ALBEMARLE COUNTY PLANNING
STAFF REPORT SUMMARY

Proposal: SP202000006 Ivy Exxon	**Staff:** Tori Kanellopoulos, Senior Planner
Planning Commission Public Hearing: June 16, 2020	**Board of Supervisors Hearing:** TBD
Owner: SR&DR LLC	**Applicant:** Scott Collins, Collins Engineering on behalf of Scott Ramm
Acreage: 1.59 acres	**Special Use Permit for:** Request for automobile service station per Zoning Ordinance 18-22.2.2(16)(a)
TMP: 058A2000002100 **Location:** 4260 Ivy Road, Charlottesville VA 22903	**By-right use:** C-1 Commercial – retail sales and service; residential by special use permit (15 units/ acre).
Magisterial District: Scottsville	**Conditions:** Yes **EC:** Yes
Proposal: Proposed expansion of existing auto service station from three (3) auto service bays to seven (7) auto service bays. Current auto service building is approx. 1,950 sq. ft., and proposed building addition is approx. 3,200 sq. ft., for a total of 5,150 sq. ft. There are two (2) existing gas pumps, and there is no proposed change in the number of pumps.	**Requested # of Dwelling Units:** No dwelling units proposed.
DA: **RA: X**	**Comp. Plan Designation:** Rural Area – preserve and protect agricultural, forestal, open space, and natural, historic and scenic resources; residential (0.5 unit/ acre in development lots).
Character of Property: The parcel is developed with an existing auto service station, with two (2) fuel pumps and three (3) service bays. There are existing parking areas around the service station. There is also an existing dwelling unit at the rear of the parcel, which is an existing nonconforming use.	**Use of Surrounding Properties:** The two adjacent properties to the west are also zoned C-1 Commercial. TMP 58A2-20A has an existing dwelling unit. TMP 58A2-20 is currently undeveloped. The Buckingham Branch railroad tracks are adjacent to this parcel to the north. The adjacent parcel to the east (TMP 58A2-24C) is also zoned C-1 commercial and is owned by the RWSA. The next parcel to the east is TMP 58A2-24, which has an existing dwelling unit and is zoned Rural Area (RA).
Factors Favorable: 1. The application is consistent with the criteria for the issuance of a special use permit. 2. The proposed uses, equipment, and	**Factors Unfavorable:** 1. If the Board of Supervisors disagrees with the staff interpretation of the meaning and intent of the Comprehensive Plan, this application

supplies would be within an enclosed building and not visible from the public right of way. Only repaired vehicles would be visible.	may be considered inconsistent with the Comprehensive Plan.
RECOMMENDATION: **Special Use Permit:** Staff recommends approval of SP202000006, Scott's Ivy Exxon, with conditions.	

STAFF PERSON: Tori Kanellopoulos, Senior Planner
PLANNING COMMISSION: June 16, 2020
BOARD OF SUPERVISORS: TBD

SP202000006 Ivy Exxon:

PETITION:
PROJECT: SP202000006 Scott's Ivy Exxon
MAGISTERIAL DISTRICT: Samuel Miller
TAX MAP/PARCEL: 058A2000002100
LOCATION: Parcel is located at 4260 Ivy Road, Charlottesville, VA 22903. Parcel is approximately 280 feet to the southeast of the intersection of State Route 250 (Ivy Road) and State Route 786 (Ivy Depot Lane). The northern portion of the property (rear) is adjacent to the Buckingham Branch railroad tracks.
PROPOSAL: Proposed expansion of existing auto service station from three (3) auto service bays to seven (7) auto service bays. Current auto service building is approx. 1,950 sq. ft., and proposed building addition is approx. 3,200 sq. ft., for a total of 5,150 sq. ft. There are two (2) existing gas pumps, and there is no proposed change in the number of pumps.
PETITION: Automobile service station per Zoning Ordinance 18-22.2.2(16)(a) on a 1.587 acre parcel. No dwelling units are proposed.
ZONING: This parcel is zoned C-1 Commercial – retail sales and service; residential by special use permit (15 units/ acre).
OVERLAY DISTRICT(S): Entrance Corridor; Flood Hazard Overlay; Steep Slopes - Critical
COMPREHENSIVE PLAN: Rural Area – preserve and protect agricultural, forestal, open space, and natural, historic and scenic resources; residential (0.5 unit/ acre in development lots).

CHARACTER OF SURROUNDING AREA:
There are two adjacent properties to the west: TMP 58A2-20A and TMP 58A2-20. Both are also zoned C-1 Commercial. TMP 58A2-20A has an existing commercial building. TMP 58A2-20 is currently undeveloped, although there is a pending special use permit request for a 2,500-3,000 square foot veterinary office within a new 6,500 square foot, multi-tenant building. The Buckingham Branch railroad tracks are adjacent to this parcel to the north. The adjacent parcel to the east (TMP 58A2-24C) is also zoned C-1 commercial and is owned by the RWSA. The next parcel to the east is TMP 58A2-24, which has an existing dwelling unit and is zoned Rural Area (RA). Other nearby parcels to the west, south, and north are zoned C-1 Commercial and Village Residential, and have commercial, retail, and residential uses. Other nearby parcels to the east are zoned RA and are mainly residential.

PLANNING AND ZONING HISTORY:
County comprehensive rezoning in 1980: This property was rezoned to C-1, Commercial in 1980 as part of the comprehensive rezoning of the County. This property, and others in the immediate area are within the Rural Area as designated by the Comprehensive Plan. The County has not initiated a rezoning since 1980 to rezone any properties that are outside of the Development Areas but are zoned with "urban" zoning designations. This property and others in the immediate area were

previously within the former Ivy Village (formerly a Development Area), as designated by previous Comprehensive Plans. Ivy was removed as a Village in the 1989 Comprehensive Plan update, as the area was considered mostly built-out and is within a water supply watershed. (Attachment 2)

There does not appear to be an existing site plan for this site. The existing site was developed prior to the County's requirement for a site plan. The proposed building expansion would require a site plan, due to changes in parking and the ingress/egress (18-32.2).

DETAILS OF THE PROPOSAL:

Section 18-22.2.2(16)(a) requires auto service stations that are not served by public water or an approved central water supply in the C-1 Commercial zoning district to obtain a special use permit. The existing use is a 1,950 square foot auto service station with three (3) service bays. The proposal is for a building addition of approximately 3,200 square feet on the rear of the existing building. The addition would have four (4) additional service bays for auto repair and service, for a total of seven (7) service bays. There are two (2) existing gas pumps, and there is no proposed change in the number of gas pumps. The number of employees is not proposed to increase. The intent of the expansion, per the application, is the following: "*The (4) additional bays will allow the technicians to perform the diagnostics on a car and then move on to another car in an adjacent service bay while they wait for approval or authorization to continue with the service repairs, without having to stop, put the car back together, and remove it from its service bay*." The increased efficiency would allow the business to service 13 cars per day, an increase of five (5) from the current approximately eight (8) cars serviced per day.

It should be noted that the existing use is by-right per 18-22.2.1(e). Regardless of approval or denial of this special use permit request, the existing use may continue by-right. The special use permit is for the proposed expansion of the auto service station. Therefore, the impacts of the expansion have been reviewed, and conditions are intended to address any impacts of the expansion.

Additional information is provided in the applicant's narrative and application plan (Attachment 3).

COMMUNITY MEETING:

The community meeting requirement per 18-33.37 was met in the form of mailed letters with information about the proposal, with response options including contacting staff via email or phone call or using an online input form. The applicant mailed letters to property owners within a ¼ mile radius of the proposal. The letters were mailed on May 1, and recipients were given until May 15 to provide comments, questions, and concerns. Staff continued to incorporate feedback after this date, as the Planning Commission public hearing date was moved later, providing more time for responses.

The following are the main concerns staff has heard:

- Stormwater management: There are existing stormwater and runoff concerns.
- Access to the site: There are concerns with the current configuration of the ingress/egress. Additionally, there is a shared access easement with two properties to the east.
- Traffic: This is an area with existing congestion and traffic.
- Groundwater Contamination: This is an area that has had and may still have groundwater contamination.
- Scale: There are concerns that the proposed building addition is not appropriate in scale given the surrounding context and area.

These concerns are further discussed in the following sections of this staff report. Additionally, there are proposed conditions to mitigate some of these potential impacts, which are also discussed in the staff report. Written responses from members of the public are included as Attachment 5.

ANALYSIS OF THE SPECIAL USE PERMIT REQUEST:

Special Use Permits are evaluated under reasonable standards, based on zoning principles which includes the proposal's compliance with the Comprehensive Plan. Any impacts caused by the proposal may be addressed through conditions and those conditions must be reasonably related to the impacts and be roughly proportional to the impacts.

The appropriateness of the C-1 Commercial zoning designation on the property is not under consideration. The property was comprehensively rezoned by the County in 1980 and no action has been taken to amend or modify the zoning of the property.

