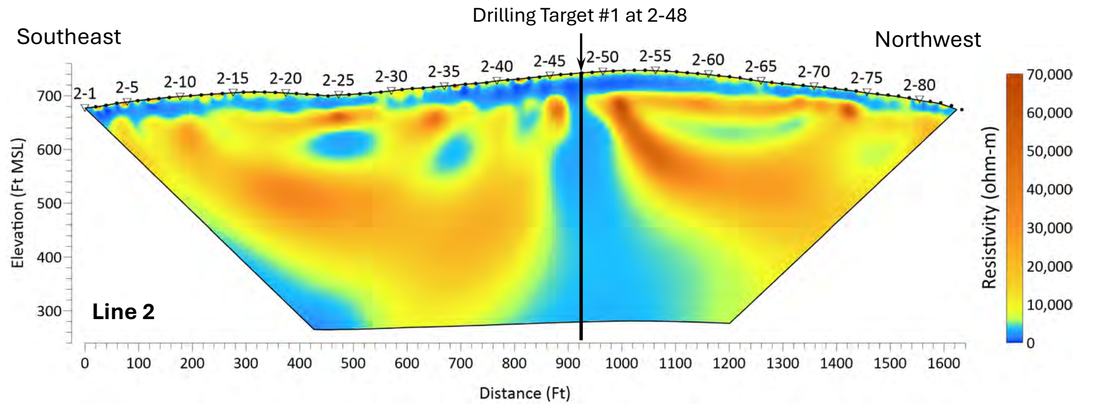
640 660 680 700 720 740 760 780 800 820 840

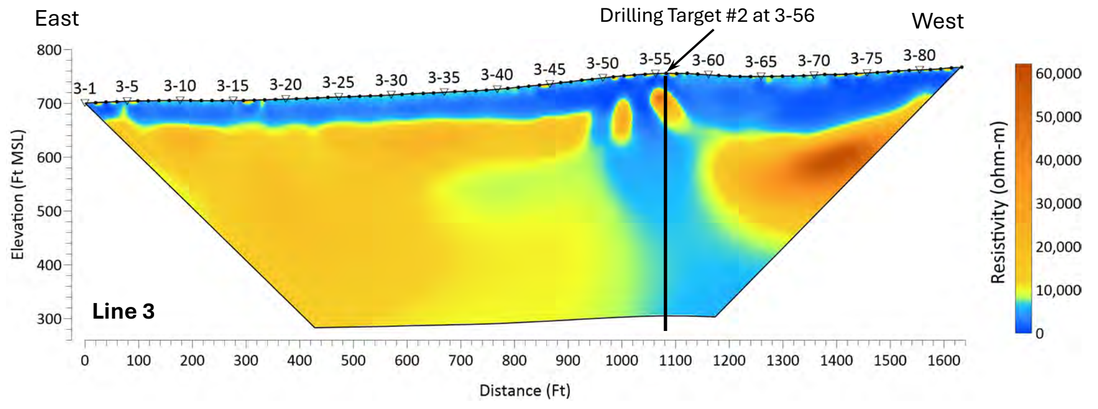
N

Feet

0 400 800







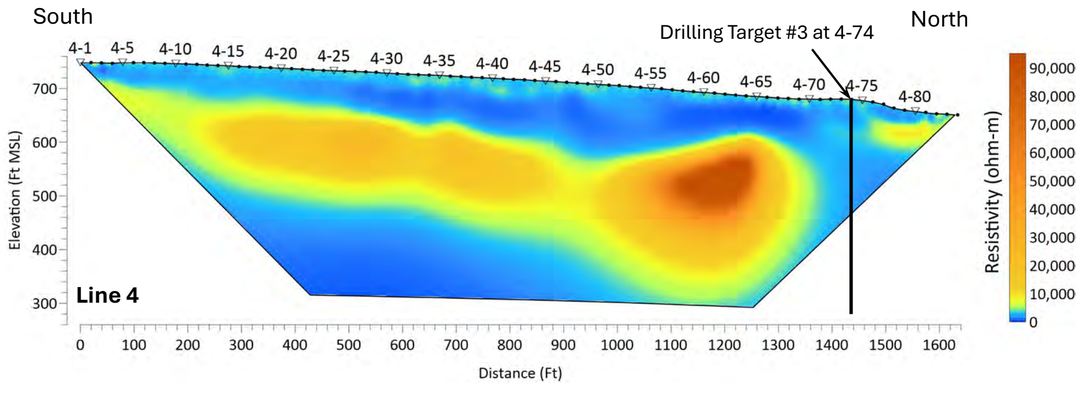


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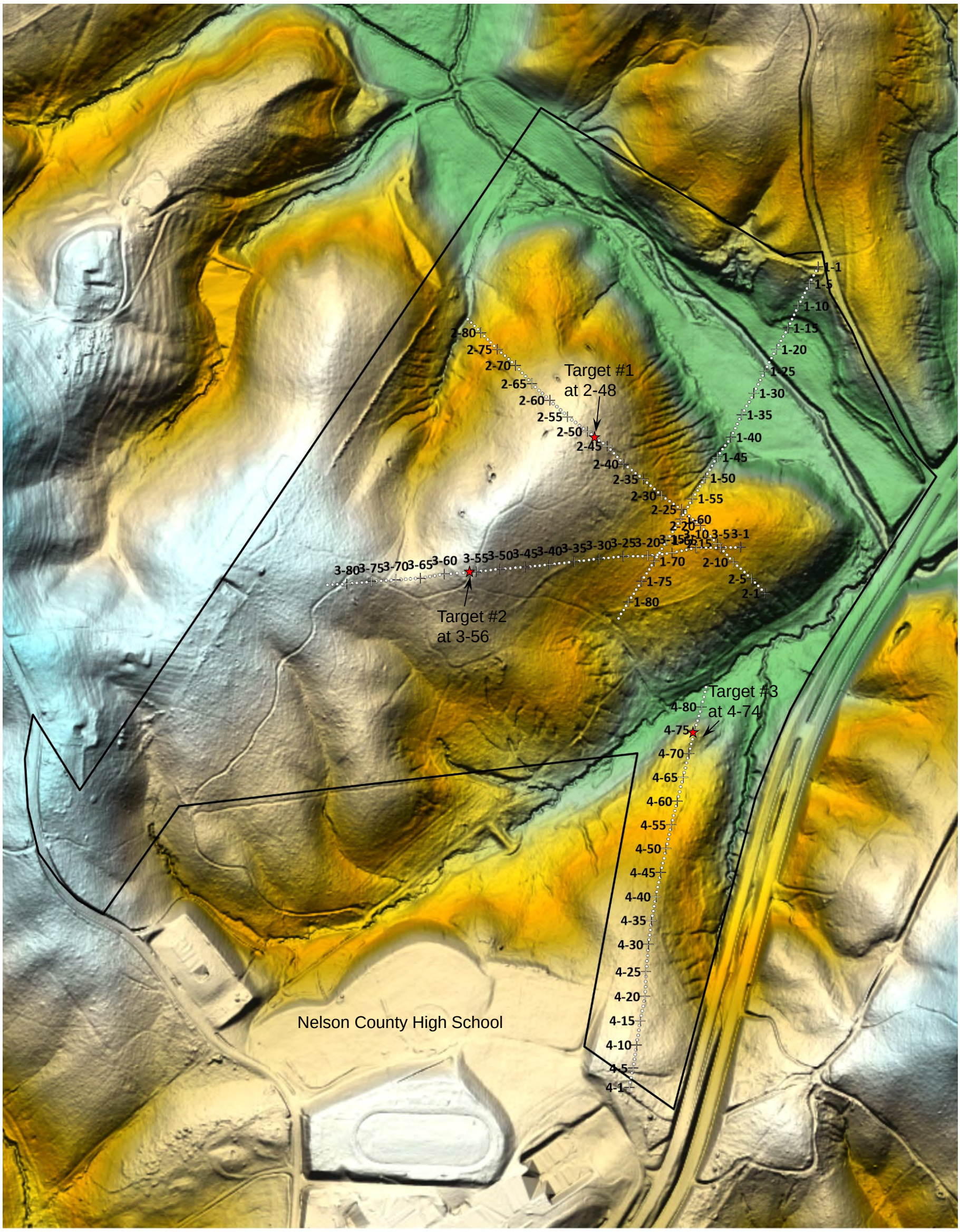
Figure 5. Resistivity results and prospective drilling targets.