The existing use (auto service station) is a by-right use per 18-22.2.1(e). The special use permit is per 18-22.2.2(16)(a) and is for the expansion of the auto service station only. If the special use permit is not approved, the existing use may continue by-right. While approval of the special use permit would bring the whole site into compliance with current zoning regulations, the special use permit is only required due to the proposed expansion. Given that special use permits are evaluated based on their potential impact, the impacts of the proposed expansion have been evaluated and are discussed in the following section.

Section 33.39(B) states that the Commission, in making its recommendation, shall consider the same factors found in Section 33.40(B):

1. No substantial detriment. Whether the proposed special use will be a substantial detriment to adjacent parcels.

Staff finds that the proposed special use permit would not be a substantial detriment to adjacent and nearby parcels. Staff has evaluated the potential impacts of the proposed expansion, including potential impacts listed as concerns by community members. The following are the potential impacts of the proposed expansion, with staff's analysis and any relevant proposed conditions.

Traffic

The proposed expansion for four (4) additional auto service bays would add approximately 10 vehicle trips per day. The applicant estimates that eight (8) cars per day are serviced now, and an additional five (5) would be serviced with the expansion, for a total of 13 per day. Route 250 has approximately 13,000 vehicle trips per day. Planning, Transportation Planning, and VDOT did not find a significant traffic impact from the proposed expansion. VDOT's main concern with this site is the existing design of the ingress/egress. The proposed expansion would require an additional eight (8) parking spaces. The application plan submitted by the applicant shows parking envelope areas on the site. The exact parking locations would be determined with the site plan. Staff finds that the additional traffic impact from the proposed expansion is not a substantial detriment.

Stormwater Management, Floodplain, and Stream Buffer

According to GIS, the existing structure (service station) is located partially within the floodplain. The applicant must submit a Letter of Map Change (LOMC) to formally determine the location of the floodplain. The proposed expansion would also require a Virginia Stormwater Management Program (VSMP) application and would need to meet the minimum standards for channel and flood protection [9VAC25-870-66]. Members of the public have expressed concern with potential runoff and petroleum spills. Release of petroleum is prohibited by law and is considered an illicit discharge [17-700 et al].

A LOMC must be submitted prior to site plan or VSMP approval, as the building cannot be expanded if located within the floodplain. If the floodplain is adjusted, the stream buffer will also be adjusted, per County Code 17-600(A). The existing structure would no longer be within the stream buffer, however a portion of the eastern edge of the property would still be within the stream buffer.

The applicant is proposing plantings within the stream buffer for mitigation purposes. These plantings are required as a condition, to be provided during site planning to the satisfaction of the County Engineer.

Water and Sewer

The property is located in the ACSA jurisdictional area for water only. The property is currently not connected to public water or sewer and is served by an existing well and drainfield. The applicant has requested a waiver per 18-4.1(a)(2) as follows: *"When the director of community development, in consultation with the Albemarle County Service Authority finds that the cost of connecting the proposed development or lot to the public water supply and/or the public sewer system, exclusive of connection fees, exceeds the cost of installing an on-site well and/or an onsite sewage system."* The applicant has submitted a connection waiver request, which is being evaluated by the Community Development Department and ACSA. The waiver request can be completed during site planning. VDH (Virginia Department of Health) review and approval will also be required prior to any site plan or building permit approval.

A Tier 3 or Tier 4 groundwater study (depending on total daily water usage) will be required during site planning. Virginia State Code [12VAC5-590-690] estimates water usage for service stations as 10 gallons per vehicle served. Therefore, an additional five (5) vehicles per day would result in approximately 50 additional gallons used per day. VDH and ACSA do not have any capacity or usage concerns from the proposed expansion and expect that additional water usage will likely be lower than 50 additional gallons per day.

There is an existing drainfield on the property, which will need to be field verified during site planning. No parking or structures will be permitted on or encroaching on the drainfield. VDH has offered the following comment: *"The automotive shop is proposing to expand the number of bays so they can more efficiently handle their repairs and there is no intent to increase the number of employees. Even though this may result in some increase in the amount of customers, I think any increase in daily flow to the existing septic system will be negligible. In my perspective this does not equate to a change of use and therefore I don't believe assessing the capacity of the existing septic system is warranted."*

Based on information provided by VDH and DEQ (Department of Environmental Quality), there no longer appears to be significant water quality and contamination issues with the wells in this area (reference Attachment 4). The proposed expansion would not generate a significant increase in water usage. There does not appear to be a need to improve the existing water and sewer systems, based on the impact of the expansion. Therefore, a connection to public water does not appear to be necessary for quantity or quality issues that staff is aware of to date.

Visual Impacts

The proposed expansion must comply with the requirements of 18-5.1.31, which includes the following: all equipment and materials must be stored in an enclosed building; vehicles awaiting repair must not be visible from the public right of way or residential properties; all services must be performed in an enclosed building; and auto service buildings must be located at least 50 feet from any residential or agricultural district. The proposed expansion is visible from the Entrance Corridor and will therefore require Architectural Review Board (ARB) approval. There is a condition to mitigate potential new lighting impacts, including requiring any new lighting to be turned off (motion-activated only) during overnight hours. No new outdoor lighting is proposed at this time; however, any future new outdoor lighting would need to meet the conditions of this special use permit and all current regulations per 18-4.17. Additional information on scale and ARB review is included in the following 'Character of the area' section of this report.

Noise Impacts

There is a condition to limit hours of operation of the service station to the current hours, which are 7 AM to 9 PM, Monday through Saturday. The ending time of 9 PM is consistent with (and earlier than) other rural uses and uses adjacent to residential and rural districts. For example, County Code 18-5.1.57(e)(4) prohibits amplified music for farm brewery events (rural use) after 10 PM during weekdays and after 11 PM on weekends. Farm wineries have the same regulation (18-5.1.25(e)(4)). This is to limit potential negative impacts on nearby and neighboring residential and rural properties. Per 18-5.1.60, drive-through windows that are within 100 feet of a residential or rural district must be closed by 10 PM.

Underground Storage Tanks and Groundwater Contamination

DEQ has offered the following comment on contamination and underground storage tanks (UST) for this area: *"There are two components to the petroleum contamination at these two sites (Toddsbury of Ivy and Ivy Exxon) - a shallow dissolved-phase groundwater plume approx. 10-20 feet below grade (fbg), and a deeper dissolved-phase plume approx. 80-90 fbg. Concentrations have steadily decreased since the releases at both sites were discovered due to substantial corrective action efforts at the Toddsbury site and natural attenuation at both sites...The well at 4260 (which is a shared well serving the Exxon and a rental residence behind the station) is the only one still receiving carbon treatment at this point. If wells have been found to have petroleum contamination, DEQ can provide well owners with carbon filtration systems."*

DEQ also offered the following response on the potential impact of the proposed Ivy Exxon building expansion: "*I would not anticipate the planned expansion project having any effect on the existing UST system or the groundwater contamination situation."* See Attachment 4 for additional information provided by DEQ.

The Toddsbury case has been closed (Attachment 7). A groundwater monitoring report for the Ivy Exxon site is included as Attachment 6 (dated March 3, 2020). A previous BTEX report for the area is included as Attachment 8.

2. Character of the nearby area is unchanged. Whether the character of the adjacent parcels and the nearby area will be changed by the proposed special use.

Staff finds that the proposed expansion would not change the character of the area. The property is located in an existing commercial area and is adjacent to other C-1 Commercial properties. While the area is not currently within a Development Area in the Comprehensive Plan, the area was previously designated as a Village in the County's Future Land Use Plan in the Comprehensive Plan, until 1989. Nearby parcels are zoned C-1 Commercial, VR Village Residential, and RA Rural Area. Nearby uses include a post office, garden center, restaurant, medical offices, a church, a recently closed country store with gas pumps, and residential uses. The auto service station is an existing use and has been in operation for more than 50 years.

There is a proposed condition to limit the maximum structure height of the proposed expansion to 24 feet. Adjacent and nearby structures have varying heights. Nearby commercial and institutional uses range from approximately 16 feet to more than 30 feet in height. The proposed expansion is approximately 3,200 square feet, which would bring the total square footage of the auto service station to approximately 5,150 square feet. Nearby commercial and institutional uses have a range of building footprints as well. For example: the Toddsbury commercial building across the street has a footprint of approximately 2,500 square feet; the garden center footprint is approximately 4,200 square feet; the nearby row of commercial and office buildings at Ivy Commons is approximately 9,600 square feet; and the nearby church is approximately 10,000 square feet.

The proposed expansion will require Architectural Review Board (ARB) review and approval, as it would be visible from an Entrance Corridor (Route 250). The purpose of ARB review is, generally,

to promote orderly and attractive development and, more specifically, to ensure that proposed development within the Entrance Corridors reflects elements of design characteristic of the significant historic resources of the area. The Entrance Corridor Design Guidelines guide the ARB's review of development proposals. The guidelines address site layout, grading, landscaping, lighting, architectural design, accessory structures and equipment, and related screening. Several of the guidelines directly or indirectly address the scale of a proposed development, and the guidelines also address building materials and colors, and building forms and features. A goal of the review is to achieve a level of compatibility along the corridor and a balance among new development, existing character, and historic character. Proposed development is considered as it is viewed from the Entrance Corridor street. The Ivy Exxon building addition and site changes will be reviewed by the ARB according to the Entrance Corridor Design Guidelines during the site plan review process.

3. Harmony. Whether the proposed special use will be in harmony with the purpose and intent of this chapter,

Staff finds that the proposed use is in harmony with the purpose and intent of this chapter. Section 18-22 of the Zoning Ordinance outlines the intent of the C-1 Commercial zoning district: *"C-1 districts are hereby created and may hereafter be established by amendment to the zoning map to permit selected retail sales, service and public use establishments which are primarily oriented to central business concentrations. It is intended that C-1 districts be established only within the urban area, communities and villages in the comprehensive plan."*

The proposed use is consistent with the uses described in the intent of the zoning district. It is not consistent with the intent that these districts be established only in the Development Area of the Comprehensive Plan. However, this property has been zoned C-1 since 1980. Additionally, Ivy was previously designated a Village in the Comprehensive Plan until 1989.

Section 18-1.5 of the Zoning Ordinance states that an intent of the Ordinance is to *"implement the policies, goals and objectives of the comprehensive plan."* Staff has used the scale of the surrounding area (which includes other commercial uses) for guidance in evaluating the scale of the proposed expansion. Additional analysis is provided the preceding section of this report ('Character of the area') and the following section of this report ('Consistency with the Comprehensive Plan').

a. with the uses permitted by right in the district,

The intent of the C-1 zoning district, stated in section 18-22.1, is that C-1 districts "*be established only within the urban area, communities and villages in the comprehensive plan*." This application is for a special use permit, and therefore does not change the zoning district of the property. The property is already zoned C-1 Commercial and was previously within a designated Village. The proposed use is consistent with uses permitted in the C-1 zoning district. Given that this site is not served by public water, other C-1 uses (such as retail and commercial) would also require a special use permit, if consuming more than 400 gallons per acre per day.

b. with the regulations provided in Section 5 as applicable,

The proposed use will need to meet the regulations of 18-5.1.20 for fuel sales during site planning. Preliminary review shows that existing storage tanks may not be meeting this setback requirement; however, there are no proposed changes to the storage tanks or fuel pumps this proposal. Any future storage tanks would need to meet this requirement. The proposed use will also need to meet the regulations of 18-5.1.31 for supplementary regulations for auto service uses. The applicant has included the requirements of 18-5.1.31 as notes on the concept plan. This includes screening any cars awaiting repair from public streets and residential properties.

c. and with the public health, safety, and general welfare.
Public health, safety, and welfare comments are also provided above in the first factor section: "*No substantial detriment. Whether the proposed special use will be a substantial detriment to adjacent parcels.*" Based on this analysis and proposed conditions, staff's opinion is that the development is consistent with public health, safety, and general welfare. Additional information on an existing joint access easement and ingress/egress to the site is provided in the following paragraph.

Access to the Site
There is an existing joint access easement across this property (TMP 58A2-21), which is also used by TMP 58A2-24C (C-1 property used by Rivanna Water and Sewer Authority) and by TMP 58A2-24 (RA property with one dwelling unit). This access easement and/or access to these properties may need to be adjusted during site planning, in order to meet current VDOT standards for access management and safety. VDOT finds that the ingress/egress for this property (Ivy Exxon) does not meet VDOT's current design standards, and that upgrading to meet current standards could also affect the joint access easement. Given that this is a site plan requirement that affects access to the entire Ivy Exxon site (not just the expansion), staff finds that this issue should be addressed during site planning. There is a note on the application plan stating that access for all parcels will remain, even if the access easement or layout needs to be adjusted, and that the final location and layout proposed landscaping area and ingress/egress will be determined during site planning. The proposed ingress/egress on the application plan is not necessarily a final layout.

4. Consistency with the Comprehensive Plan. Whether the proposed special use will be consistent with the Comprehensive Plan.
The zoning of this property, C-1 Commercial, is inconsistent with the Comprehensive Plan land use recommendation which directs development into the Development Areas. However, as has been previously stated, the decision to zone this property C-1 Commercial has been made and the County has initiated no action since 1980 to change the zoning designation. Additionally, the property was previously within a Village (Development Area) until 1989.

Strategy 1a of Chapter 3 (Growth Management) reads in part: *"Only approve new development proposals in the Rural Area that are supported by Rural Area goals, objectives, and strategies."* The scale and design of this proposal has been analyzed for consistency with the Rural Area chapter of the Comprehensive Plan and with the scale and design of nearby existing uses. The following analysis focuses on the Rural Area Chapter and includes other relevant sections.

Chapter 7: Rural Area
The preferred land uses in the Rural Area are agricultural and forestry uses. Other uses should be supportive either of agricultural and forestal uses, or of existing residents in the Rural Area. New structures and uses in the Rural Area, when permitted, should be of appropriate scale and character for the Rural Area. Staff has used the scale of surrounding existing uses for partial guidance on the appropriateness of the proposed scale. As previously included in the 'Character of the nearby area section' above, staff finds the proposed expansion is within the range of the building square footages and heights of existing nearby commercial, office, and institutional uses in the Ivy area.

The scale of the proposal should be consistent with the scale called for in this chapter of the Comprehensive Plan and with existing comparable uses and developments in the surrounding Rural Area. Supportive uses in the Rural Area are intended to provide services for residents in the immediate area. While it is not possible for staff to determine precisely which residents would be served by the proposed expansion, it is accessible to nearby neighborhoods and residential uses. The proposed expansion is to serve an additional five (5) vehicles per day, or approximately five additional customers.

Objective 2 of this Chapter is: *"Protect and preserve natural resources, which include mountains, hills, valleys, rivers, streams, groundwater, and retain continuous and unfragmented land for agriculture, forestry, biodiversity, and natural resource protection."* There are critical slopes on this property, however they will not be disturbed with this proposal. A portion of the property is in the floodplain. The applicant will be submitting a LOMC to determine the exact location of the floodplain. No building permit or site plan will be approved until the LOMC is received. The use would not significantly increase water usage on the site, and the Health Department has no objection to the proposal. There are no agricultural/forest districts, conservation easements, or open space agreements affecting this property.

Chapter 5: Historic, Cultural, and Scenic Resources
Objective 11 of this Chapter is to *"Protect the dark sky of Albemarle County as one of the many natural, scenic, scientific, and cultural resources for the benefit of residents, visitors, and the larger scientific community."* There is a proposed condition to limit the maximum allowable foot candles and require any new lighting to be full cutoff and on motion-sensor only during overnight hours. This condition is intended to limit potential negative impacts to nearby residential and rural properties, and to protect dark skies. The property is not within a National Register Historic District and does not contain any Designated Historic Resources.

SUMMARY:

Staff finds the following factors favorable to this request:
1. The application is consistent with the criteria for the issuance of a special use permit.
2. The proposed uses, equipment, and supplies would be within an enclosed building and not visible from the public right of way. Only repaired vehicles would be visible.

Staff finds the following factor(s) unfavorable to this request:
1. If the Board of Supervisors disagrees with the staff interpretation of the meaning and intent of the Comprehensive Plan, this application may be considered inconsistent with the Comprehensive Plan.