Report Title: *Water Supply Well Study at the Larkin Well Site, Nelson County, Virginia*

File Name: *Larkin 24X18 ls.pptx*

Date: *06/12/25*

Project No: *P25-04*



Report Title: *Water Supply Well Study at the Larkin Well Site, Nelson County, Virginia*	*Figure 6. Map locations of the drilling targets.*	GEOSCIENCE PROFESSIONALS *Hydrogeology • Engineering Geology • Geophysics* 40 Nancy Court Christiansburg, VA 24073 Phone: (540) 998-8861 www.geoscience-pros.com
File Name: *Larkin tb pt,pptx*		
Date: *06/12/25* GSP Proj. No.: *P25-04*		

Memorandum

To:	Candy McGarry, County Administrator, Nelson County	**Project:**	Nelson County Source Water Evaluation
From:	Amanda Marsh, Project Manager, CHA Consulting, Inc.	**Date:**	July 10, 2025
CHA PN:	100648	**RE:**	Dillard Creek Water Source Evaluation

Executive Summary

Nelson County is exploring Dillard Creek, which traverses the recently acquired Larkin property, as a potential surface water source to support future development. A 2024 Water and Sewer Capacity Analysis report identified a need for an additional 81,940 gallons per day (GPD) (~0.082 million gallons per day (MGD)) to meet projected demand. The key objectives of the evaluation are to evaluate Dillard Creek's capacity to serve as a reliable water source by estimating streamflow with regard to needed future water demand; identify any threatened and endangered species and migratory fish in the project area and assess potential impacts of these species on withdrawal permitting; outline permitting requirements; and estimate associated costs of water withdrawal permitting, engineering, construction, and operation.

Dillard Creek Withdrawal Evaluation

- No direct USGS gage exists on Dillard Creek; as such, the Tye River gage (USGS 02027000) was selected as a surrogate to estimate Dillard Creek flows due to its proximity and similar watershed characteristics.
- Using drainage area scaling and the Tye River gage data for the 25-year period of January 1, 2000 to December 31, 2024, the average daily flow at Dillard Creek is estimated at 8.3 MGD, with a median flow of 5.0 MGD.
- A typical DEQ Virginia Water Protection (VWP) permit 10% withdrawal limit would allow for an **average** withdrawal of 0.83 MGD.

Historic Low Flow Periods

- During typical low-flow months of July and August, **monthly average** flows would support the required 0.082 MGD withdrawal.
- During the 2002 severe drought year, creek flow was too low on 30% of days for the projected needed demand. During these days, supplemental water would be required to meet the projected demand.

Permitting

- A VWP permit will be required for intake construction and water withdrawals which will include conditions on intake design, flow monitoring, and construction as well as withdrawal limitations.

Endangered and Threatened Species

- There are threatened and endangered aquatic species possible in the project area; potential impacts are believed to be minimal but environmental agencies may require site-specific evaluations.
- A low-level dam may be necessary to ensure adequate stream depth for water withdrawals, though it could face regulatory and ecological challenges.

Preliminary Cost Estimates

- Withdrawal permitting (Application prep and DEQ fee): $40,000–$50,000
- Dam installation permitting: $50,000-$75,000

- Special studies (e.g., endangered species, archaeology): $10,000–$25,000 per study
- Intake, pump station and water treatment system engineering and construction are estimated at $6.5M with operations and maintenance costs between $150,000 - $250,000 annually.

Conclusion

- Dillard Creek appears to have sufficient flow to meet future water needs under normal conditions. However, seasonal variability, environmental constraints, potential costs, and the need for supplemental water during drought conditions must be carefully considered.

Background and Objectives

In 2024 CHA Consulting Inc. completed a Water and Sewer Capacity Analysis for the Nelson County Larkin property that showed additional water source(s) would be needed to support future residential and recreational site development included in the master plan for the site. This analysis estimated an additional 81,940 GPD (or approximately 0.082 MGD) of water is needed to support future development of the property. As a follow-up to the 2024 analysis, CHA evaluated Dillard Creek, a portion of which runs through the Larkin property, as a potential surface water source to support future development of this property.

Photograph 1. Dillard Creek on Larkin Property.

The following objectives formed the basis of the evaluation of the potential Dillard Creek surface water source:

1. Identify an appropriate United States Geological Survey (USGS) gage in the area and the associated stream flow data to project estimated Dillard Creek flows and determine if there is potential for this creek to support development of the property.
2. Identify potential intake locations and the corresponding estimated flows.
3. Determine whether endangered or threatened species or other species concerns that may be in the areas upstream and downstream of the potential withdrawal location and assess the potential impacts of any such species on potential intake location and withdrawal volumes.
4. Identify potential permit conditions that are expected to be included in a Virginia Water Protection (VWP) permit that will be required for surface water withdrawal activities including withdrawal limitations, intake construction requirements and operations and reporting requirements.
5. Estimate permitting and capital and operational costs for a withdrawal location along Dillard Creek.

USGS Gage Station Identification and Stream Flow

The project area is located southwest of Lovingston in Nelson County. There are no permanent or temporary USGS gages or stream monitoring locations on Dillard Creek that can be used to determine creek flows based on actual stream flow data. In such circumstances, the Virginia Department of Environmental Quality (DEQ) and other agencies will use stream flow from USGS gages in nearby watersheds to project flows for those streams without USGS gages. CHA identified and assessed three real-time monitoring USGS gages located in the general project area around Lovingston from the USGS National Water Dashboard interactive map (https://dashboard.waterdata.usgs.gov/app/nwd/en/).

- USGS 02027000 Tye River Near Lovingston, VA
- USGS 02027500 Piney River at Piney River, VA
- USGS 02026000 James River at Bent Creek, VA

The James River upstream of Bent Creek encompasses multiple geophysical and hydrogeological regimes, some of which are not consistent with those of Nelson County and the Dillard Creek watershed. In addition, the James River watershed is substantially larger than the Dillard Creek watershed. As such, it was determined to not be a good watershed for drainage area comparisons.

Nelson County is the location of the headwaters of the Tye River, and the portion of the river measured by the gage referenced above has a much smaller drainage area and streamflow and more

representative of the hydrogeology of Dillard Creek than the downstream gage on the James River. The gage on the Tye River is also closer to the project site than the gage on the Piney River which is located further west. In addition, it appears DEQ utilized the Tye River gage for Dillard Creek flow projections for the development of the Nelson County Sewage Treatment Plant's VPDES permit, indicating agency acceptance of this data set for flow determinations. As such, the Tye River Near Lovingston, VA (02027000) gage was selected for review of the stream data since it is closer to the project area and is believed to provide more representative data.

The Piney River watershed is similar to the Tye River watershed's geophysical and hydrogeological regimes but is located further from Dillard Creek than the Tye River gage. As such, the Piney River gage data was used as a secondary data source for comparison to the Tye River gage data. Table 1 summarizes the USGS gages/flow monitoring locations and streamflow data for the Tye River and Piney River gages.

Table 1. USGS Gage in Nelson County on the Tye River.

Waterbody Name	Gage Identification	Latitude/ Longitude	Drainage Area (square miles)	Average Daily Streamflow Data	cfs/ Square Mile	Comments
Tye River	USGS 02027000 Tye River Near Lovingston, VA	37°42'55"N 78°58'55"W	93.0	103 MGD (160 cfs)	1.72	Real-time data(1) (10/1/1938 -to 4/9/2024)
Piney River	USGS 02027500 Piney River at Piney River, VA	37°42'08"N 79°01'40"W	47.7	61.4 MGD (95 cfs)	1.99	Real-time data(2) (10/1/1949 -to 9/30/2015)

(1) Used daily mean flows from USGS gage data from https://waterdata.usgs.gov/va/nwis/rt to calculate.

(2) Used statistics included from the USGS StreamStats application for this gage.

Dillard Creek Withdrawal Location

Flows in surface water bodies are influenced by several factors including the amount of watershed drained. In general, stream flows are expected to be the greatest in the downstream sections of the County where watershed areas are larger; however, the location of the potential withdrawal is limited to the location of the newly acquired property owned by the County. Thus, the evaluation was limited to this section of Dillard Creek on the property.

Dillard Creek Flow Evaluation Approach

The data from the Tye River reference gage can be extrapolated to provide estimated flow data for the Dillard Creek project location. The data extrapolation accounts for the additional drainage area of the reference gage, and the formula used is:

$$Q_{ungaged} = \underline{A_{ungaged}} / A_{gaged} * Q_{gaged}$$

where

$Q_{ungaged}$:	Flow at the ungaged location
Q_{gaged}:	Flow at surrogate USGS gage station
$A_{ungaged}$:	Drainage area of the ungaged location
A_{gaged}:	Drainage area at surrogate USGS gage station

The drainage area for the Dillard Creek withdrawal location along US-29 (Thomas Nelson Highway) near Lovingston was calculated and was compared to the watershed at the Tye River reference USGS Gage. Twenty-five years of data from January 1, 2000 through December 31, 2024 from the Tye River gage were used to project flows for the Dillard Creek withdrawal location since this period is considered to be more representative of current climatic and stream flow conditions than the entire data set beginning in 1938. This 25-year period also includes recent major drought periods. DEQ may select a different timeframe for the development of VWP permits required for the installation and operation of an intake, but it is not anticipated that this will have a significant impact on their calculations.