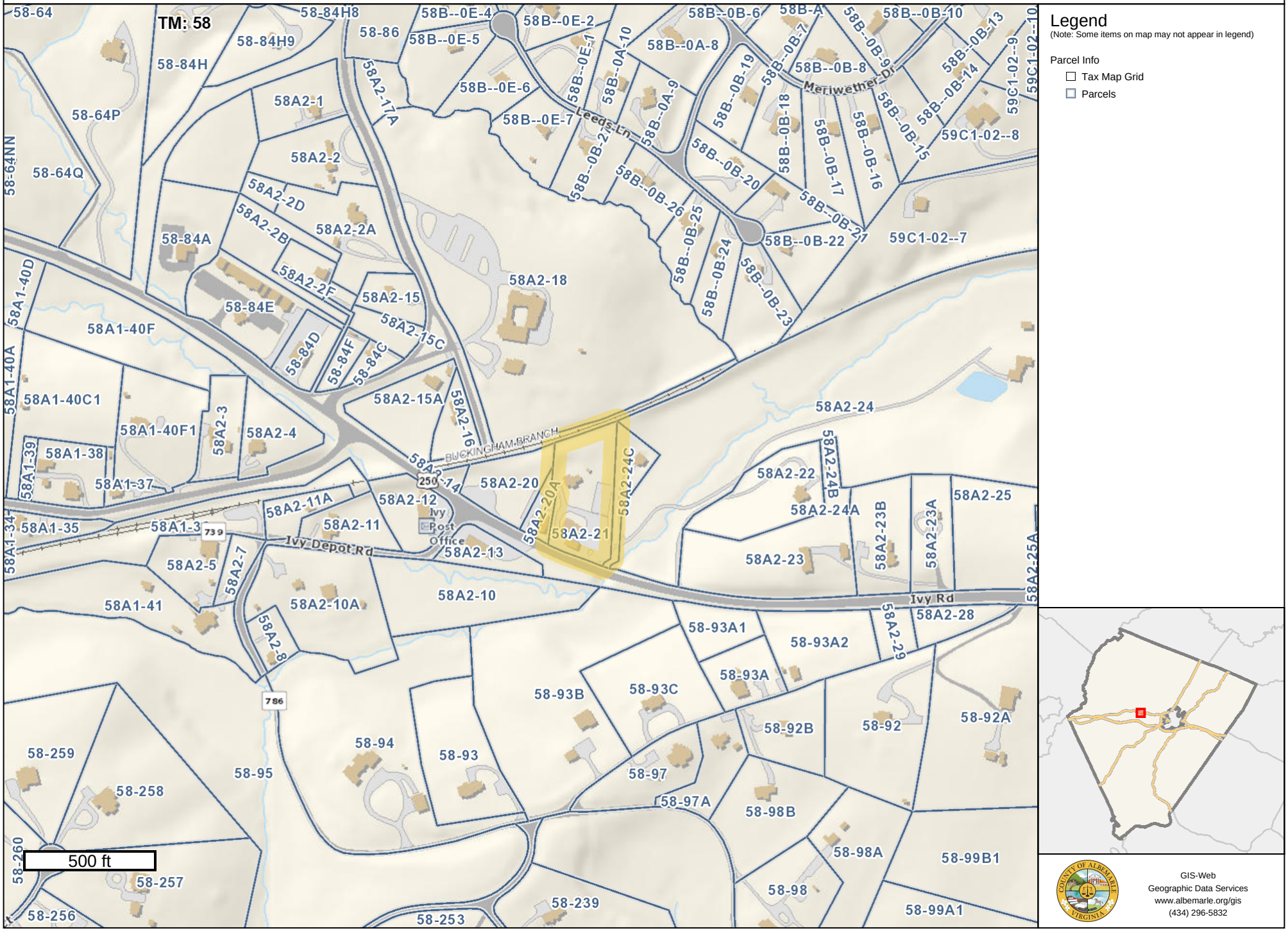
RECOMMENDED ACTION for SP202000006:
Staff recommends approval of the special use permit request with the following conditions:

CONDITIONS:
1. Development of the use shall be in general accord with the Conceptual Plan titled "Scott's Ivy Exxon – Special Use Permit – Conceptual Layout Plan", prepared by Collins Engineering, with the latest revision date of June 2, 2020, as determined by the Director of Planning and the Zoning Administrator. To be in general accord with the Conceptual Plan, development shall reflect the following major elements within the development essential to the design of the development and as described in the narrative and concept plan:
    a. Location and building footprint of the proposed expansion.
    b. The number of auto service bays.
    c. Mitigating landscaping within the stream buffer, to the satisfaction of the County Engineer.
    d. Location and type of proposed landscaping buffer. The landscaping buffer must be a mixture of deciduous and evergreen plantings, to the satisfaction of the Planning Director.
    e. Location of the parking areas.
2. The following restrictions to any new outdoor lighting must apply: all fixtures must be full cutoff; lighting is limited to 20 foot-candles at the ground; new outdoor lighting must be on a timer or motion sensor between the hours of 10 PM and 6 AM.

3. All mechanical equipment must be fully screened from the view of adjacent properties and adjacent public streets.
4. Hours of operation of the service station must be between 7 AM and 9 PM, Monday through Saturday. Fuel sales are permitted 24 hours per day.
5. The maximum building height is 24 feet.
6. All stormwater management treatment for the proposed expansion must be provided onsite.

ATTACHMENTS

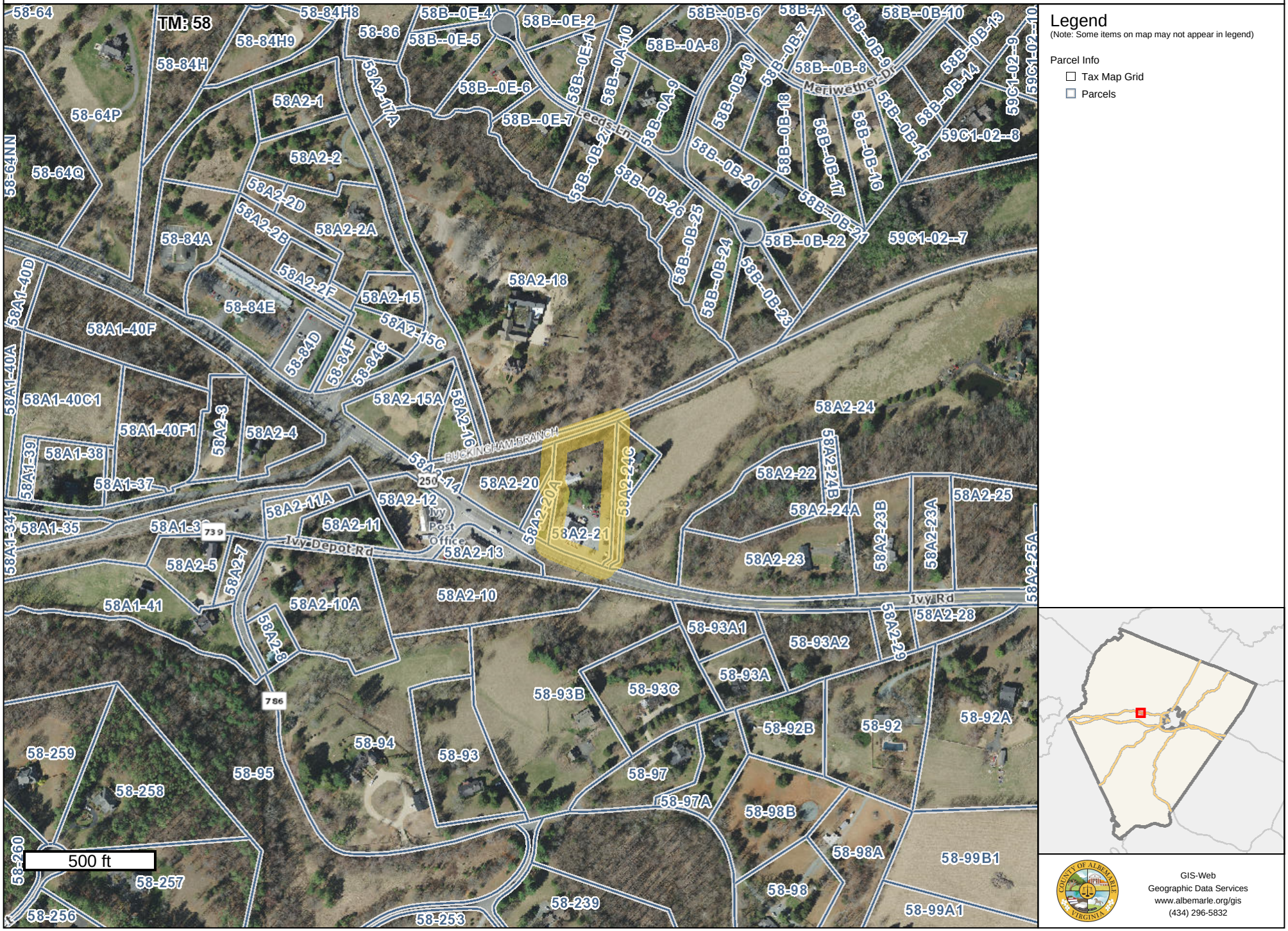
Attachment 1 – Vicinity Maps
Attachment 2 – Map showing zoning of surrounding area
Attachment 3 – Project Narrative and Concept Plan, latest revision date of June 2, 2020
Attachment 4 – Additional information provided by DEQ
Attachment 5 – Comments Received from the Public
Attachment 6 – Monitoring Report for Ivy Exxon Site, dated March 3, 2020
Attachment 7 – Close Out Report for Toddsbury Site, dated May 2, 2019
Attachment 8 – BTEX Report, dated April 12, 2013



Any determination of topography or contours, or any depiction of physical improvements, property lines or boundaries is for general information only and shall not be used for the design, modification, or construction of improvements to real property or for flood plain determination.