The drainage area at the Tye River Near Lovingston, VA gage is 93.0 square miles while the drainage area at the Larkin Property just north of Thomas Nelson Highway (US 29) was determined to be ~7.3 square miles using the USGS StreamStats application. The section of Dillard Creek represents approximately 8% of the Tye River watershed at the Tye River Near Lovingston, VA gage location. Using a drainage area comparison approach frequently used by Virginia regulatory agencies, the flow at the County line is assumed to be approximately 8% of the flow at the selected gage location. Figure 1 shows the location of the drainage area for the gages and drainage areas for the Tye River, Piney River, and the potential intake location on Dillard Creek.

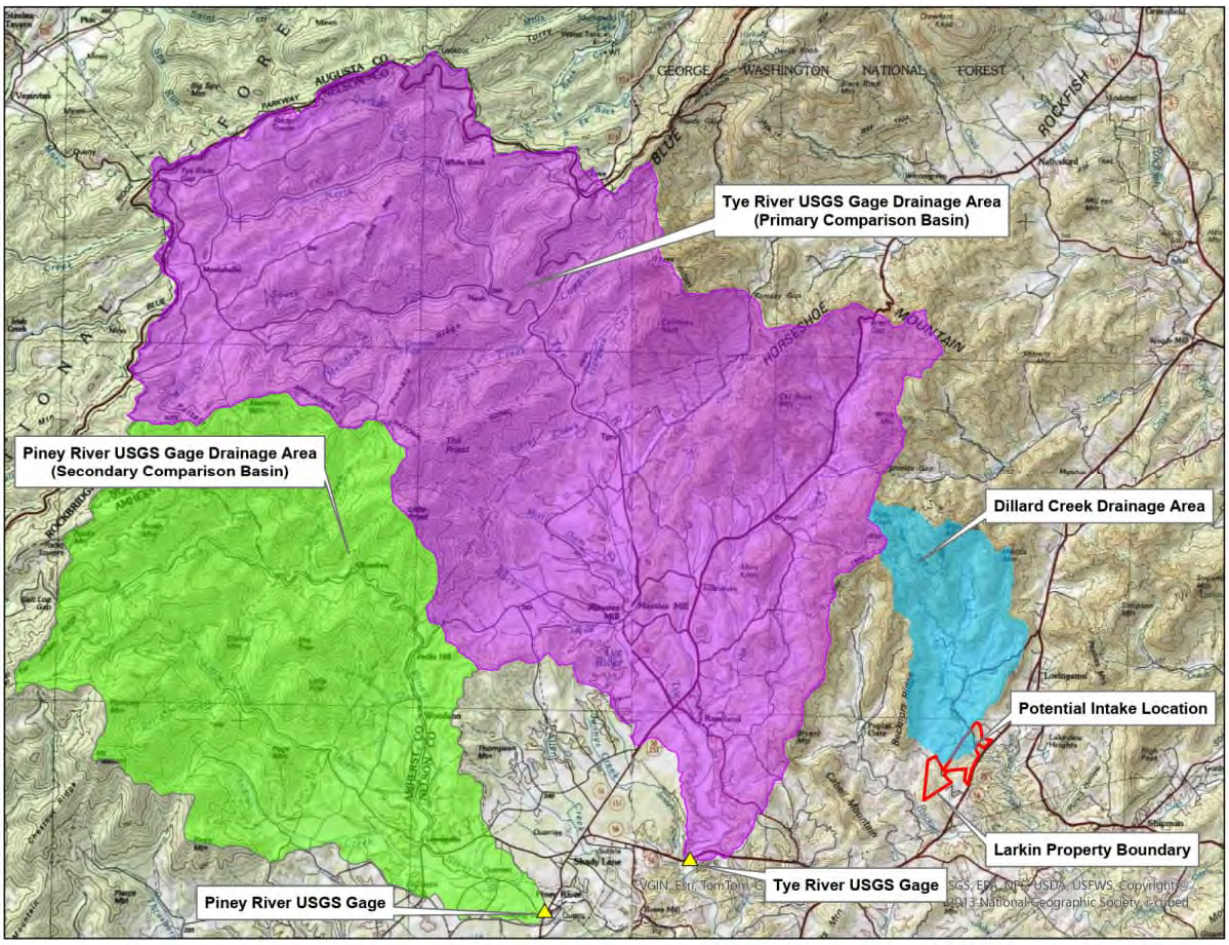


Figure 1. USGS Gages and Drainage Areas and Drainage Area of Potential Intake Location on Dillard Creek.

Projected Flows for Dillard Creek

The sections below analyze the data with consideration to average flows over a long-term period, monthly flow distribution over a long-term period, daily volume frequency flow distribution projections, and potential withdrawals during historic drought conditions.

Average Flows

The average flow data for the Tye River gage 25-year period was used in conjunction with the watershed size ratio to estimate average flows in Dillard Creek ($Q_{ungaged}$). For that 25-year period, there are 9,132 data points representing the average daily flow for the Tye River gage. The results are shown in the table below.

Table 2. Estimated Average Daily Streamflow for the Tye River Reference Location.

Stream	USGS Gage ID	A_{gaged} (Tye River Drainage Area)	$A_{ungaged}$ (Dillard Creek Drainage Area)	Q_{gaged} (Average Daily Tye River Flow)	$Q_{ungaged}$ (Estimated Average Dillard Creek Flow)
Tye River	02027000 Tye River Near Lovingston, VA	93 sq. miles	7.3 sq. miles	103 MGD (160 cfs)	8.3 MGD (12.8 cfs)

Notes: 1. Tye River flow based on the last 25-year period.
2. Dillard Creek flows at the reference location near US 29.

As depicted, the **average** estimated flow at Dillard Creek is 8.3 MGD. Assuming a typical 10% flow withdrawal limitation in a VWP withdrawal permit, the **average** available withdrawal at this location is estimated at 0.83 MGD.

Using this estimated Dillard Creek flow information, a median flow can also be determined (the median value of a set of numbers is the value at which half of the numbers in the set are below it, and the other half are above it). The **median** estimated flow in Dillard Creek is 5.0 MGD. The corresponding 10% withdrawal volume based on **median** creek flow is 0.50 MGD, and the minimum withdrawal volume was estimated at 0.003 MGD. The estimated streamflow depicted in Table 2 does not account for monthly or seasonal variations. These monthly and seasonal variations are described in the sections below.

As confirmation of the initial results of the calculated estimated flow at the Larkin property using the Tye River gage data, the Piney River average daily flow data from the StreamStats report of 95.2 cfs with its drainage area of 47.7 square miles calculates to 1.99 cfs/mile^2 as show in Table 1. Extrapolating the data for the drainage area size associated with the potential for a withdrawal on Dillard Creek on the Larkin property using the Piney River data, the estimated streamflow on Dillard Creek is 9.4 MGD (14.5 cfs). This projected flow is close to the estimate using the Tye River gage data and supports the Dillard Creek flow estimated described herein.

Monthly Flow Distribution Projections

The average daily streamflow data by month for the last 25 years was obtained for the reference gage on the Tye River and was used in conjunction with the drainage area information from the potential intake location on Dillard Creek near US-29 to determine estimated average streamflow for each month to better understand potential seasonal flow variations. These data are summarized in the table below.

Table 3. Monthly Average Streamflow for the Dillard Creek Location.

Month	Average Discharge at Tye River Near Lovingston, VA 02027000 (cfs)	Estimated Average Flow at the Dillard Creek Location (cfs)	Estimated Average Flow at the Dillard Creek Location (MGD)	10% of Average Flow at Dillard Creek (MGD)
January	192.5	15.4	9.9	1.0
February	192.4	15.4	9.9	1.0
March	215.0	17.2	11.1	1.1
April	234.8	18.8	12.1	1.2
May	203.4	16.3	10.5	1.1
June	130.3	10.4	6.7	0.7
July	70.5	5.6	3.6	0.4
August	64.9	5.2	3.4	0.3
September	129.3	10.3	6.7	0.7
October	103.5	8.3	5.3	0.5
November	168.5	13.5	8.7	0.9
December	217.0	17.4	11.2	1.1

As described previously, the **annual average** projected flow of Dillard Creek is 8.3 MGD. Using a 10% VWP permit withdrawal limit, the **average** allowable withdrawal is 0.83 MGD at the reference flow location on Dillard Creek. As shown on the table above, there are significant monthly and seasonal variations in the projected Dillard Creek flow that would change the actual withdrawal volume limits throughout the year. The projected Dillard Creek flow is lowest during the summer and fall periods. The lowest average streamflow months are July and August, followed by October. These data indicate that even during the low flow months, the **monthly average daily flow** is greater than the projected demand of 0.082 MGD.