June 8, 2020

Map elements may scale larger than GIS data measured in the map or as provided on the data download page due to the projection used. Map Projection: WGS84 Web Mercator (Auxiliary Sphere) (EPSG 3857)



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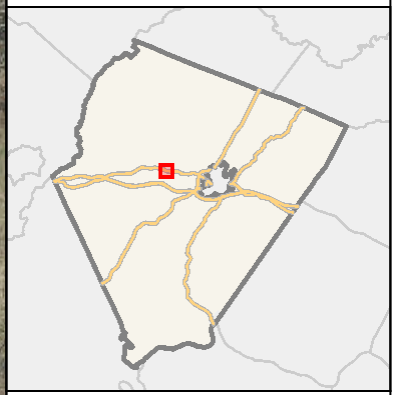


Legend

(Note: Some items on map may not appear in legend)

Parcel Info

- ☐ Tax Map Grid
- ☐ Parcels

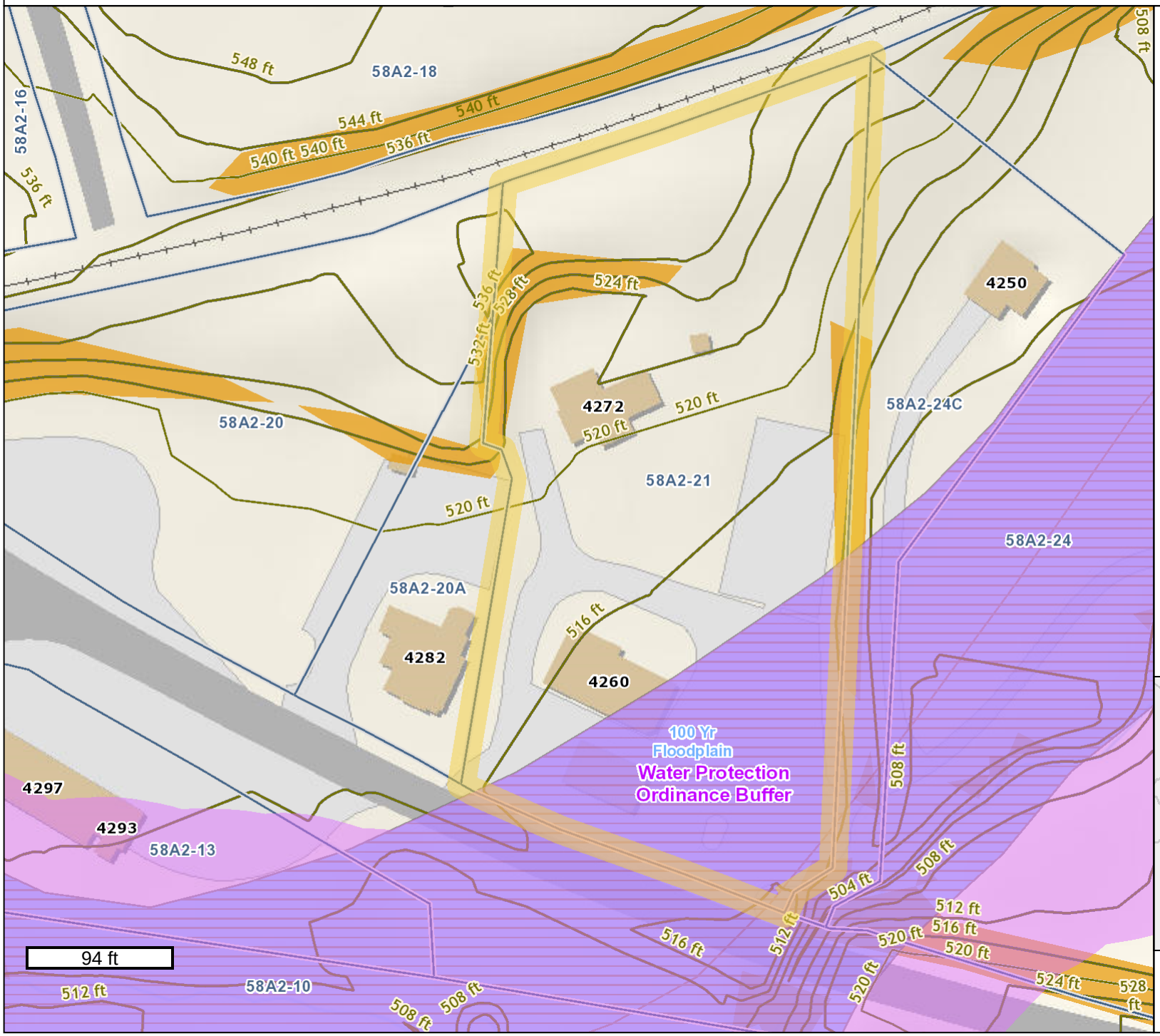


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Legend

(Note: Some items on map may not appear in legend)

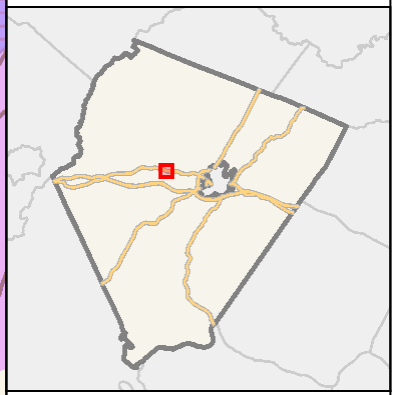
Overlays
- Water Protection Ordinance Buffers

Parcel Info
- Parcels

Elevation
- Y2018 Elevation Contours
  - Y2018 Elevation Contours (100 ft)
  - Y2018 Elevation Contours (60 ft)
  - Y2018 Elevation Contours (40 ft)
  - Y2018 Elevation Contours (20 ft)
  - Y2018 Elevation Contours (4 ft)

Zoning Info
- Flood Hazard Overlay (100 Year Flo

Steep Slopes Overlay
- Critical Slopes
- Steep Slopes - Managed
- Steep Slopes - Preserved

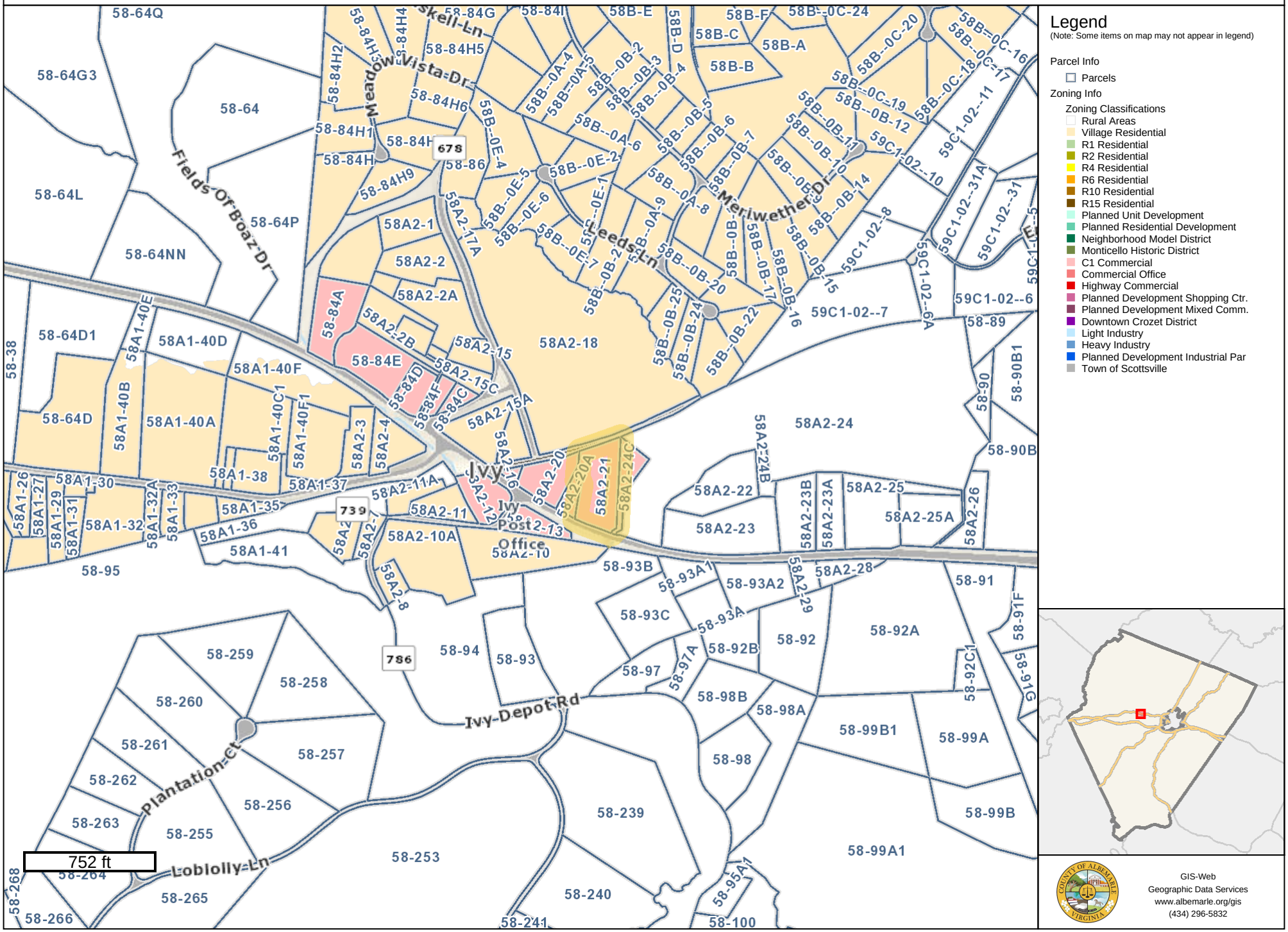


GIS-Web
Geographic Data Services
www.albemarle.org/gis
(434) 296-5832

Any determination of topography or contours, or any depiction of physical improvements, property lines or boundaries is for general information only and shall not be used for the design, modification, or construction of improvements to real property or for flood plain determination.