Daily Volume Frequency Flow Distribution Projections

While the average daily flow and monthly average flow data are helpful parameters to determine the feasibility of Dillard Creek as a potential water source, it is also important to understand the frequency of low flow events that could result in a withdrawal limitation that is less than the 0.082 MGD projected water demand.

The table below summarizes the percentages of days during the last 25 years in which withdrawal volumes (10% of the estimated Dillard Creek flow) are equal to or greater than selected incremental volumes, ranging from 0.3 MGD to 5.0 MGD.

Table 4. Volume Frequency Flow Distribution Projections at the Potential Withdrawal Location.

Flow Tier	Dillard Creek Flow	10% of Flow at Dillard Creek	Percentage of Days When Dillard Creek Flows Exceed Flow Tier	Percentage of Days When Dillard Creek Flows Do Not Exceed Flow Tier
1	0.3 MGD	0.03 MGD	98.2%	1.8%
2	0.4 MGD	0.04 MGD	97.7%	2.3%
3	0.5 MGD	0.05 MGD	97.0%	3.0%
4	0.6 MGD	0.06 MGD	96.1%	3.9%
5	0.7 MGD	0.07 MGD	94.9%	5.1%
6	**0.8 MGD**	**0.08 MGD**	**93.3%**	**6.7%**
7	0.9 MGD	0.09 MGD	91.8%	8.2%
8	1.0 MGD	0.1 MGD	90.5%	9.5%
9	2.0 MGD	0.2 MGD	77.9%	22.1%
10	3.0 MGD	0.3 MGD	67.1%	32.9%
11	4.0 MGD	0.4 MGD	57.4%	42.6%
12	5.0 MGD	0.5 MGD	49.7%	50.3%

With a desired withdrawal of approximately 0.08 MGD to meet the projected demands, the flow at the Dillard Creek withdrawal location needs to be 0.8 MGD or more on a daily basis. As indicated in bold text in the table above, the average daily flow at the withdrawal location on Dillard Creek would **not** support a withdrawal of 0.08 MGD on approximately 6.7% of the days based on the past 25 years of Tye River flow data. **This represents 615 days (1.7 years) over the last 25 years.**

Potential Withdrawals During Drought Flows

During extended low flow conditions, VWP permit requirements may limit withdrawals to less than the projected 0.082 MGD demand for extended periods. Virginia has experienced a number of multi-year droughts including the 1999-2002, 2007-2008, and 2010-2012 periods (https://www.drought.gov/states/virginia). The table below summarizes the annual mean flows for those years and includes the corresponding withdrawals that would have been possible assuming the same maximum 10% withdrawal limitation.

Table 5. Flows During Historic Drought Years and Associated Potential Withdrawals.

Year	Annual Mean Flow at Tye River Near Lovingston, VA 02027000 (cfs)	Estimated Flow at the Dillard Creek Location (MGD)	10% of Flow at Dillard Creek (MGD)	Days / Year When Dillard Creek Flow Would Have Been Less than 0.82 MGD[(1)]
1999	145	7.5	0.75	60
2000	100.5	5.2	0.52	0
2001	71.9	3.7	0.37	64
2002	62.9	3.3	0.33	112
2007	106.3	5.5	0.55	94
2008	95.1	4.9	0.49	71
2010	164.4	8.5	0.85	47
2011	183.7	9.5	0.95	2
2012	96.8	5.0	0.50	2

(1) This column indicates the number of days within the corresponding year that the projected demand of 0.082 MGD could not be withdrawn from Dillard Creek.

As shown on Table 5, the lowest **annual mean** flow at the Tye River gage was 2002 when the flow was 62.9 cfs. The corresponding estimated 10% of flow at Dillard Creek (MGD) is 0.33 MGD. During this 2002 drought period, withdrawals would have been limited to less than the 0.082 MGD projected demand on 112 days, or 30% percent of the year.

Extended Withdrawal Limitation Periods

In addition, the flow projections determined herein indicate that there will be days and periods of multiple consecutive days when Dillard Creek withdrawals will be less than 82,000 gpd and alternative supplemental sources may be needed. Examples of limited withdrawal periods using estimated Dillard Creek flows in the last few years include:

- During the 10/2/23 to 11/8/23 timeframe, there was insufficient creek flow for an 82,000 gpd withdrawal that extended for 38 consecutive days.
- During the 10/2/23 to 11/20/23 timeframe, there was only one day of the 50-day period that Dillard Creek flows would have allowed a withdrawal of 82,000 gpd.

Potential Intake Location Requirements

Stream flows, the stream's physical characteristics, access to the surface water, land ownership, public access and safety, and land use are all considerations for determining a potential site of a surface water intake. Proximity to developed road access is also considered to support intake construction and maintenance. The Larkin property is owned by Nelson County and is located

adjacent to Thomas Nelson Highway (US 29). A portion of Dillard Creek lies on the property owned by the County.

As noted above, several factors must be considered when attempting to locate a surface water withdrawal intake. Stream characteristics including stream depth are critical to support year-round operation of the intake and the associated 1 mm intake screens required by the Virginia Water Protection (VWP) permit. As such, water depths greater than four feet are desirable. In addition, the intake must be in close proximity to a pump station, which in turn requires enough available suitable land for the construction and operation of the pump station. For the purposes of maximizing the drainage area of the withdrawal location and the calculations of estimated flow described in the sections above, the location of the proposed intake was selected just north of Thomas Nelson Highway on the southern portion of the Larkin property. An intake location right off a roadway or highway is not unusual for water intakes, but it can pose an additional risk in the event of a traffic accident resulting in a spill of chemicals into the stream which could create contamination and subsequent water quality issues. If the location of the intake is moved to the most northern portion of the parcel along Dillard Creek, the drainage area is reduced from 7.33 square miles (previously rounded to 7.3 square miles for calculations) to 7.28 square miles. This represents a slight reduction in drainage area of less than 1%, and the corresponding decrease in estimated stream flows in Dillard Creek using this more upstream location is not significant.

In order to meet the needed water depth for the installation and operation of an intake, Nelson County may elect to request the installation of a low-level dam as part of the VWP permit application process. However, obtaining a permit for the installation of a dam may be difficult due to some of the negative consequences of dams. A dam can impact the safety of the stream increasing drowning risks, have ecological impacts such as elevating stream temperatures and decreasing dissolved oxygen concentrations, and act as a barrier to aquatic fish species that rely on migration as part of their life cycle. The potential impact on migratory fish is discussed in a section below.

Withdrawal Permitting Summary

The permitting process for a new water withdrawal intake includes the preparation of a Joint Permit Application (JPA) for the construction of the intake structure as well as for the water withdrawal. Once prepared, the JPA is submitted to the Virginia Marine Resources Commission (VMRC) who acts as a clearinghouse and distributes the application to the U.S. Army Corps of Engineers (USACE) and the DEQ for review and permitting purposes. Each agency has an opportunity to review the application and require a permit depending on the jurisdiction of that agency over the proposed activities. These agencies also distribute the application to a number of other Federal and

State agencies for review and comment; these include but are not limited to the U.S. Fish and Wildlife Service, the Department of Wildlife Resources, and the Department of Conservation and Recreation. As part of the permitting process, the proposed project will be advertised in a newspaper of local distribution to provide an opportunity for public comment.

For a new intake on Dillard creek, it is anticipated that DEQ will issue a VWP Permit for both the intake construction and water withdrawals. In addition to the DEQ VWP Permit, it is expected that the USACE will issue a construction permit with standard requirements applicable to intake construction activities. Due to a recent regulatory change, VMRC does not have jurisdiction in this part of Virginia and is not expected to issue a permit for an intake on Dillard Creek.

Summary of Potential VWP Permit Conditions

DEQ issues, administers, and enforces water withdrawal permits. If the withdrawal is approved, DEQ will issue a VWP permit with conditions that typically include intake construction requirements as well as water withdrawal operations and reporting requirements that are applicable throughout the permit term. These requirements typically include limitations on withdrawal volumes as a function of stream flows as well as requirements for intake screen size and face velocity.

The following sections summarize the anticipated sections of a VWP permit for the construction and operation of a new water intake. The sections include:

- Authorized Activities
- Permit Term
- Standard Project Conditions
- Stream Modifications, Including Intake/Outfall Structures
- Surface Water Withdrawals
- Water Withdrawal Monitoring, Recordation and Reporting Conditions
- Construction Monitoring and Submittals
- General Conditions

The general requirements for each of these sections are summarized herein based on as the *Virginia Water Protection Permit Program Regulation (9 VAC 25-210)* as well as a review of several other WTP facility VWP permits.

Authorized Activities

This section of the permit includes information on the activity that has been authorized by DEQ; this would include the authorization of the installation and operation of a surface water withdrawal

from the selected water body. This section will also reference the area of the temporary and permanent impacts that are authorized as part of the installation of the intake and will match the calculated areas of disturbance that were included by the County as part of the JPA. This section will also include a standard condition requiring the permittee to notify DEQ of additional impacts to surface waters as well as changes in the intake design so that the agencies may determine if the permit needs to be modified and if the changes are acceptable to the agencies.

Permit Term

The permit will include a section on the permit term. VWP permits are typically issued for fifteen (15) year terms. The permit application for reissuance of the permit must be completed 270 calendar days prior to the expiration date of the VWP permit.

Standard Project Conditions

This section will include standard text regarding the expectations that construction activities are conducted regarding standard erosion and sediment control and other best management practices to minimize in-stream impacts. This includes conditions that may require the following in addition to other conditions deemed appropriate by DEQ:

- Adhering to Time-of-Year-Restrictions recommended by the Virginia Department of Wildlife Resources if applicable;
- Beneficial uses of the stream not to be impacted by the project;
- Aquatic life movement not to be impeded by the project;
- Downstream flows to be maintained;
- Minimal adverse impacts on navigation;
- Not blocking more than half of the stream at any given time;
- Not impeding normal or expected high flows;
- Reporting any fish kills or spills of fuels or oils immediately upon discovery;
- Reporting any potentially environmentally threatening conditions within 24 hours; any changes to the conditions must be approved beforehand.;
- Conducting construction activities during periods of low flow;
- Spill prevention;
- Prevention of a violation of Virginia Water Quality Standards; and
- Reporting, notification and submittal requirements.

Stream Modifications, Including Intake/Outfall Structures, Access Roads, and Installation of Utilities

These sections of the permit include additional construction requirements that apply to the installation of an intake, access roads, and utility installation. This includes restrictions on the

disturbance and removal of stream substrate as part of the intake installation. This will include some erosion control conditions as well as restrictions on materials used. This may also include a section with conditions on the construction of an access road to the project site if needed. If utility work will be completed in surface waters, this section will include conditions on restoration of this impact post-construction and temporary excavated material storage.

Surface Water Withdrawals

This section of the permit will identify the surface water source where the intake will be located. In addition, it is expected to include the following:

- **Maximum withdrawal volumes, potentially with daily, monthly, and annual limitations;**
- **Restricting the withdrawal to a certain percentage of streamflow, often set at 10%;**
- The calculation for estimating streamflow at the intake location;
- **Requirements for the intake screen design such as screen openings not larger than 1 millimeter in width and height and the screen face intake velocities not greater than 0.25 feet per second;**
- Development and approval of a drought management plan; and
- Water withdrawal monitoring report requirements.

Water withdrawal monitoring, recordation and reporting conditions

This section of the permit will include standard text regarding monitoring and operation requirements for the intake. This includes conditions that require the following:

- Submittal of a monitoring and operations plan for approval within 180 of permit issuance. The monitoring and operations plan must include:
    - Intake procedures ensuring compliance with permit conditions;
    - Streamflow estimation procedures in accordance with permit conditions;
    - Streamflow estimation procedures in the event that the stream gauging station is damaged, disabled or discontinued; and
    - Procedures to ensure compliance with withdrawal recording, monitoring and reporting requirements.
- Pump monitoring and recording requirements;
- Daily monitoring using flow totalizer technology;
- Reporting non-compliance with withdrawal limitations within five (5) days; and
- Water withdrawal monitoring report requirements.

Construction Monitoring and Submittals

As part of the intake construction process, there are conditions for reporting and monitoring that are likely to be included in the VWP permit. This includes requirements for submitting final plans in advance of the construction activities, written notification of initiation of land disturbance, monthly site inspections reporting, semi-annual constructions status update reporting, notification to the DEQ of unauthorized impacts to surface waters, and notification of completion of construction activities.

The permit will likely include report forms for some of the reporting that is required to be completed as part of the construction monitoring.

General Conditions

Part II of the VWP permit would include the general conditions applicable to all VWP permits. The following sections summarize the anticipated general conditions of a VWP permit for the construction and operation of a new water intake.

Endangered and Threatened Species

The Virginia Department of Wildlife Resource's (DWR) Virginia Fish and Wildlife Information Service (VaFWIS) and the U.S. Fish and Wildlife Service (USFWS)'s Information for Planning and Consultation (IPaC) databases were reviewed to determine if there is the potential for any endangered and threatened (E&T) species impacts that could impact the VWP permitting and/or complicate the location of the intake in the selected waterbody or the volume and rate of withdrawals.

<u>DWR VaFWIS Database Review</u>

Based on the DWR's VaFWIS database search, ten (10) state and/or federally endangered and/or threatened (E/T) species were identified as known or likely to occur within a two-mile radius of the potential intake location on Tye River in Nelson County. Of these, seven (7) are terrestrial and three (3) are aquatic. The terrestrial species include three (3) bat species: the Northern Long-Eared Bat, the Little Brown Bat, and the Tri-Colored Bat. Although the intake construction itself would not impact these species, there is often tree-clearing associated with these types of construction projects on the bank of the stream. Any tree clearing may trigger time-of-year restrictions or that bat surveys be completed to determine if these bat species are absent in the project area prior to initiaitng tree clearing. The intake construction is not expected to have the potential to impact the remaining listed terrestrial species. A summary of the aquatic specis identified in the database along with an assessment of potential impacts follows.

The juvenile James Spineymussel (*Parvaspina collina*) generally have prominent spines on each valve although the adults usually lack spines. The shell is orange with a darkly pigmented band around the edges. The James spinymussel is found in a variety of substrates that are free from silt. The mussels are generally buried in the substrate. According to the VaFWIS database, the James Spineymussel has been located in Nelson County but is not present within the hydrologic unit where the intake construction would occur. As such, this potential intake is unlikely to impact this species.

The Yellow Lance (*Elliptio lanceolata*) is a bright yellow mussel with a shell more than twice as long as it is tall, reaching just over three inches in length. The species favors clean water in gravel or sandy substrates in small to medium-sized streams and smaller rivers. According to the VaFWIS database, the Yellow Lance has been located in Nelson County but is not present within the hydrologic unit where the intake construction would ocucr. As such, this potential intake is unlikely to impact this species.

The Green Floater (*Lasmigona subviridis*) is a small mussel with a thin shell and a subovate or trapezoidal shape. The shell is yellow to green with dark green rays. The species is found in small creeks and large rivers; it is intolerant of strong currents and occurs in pools and other calm waters. It prefers a gravel and sand substrate. The VaFWIS identified this species as known or likely to occur within the 2-mile radius of this project site, as it is known or likely within Nelson County and the hydrologic unit of the project site. However, the proposed project location receives consistent flow and current, and lacks any pools or calm waters that are ideal for this species. As such, this potential intake is unlikely to impact this species.

The potential for the project to impact endangered or threatened species is believed to be low. Most of the E&T species identified as part of this initial determination are not expected to reside in the project area.

U.S. Fish and Wildlife Services IPaC Database Review

Based on the USFWS IPaC database search, two (2) federally proposed threatened species were idenfitied as known or likely to occur within a two-mile radius of the potential intake location on Tye River in Nelson County: The Monarch Butterfly (*Danaus plexippus*) and the Green Floater (*Lasmigona subviridis*). As this project does not involve significant terrestrial impacts, it is unlikely to impact the Monarch Butterfly. As previously mentioned, the proposed location lacks pools and other calm waters that are ideal for Green Floaters, and as such, the potential intake is not likely to impact the species.

As part of the intake construction and VWP permitting process, agencies tasked with the protection of endangered and threatened species may idenfity protected species that have the potential to be impacts by the proposed project and the best methods to protect them if potential impacts could occur. Any such protections would be included as part of the construction and withdrawl permits associated with the potential intake.

Migratory Fish

The Department of Wildlife Resources (DWR) Virginia Fish and Wildlife Information Service (VaFWIS) also provides a list of all species suspected or known to be within a two-mile radius of the potential intake location. Certain structures or features, such as an impoundment or dam, can adversely impact migratory fish in the area. As stated previously, the installation of a dam may be needed so that the stream is deep enough at the potential intake location for the operation of the intake. As such, migratory fish should be considered when evaluating the potential water source. A summary of migratory fish found in the area and their associated migratory behaviors is summarized in the table below.