June 8, 2020

Map elements may scale larger than GIS data measured in the map or as provided on the data download page due to the projection used. Map Projection: WGS84 Web Mercator (Auxiliary Sphere) (EPSG 3857)



Any determination of topography or contours, or any depiction of physical improvements, property lines or boundaries is for general information only and shall not be used for the design, modification, or construction of improvements to real property or for flood plain determination.

June 8, 2020

Map elements may scale larger than GIS data measured in the map or as provided on the data download page due to the projection used. Map Projection: WGS84 Web Mercator (Auxiliary Sphere) (EPSG 3857)

SCOTT'S IVY EXXON – SPECIAL USE PERMIT

EXISTING AUTO SERVICE STATION
SPECIAL USE PERMIT (SP 2020-00006)
SAMUEL MILLER DISTRICT

NARRATIVE AND APPLICATION PLAN

Submission Date: FEBRARY 18, 2020
Revision #1: April 20, 2020
Revision #2: June 2, 2020

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1. INTRODUCTION

1.1 Project Narrative

The applicant is seeking a special use permit for the proposed renovation and expansion of the Scott's Ivy Exxon Auto Service station, located at Ivy Depot in Albemarle County. The current use of the property is a by-right use under the existing zoning, and is located within the Rural Area. The buildings and service station, which was constructed sometime between the 1965 and 1977, has been in operation for about 50 years. The applicant purchased this property and the business, and has been operating the auto service station from this location since 2012.

The existing Scott's Ivy Exxon Auto Service station has (2) gas pumps and (3) service bays. The proposed expansion is for an increase in the service bays from the (3) existing bays to (7) bays. No changes or modifications are proposed to the number of gas pumps for the service station. The proposed increase in service bays is a modification to the auto service business to increase the efficiency of the auto service station, but it will not increase the number of gas pumps or increase the number of auto service mechanics and technicians. Currently, when a car is serviced at the station, the technician will run a diagnostic on a car to determine the issues with the car and the cost of the proposed services. In many circumstances, determining the issues with a car requires the technician to take apart certain aspects of the car or car engine. Once the technician figures out the problems, they will contact the owner to discuss the next steps and how to fix the car. Resolution or authorization to move forward on the services sometimes takes several hours from the owners of the vehicle. Under the current scenario, the technician has put the car back together and move it out of the service bay to work on another vehicle while they wait for approval or authorization to move forward with the service repairs. This creates a loss in productivity for the service station. The (4) additional bays will allow the technicians to perform the diagnostics on a car and then move on to another car in an adjacent service bay while they wait for approval or authorization to continue with the service repairs, without having to stop, put the car back together, and remove it from its service bay. The increase in efficiency will allow the Ivy Exxon station to provide better overall service for its customers. Also, it is projected that the increase in efficiency will allow the auto shop to increase the number of cars that it can work on in a day by approximately 70%. The average number of cars that the Ivy Exxon services each day is approximately 8 cars, and it is projected that this will increase to about 13 cars a day.

The existing business currently operates with a well & septic system. The current use of the property is a non-conforming use, because the existing business, which is an auto service station, operates on a well. While sanitary sewer service is not available within this location of Albemarle County, water service is available. However, the existing water lines in the area are located on the adjacent property to the north, on the other side of the railroad tracks. Connecting to the existing waterline would require a substantial cost to bore under the existing railroad track for a waterline connection. Therefore, the applicant is seeking to continue to operate the business without a public water connection, which requires a Special Use Permit. Since the owner is making modifications to the building, they are required to obtain a special use permit to continue to operate on the existing well, bringing the property into conformance with the Zoning Ordinance.

Scott's Ivy Exxon Auto Service station provides a much-needed public benefit to the community. It provides a dependable and trustworthy auto servicing for the Ivy, Crozet, and Charlottesville community. The service station has been operating and providing auto services for almost 50 years and is looking to upgrade the current facility to continue to meet the public needs and demands in the area.

1.2 Consistency with the Comprehensive Plan

The existing auto service station is located within the Rural Area of Albemarle County, as shown on Figure 1. The existing zoning of the property, shown on Figure 2, is C-1 commercial. The auto service station is an existing by-right use in the C-1 zoning district, and the auto service business has been in operation for approximately 50 years at this location. The existing use is a non-conforming use, because the automobile service station is not served by public water or an approved central water supply. With the modifications proposed to the service bays on the building, the applicant is seeking a special use permit in accordance with the C-1 Zoning ordinance to continue to operate the automobile service station from an existing well. The applicant is not increasing the number of gas pumps as part of this modification to the service station. The applicant is adding additional auto service bays to help with the overall efficiency of the auto service business on the property. The existing auto service station meets a need the need for car servicing for the existing rural area and adjacent development neighborhoods in this area.

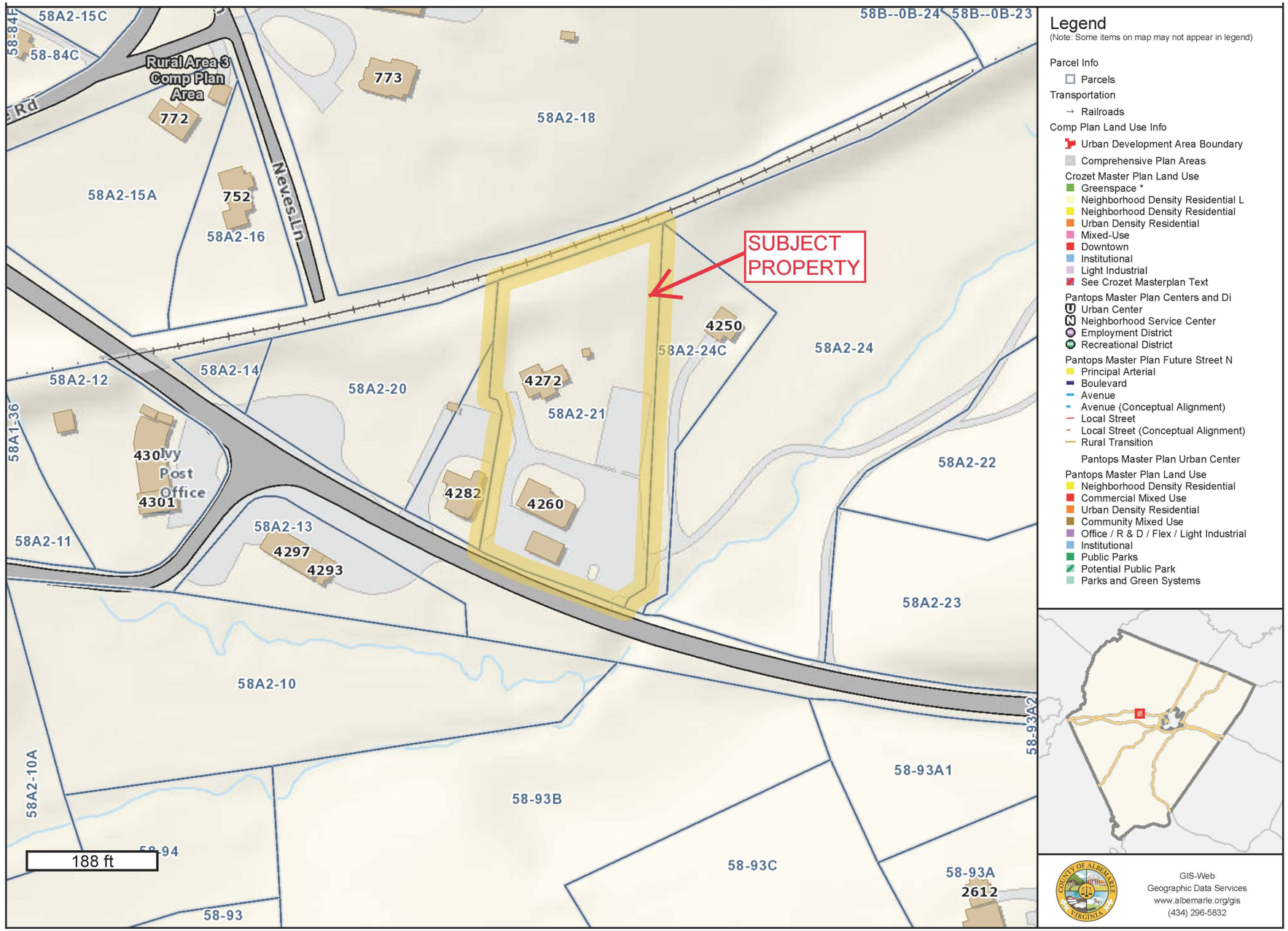


Figure 1: Current Comprehensive Plan

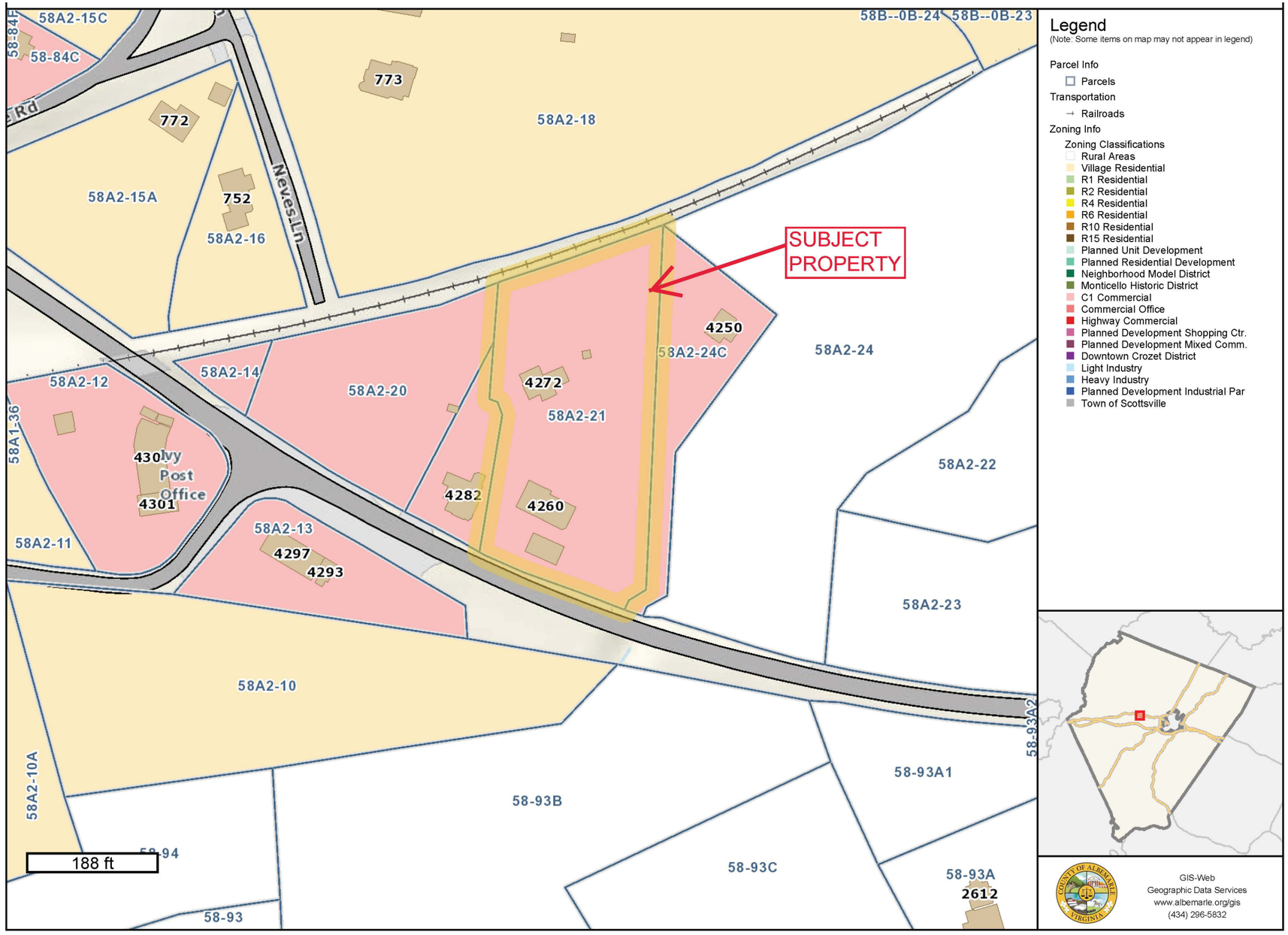


Figure 2: Current Zoning Map

1.3 Existing Conditions

The subjection property, as shown in Figure 3 on this page, is located along Route 250 (Ivy Road), just east of the intersection of Ivy Depot Road and Ivy Road in the western part of Albemarle County. The parcel is 1.613 acres in size and is located adjacent to Little Ivy Creek. The property is bordered to the east by parcel owned and maintained by the Rivanna Water and Sewer Authority and by an existing residence. Both properties have an existing access easement through the subject property for a connection to Route 250. Little Ivy Creek also is adjacent to the property on the east. The site is bounded to the north by the existing railroad. On the other side of the tracks north of the property is St. Pauls Episcopal Church. The property to the west of the Ivy Exxon station is an existing commercial business, and the property to the south is an existing auto service station and convenience store.

There are (2) buildings on the existing property, which were constructed between the mid 1960's and late 1970's. Aerial maps and images show these (2) buildings as existing in 1968 (but not in 1963), and the Albemarle County records show the front buildings being constructed for a service garage in 1977, but also indicates the improvements as existing before 1977. The front building is currently an auto service station and the building in the rear is an existing residential house.

The topography of the subject property is primarily sloped terrain from the back of the property down to Route 250 and to Little Ivy Creek. There is approximately 24 feet of elevation change from the back of the site to Route 250 and Little Ivy Creek. The front half of the property is primarily asphalt and gravel, and is being utilized for the service station gas pumps and parking for the auto service shop. The back half of the site is partially wooded with trees and vegetation surrounding the existing residential house and providing a vegetative buffer between the subject property and the railroad. The current plan for the existing residential house on the property is to remain. The existing house is not part of this application.

The applicant is proposing to renovate and expand the existing auto service station with this application, while still operating the existing auto service station (with no expansion to the gas pumps on the property).