Table 6. Summary of Migratory Fish Near Potential Intake Location and Associated Behaviors

Common Name	Scientific Name	Migratory Pattern
American Eel	*Anguilla rostrata*	Adults migrate to Sargasso Sea to spawn and then die.
Brook Trout	*Salvelinus frontinalis*	Migrations are generally limited to movements into headwater streams or tributaries for spawning or short migrations to avoid temperature extremes.
Largemouth Bass	*Micropterus nigricans*	Migrate to warm water discharges of power plants in the winter; There is an upstream migration of adults in the spring, and a downstream migration in the fall.
Smallmouth Bass	*Micropterus dolomieu*	The upstream migration of adults occurs in the spring, with a downstream migration in the fall.
Common carp	*Cyprinus carpio*	This species will migrate into shallow weedy bays to spawn.
Channel Fish	*Ictalurus punctatus*	Depending on habitat, the spawners may or may not migrate into rivers or moving water at spawning time.
Flathead catfish	*Pylodictis olivary*	A spring migration and temporary departure from home range.
Creek chub	*Semotilus atromaculatus*	Many individuals show upstream spawning migration in the spring, and the males move into shallow gravel channels, runs, and riffles.
Fantail darter	*Etheostoma flabellare*	Males migrate from deeper faster riffles up to shallow, slow flowing riffles.
Eastern creek chubsucker	*Erimyzon oblongus*	Stream fish undertake a short spawning migration to headwaters in the spring and move downstream to larger creeks following spawning.

Sea lamprey	*Petromyzon marinus*	Upstream migrations occur in Virginia and Maryland between March and June.
Shorthead redhorse	*Moxostoma macrolepidotum*	Spring migration and ascend streams to spawn.
Golden shiner	*Notemigonus crysoleucas*	They migrate daily, from the littoral zone near the shoreline during day to open water at night. Migration is associated with the breeding season.
Central stoneroller	*Campostoma anomalum*	They migrate up-stream in spring to spawn; to an area with a good current and a gravel bottom.
Northern hog sucker	*Hypentelium nigricans*	They begin the upstream migration to spawning grounds when the water temperature rises above 4.4 degrees C and congregates in high gradient streams over riffles.
White sucker	*Catostomus commersonii*	They migrate during spring when water temperatures reach a minimum of 4 degrees C, and move toward headwater areas or until an impassable barrier is reached.
Rainbow trout	*Oncorhynchus mykiss*	Juveniles migrate from natal streams to a freshwater lake instead of to the ocean; Anadromous steelhead juveniles reside in fresh water for 1-4 years before migrating to the sea as smolts.

While some of the migratory patterns of these species of fish do not appear to apply to Dillard Creek due to the relatively small size of the stream and its location inland, there may need to be surveys or other studies completed to determine if these species could be impacted if a structure was installed in the creek such as a dam or impoundment.

Preliminary Cost Estimates of Water Withdrawal and Treatment System

The costs that will be incurred as part of the development of a withdrawal include both engineering costs and those costs associated with obtaining permits for the construction and operation of the intake on Dillard Creek as well as the costs for the design and construcion of the associated pump station and treatment system needed to procude potable water. The estimated costs are described below.

Engineering Cost Estimates

There are currently many unknowns about the site and the water quality of the stream that make it difficult to determine the actual engineering costs at this time; however a conservative preliminary estimate is provided for intial assessment purposes. The quality of the water is important to determine if a membrane treatment system is feasible or if a conventional treatment system will be required. A summary of the estimated engineering, construction, and operating and maintence costs are included in Table 7.

Table 7. Estimated Engineering Costs.

Activity	Estimated Cost
Engineering and Construction	$6.5M
Operating and Maintenance (annual)*	$150,000 - $250,000

*Surface water plants that are not membranes require operators onsite when running.

If there is the potential to pump water from the creek to an existing treatment system, a new treatment facility would not be required and the engineering, construcion and O&M costs depicted above could be reduced substantially. These cost reductions would be offset by the cost of installing a raw water transmission line to the existing treatment system.

Permitting Cost Estimates

As described previously, to construct and operate a surface water withdrawal on Dillard Creek, Nelson County will need to prepare and submit a Joint Permit Application (JPA) to the Virginia Marine Resource Commission (VMRC) who will distibute this permit application to the appropriate agencies for review and permitting. For an intake and withdrawal project, it is anticiapated that for the construction portion of the project, the United States Army Corps of Engineers (USACE) and Virginia Department of Envioronmental Quality (DEQ) will both issue permits. DEQ VWP permit preparation requires payment of a permit processing fee. The DEQ permit will also include the requirements and limitations for operating the withdrawal system. It is estimated to take 9 months to 1 year to receive a DEQ VWP permit and USACE contruction permit once the JPA is submitted, longer if special studies are required by regulatory agencies.

DEQ and USACE will solicit input from other state and federal agencies to support the permit development process including review and comment with regards to historic resources and endangered and threatened species. If there are concerns about either of these types of resources, the agencies may request special studies be conducted including archaeological surveys, habitat assessments and/or species surveys and relocations. These can result in additional costs as well as delays in the project schedule. The table below provides some general cost estimates for the permitting process, and these are intended for initial planning purposes only.

Table 8. Estimated Permitting Costs.

Activity	Estimated Cost
Joint Permit Application Development and Permitting Assistance (VWP)	$40,000 - $50,000
Dam installation permitting	$50,000 - $75,000
DEQ VWP Permit Application Fee (withdrawals less than 1,000,000 gallons on any day)	$10,000
Special Studies (archeaological & endangered and threatened species)	$10,000 - $25,000 (per study)

Summary of Source Limitations

The flow needed to meet the additional water needs appears to be available in Dillard Creek under most flow conditions; however, the stream itself is small and typically shallow and unless there are some naturally occurring deep areas, the installation of an intake may require a low-level dam. This may not be possible due to restrictions or prohibitions from environmental agencies due to the presence of migratory fish. The cost of the installation of an intake may be cost prohibitive. The level of treatment that may be required is unknown and could also be cost prohibitive.

In addition, the flow projections determined herein indicate that there will be days and periods of multiple consecutive days when Dillard Creek withdrawals will be less than 82,000 gpd and alternative supplemental sources may be needed. An evaluation of supplemental sources such as groundwater wells will help determine if there is sufficient availability to supplemental surface water withdrawals during low or very low Dillard Creek flow periods.

Christmas Lights Update

I am working to obtain information on the Christmas lights for Lovingston, Shipman and Nellysford. Elaine Hooker said that when the lights project first started, timers were installed for the lights. Apparently the timers were very expensive and they have not been used in many years. She said that people have preferred that the lights stay on 24/7 during the season. I was able to speak with Paul Carter, who said that all of the poles used for the lights currently have brackets mounted on the poles. He says that the conduit and receptacles on the AEP poles in Lovingston and Shipman need to be replaced. He also suggested that the light frames could be restrung with LED lights to use less electricity. He estimates that Lovingston has 16 lights (including 4 angels which are placed on certain poles). All of the light fixture in Lovingston are large, while Shipman includes a mix of large and small lights. Paul Carter did comment that as AEP has replaced a few of the poles, they have not been putting the bracket and equipment on the new pole – he can recall one instance where this specifically happened while the light was on the pole. I have reached out to AEP to find out what would need to be done to have the conduits and receptacles replaced and am waiting to hear back.

In Nellysford, Jeff Brantley has indicated that some of the lights do not work and several of the poles need the power supply replaced. He assumes that CVEC may need to do the replacement work since they are on the power pole. I have reached out to Galen Creekmore to see whether CVEC would make the repairs, and whether there is a cost associated with it. The Chamber has been paying the electric bill for the lights in Nellysford.

Should the Board decide to take on the lights, we would anticipate at a minimum, the cost to replace any bulbs on the lights currently in inventory. We do not have a total count at this time. Additional costs would include the electric service (both AEP and CVEC), as well as any costs to make the necessary repairs to the power supply on each of the poles used. I have reached out to Elaine Hooker to get an estimate on the cost to have the lights on Nellysford for the season and am waiting to hear back. I would estimate that the lights in Lovingston would cost about $750-$800 for the season, which is what we were billed to an account set up without our permission in early 2024 – we ended up not having to pay this bill but I do not know if in the future, we would need to have an account set up to cover this.

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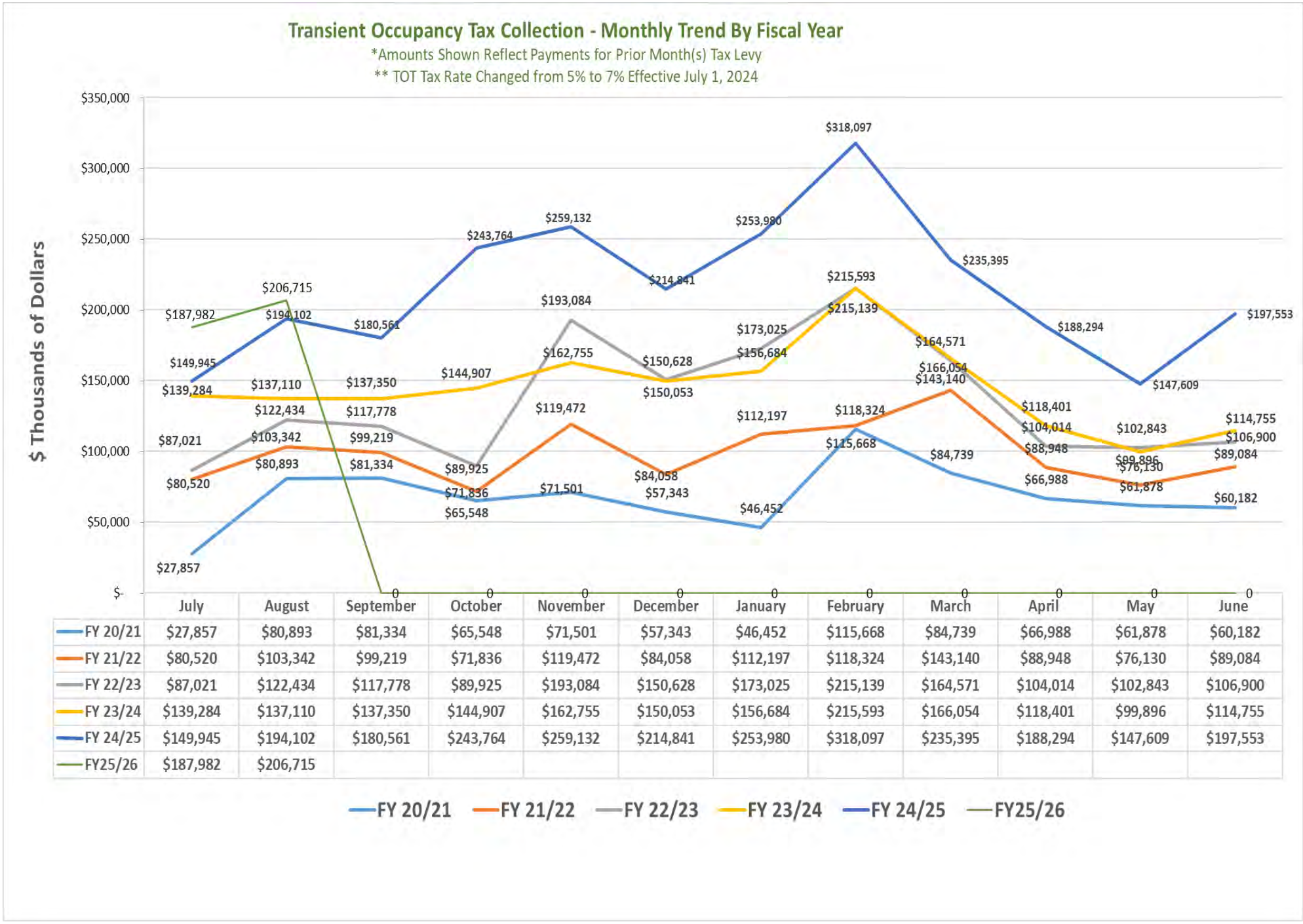


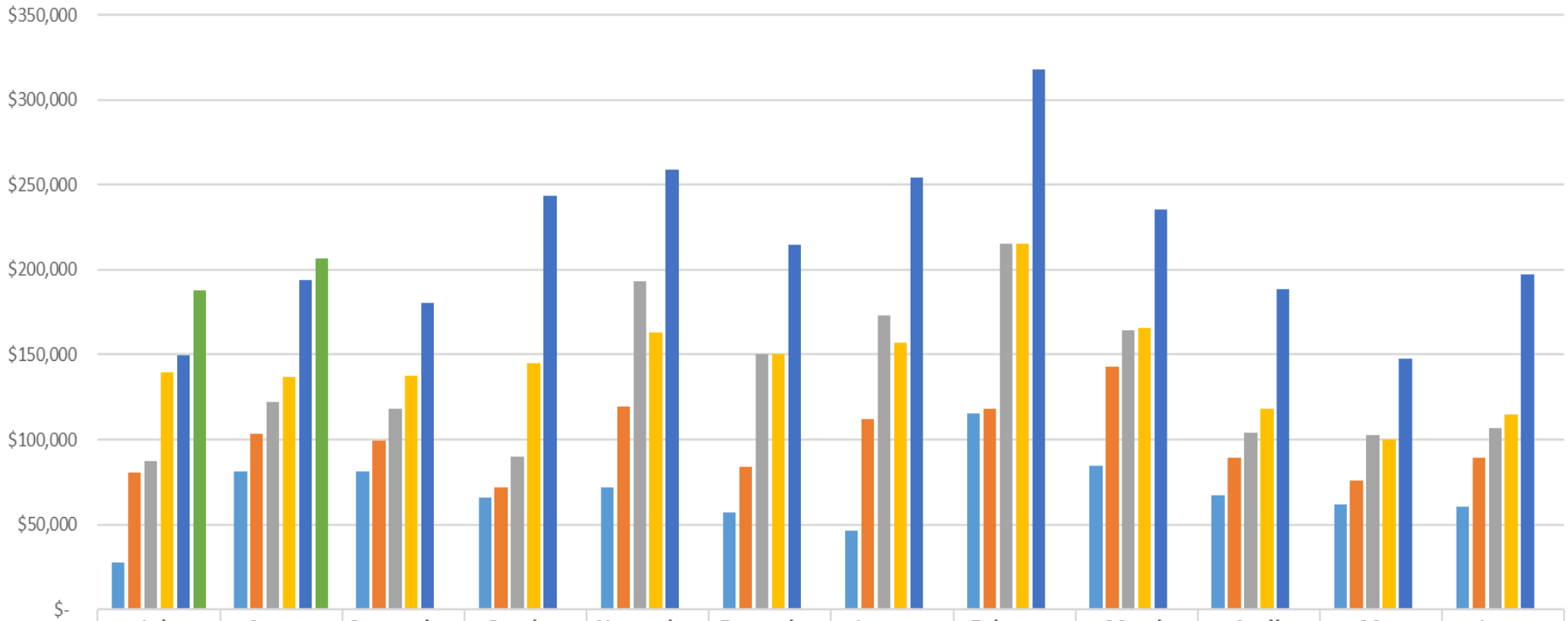
	July	August	September	October	November	December	January	February	March	April	May	June
FY 20/21	$27,857	$80,893	$81,334	$65,548	$71,501	$57,343	$46,452	$115,668	$84,739	$66,988	$61,878	$60,182
FY 21/22	$80,520	$103,342	$99,219	$71,836	$119,472	$84,058	$112,197	$118,324	$143,140	$88,948	$76,130	$89,084
FY 22/23	$87,021	$122,434	$117,778	$89,925	$193,084	$150,628	$173,025	$215,139	$164,571	$104,014	$102,843	$106,900
FY 23/24	$139,284	$137,110	$137,350	$144,907	$162,755	$150,053	$156,684	$215,593	$166,054	$118,401	$99,896	$114,755
FY 24/25	$149,945	$194,102	$180,561	$243,764	$259,132	$214,841	$253,980	$318,097	$235,395	$188,294	$147,609	$197,553
FY25/26	$187,982	$206,715										

August 2025 Collection – September 9, 2025 BOS Report

Transient Occupancy Tax Collection by Month and Fiscal Year

*Amounts Shown Reflect Payments for Prior Month(s) Tax Levy

** TOT Tax Rate Changed from 5% to 7% Effective July 1, 2024



	July	August	September	October	November	December	January	February	March	April	May	June
FY 20/21	$27,857	$80,893	$81,334	$65,548	$71,501	$57,343	$46,452	$115,668	$84,739	$66,988	$61,878	$60,182
FY 21/22	$80,520	$103,342	$99,219	$71,836	$119,472	$84,058	$112,197	$118,324	$143,140	$88,948	$76,130	$89,084
FY 22/23	$87,021	$122,434	$117,778	$89,925	$193,084	$150,628	$173,025	$215,139	$164,571	$104,014	$102,843	$106,900
FY 23/24	$139,284	$137,110	$137,350	$144,907	$162,755	$150,053	$156,684	$215,593	$166,054	$118,401	$99,896	$114,755
FY 24/25	$149,945	$194,102	$180,561	$243,764	$259,132	$214,841	$253,980	$318,097	$235,395	$188,294	$147,609	$197,553
FY25/26	$187,982	$206,715										

FY 20/21 FY 21/22 FY 22/23 FY 23/24 FY 24/25 FY25/26

August 2025 Collection – September 9, 2025 BOS Report

*Lodging Establishments is the number of businesses who are registered with the Commissioner of the Revenue for lodging in Nelson County. The number includes businesses who may have multiple properties who remit for all units with one payment. Some businesses remit their taxes quarterly, and due to their start date, may not be on a January-March-June-September schedule. Many businesses utilize services such as AirBnB who remit on their behalf and by State Code, these revenues are only to be disclosed in aggregate; no personal information can be shared (55.1-1209).

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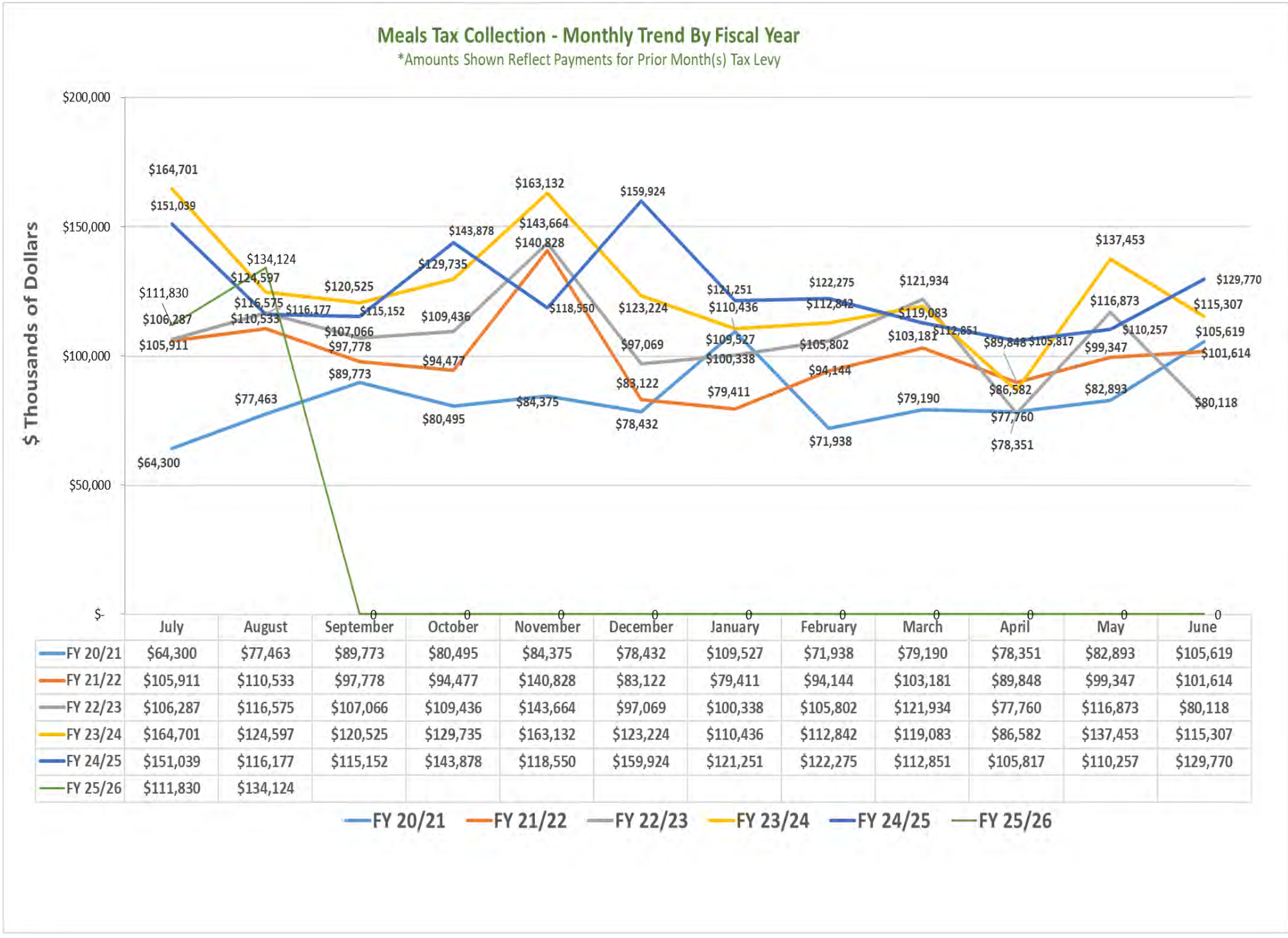
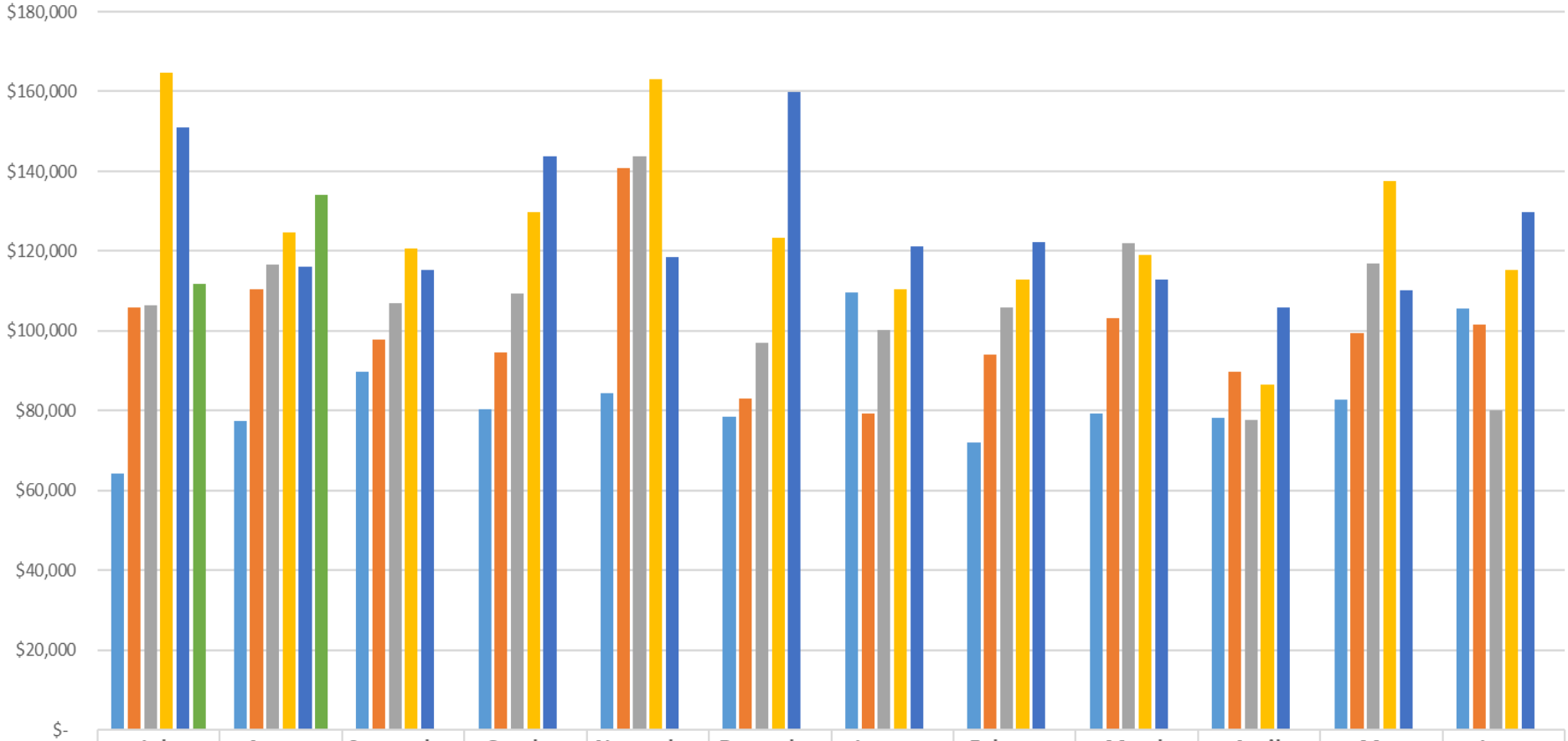


	July	August	September	October	November	December	January	February	March	April	May	June
FY 20/21	$64,300	$77,463	$89,773	$80,495	$84,375	$78,432	$109,527	$71,938	$79,190	$78,351	$82,893	$105,619
FY 21/22	$105,911	$110,533	$97,778	$94,477	$140,828	$83,122	$79,411	$94,144	$103,181	$89,848	$99,347	$101,614
FY 22/23	$106,287	$116,575	$107,066	$109,436	$143,664	$97,069	$100,338	$105,802	$121,934	$77,760	$116,873	$80,118
FY 23/24	$164,701	$124,597	$120,525	$129,735	$163,132	$123,224	$110,436	$112,842	$119,083	$86,582	$137,453	$115,307
FY 24/25	$151,039	$116,177	$115,152	$143,878	$118,550	$159,924	$121,251	$122,275	$112,851	$105,817	$110,257	$129,770
FY 25/26	$111,830	$134,124										

August 2025 Collection – September 9, 2025 BOS Report

Meals Tax Collection by Month and Fiscal Year

*Amounts Shown Reflect Payments for Prior Month(s) Tax Levy



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FY 25/26	$111,830	$134,124										

FY 20/21 FY 21/22 FY 22/23 FY 23/24 FY 24/25 FY 25/26