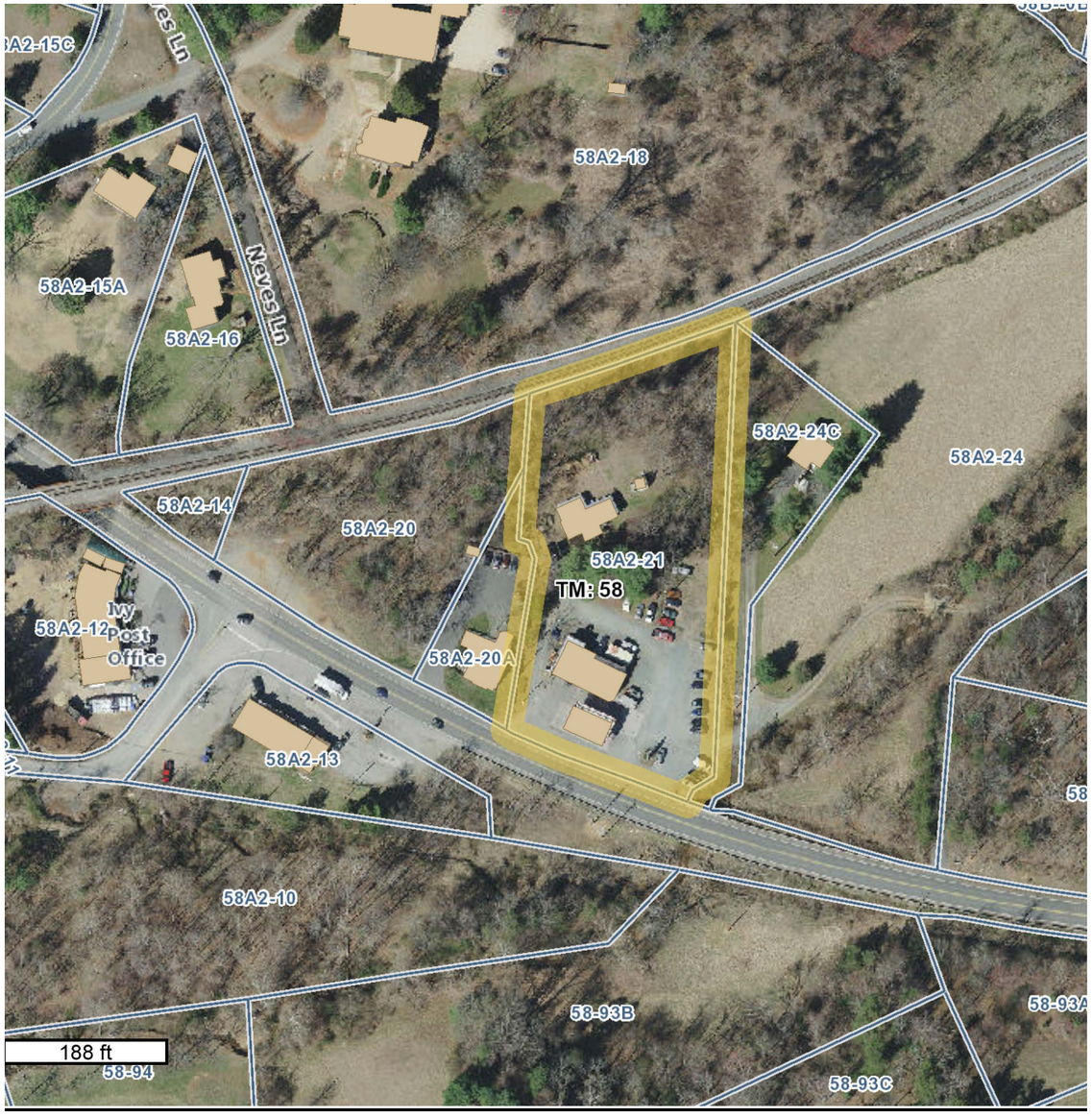


Figure 3: Overall Context Map

1.4 Development Impacts

As stated above, this property is located within the Albemarle County Rural area is currently operating from an existing well and septic system. The existing well and septic are adequate for the existing business and the proposed service bay expansion will have a minimal effect on the overall water consumption and water usage for the property. No additional gas pumps are being added to the site with the current proposal for the expansion of the facility. Because the subject property is proposing to maintain the existing well and septic system, there is no impact on the public utilities with this proposal.

The existing auto service station is located within 5 miles of an existing fire department station. No additional fire/rescue services are needed to this proposal.

There are no proposed additional residential units proposed with this application. As a result, there will be no impacts to the Albemarle County Public Schools with the proposed special use permit application.

The parcel is located along Route 250 (Ivy Road). The proposed application plan shows improvements along the frontage of the site to maintain traffic flow in and out of the property. See the transportation narrative for additional information on the proposed traffic improvements for the property.

1.5 Environmental Impacts

Figure 4 illustrates the existing environmental features on the property. There is an existing floodplain on the property; however, it is currently not mapped in accordance with the existing topography on the property. The mapping on Figure 4 illustrates the floodplain incorporating about 1/3 of the property, including a portion of the existing building and service station gas pumps. Using the existing topography of the site from the recent survey and mapping the FEMA floodplain elevation on the existing topography, the floodplain only overlays a very small portion of the site. This is illustrated on the existing conditions sheet in this application plan. A letter of map revision (LOMR) will need to be processed with the site plan for the proposed auto service station expansion. This LOMR will allow the building expansion and the existing portion of the property where the cars are currently parked for auto service work to remain in this location. Without the LOMR, the cars could not be parked in this area overnight, and the existing building could not be expanded. With the approval of the LOMR, there will be no improvements proposed with this application plan in the limits of the FEMA floodplain.

There is a small area of critical slopes on the property to the north of the existing residential building. This area of the property will not be disturbed with the expansion of the auto service station. There are no proposed impacts to the critical slopes on the property with this proposal.

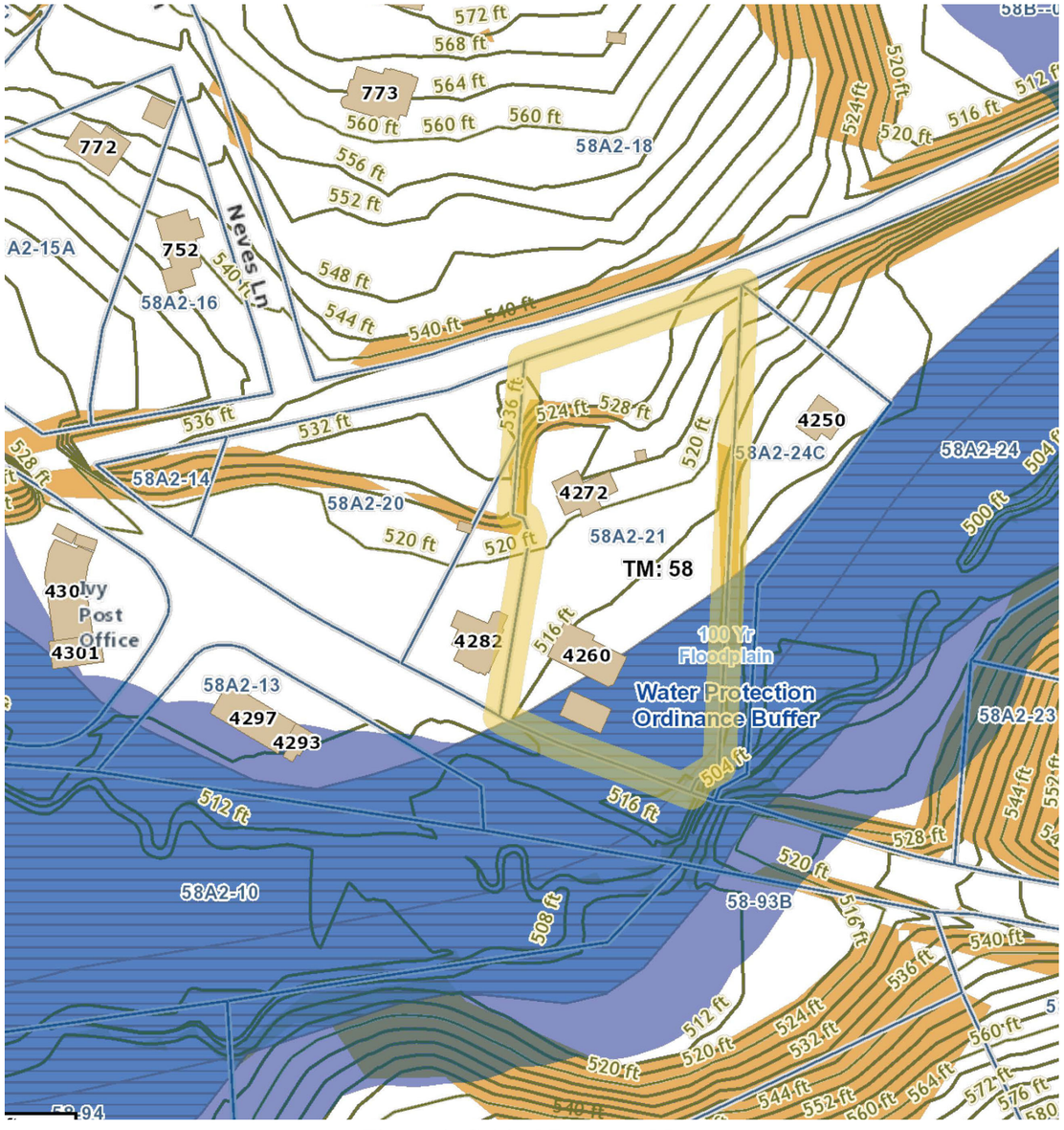


Figure 4: Critical Resource Map

2. DESIGN ELEMENTS & FACTORS FOR THE SPECIAL USE PERMIT

2.1 Traffic and Transportation Improvements

The property is located along Route 250 (Ivy Road) which is a minor arterial roadway in Albemarle County. The current AADT volume of traffic on this portion of the roadway is approximately 13,000 VPD. The subject parcel is located along a 2200ft stretch of the roadway where the posted speed limit is 35 mph. There are no left turn lanes for any of the existing businesses along this portion of Ivy road, mainly due to the fact that there is an existing 2 lane bridge crossing over Little Ivy Creek and an existing 2 lane railroad underpass within the 2200 linear feet of roadway. The existing bridge underpass is located approximately 650 feet from the existing bridge, and the intersection for Ivy Depot Road is located between these (2) restrictions.

The current traffic trips per day with the existing auto service station, per the 10th Editions of the ITE Trip Generation Manual, is as follows:

Section 944 – Gasoline/Service Station
Daily Trips: 2 existing gas stations (4 pumps total) x 172 VPD = 688 VPD
Peak Hour (AM): 10.28 trips/hr x 4 pumps = 41 VPH (21 trips in & 20 trips out)
Peak Hour (PM): 14.03 trips/hr x 4 pumps = 56 VPH (28 trips in & 28 trips out)

The ITE manual lists the total trips per day for an automobile care center (Section 942) is not applicable.

As noted in this application plan, the proposed expansion of the Ivy Exxon auto service station is only for the auto service garage portion of the business. The number of gas pumps is not increasing with this application. The total number of service bays is increasing from 3 bays to 7 service bays. No increase in the number of mechanics or technicians are proposed with this expansion. The increase of the service bays is to increase the productivity of the auto service station when working on cars. The additional services bays will allow a service mechanic/technician to work on another car in the adjacent service bay while authorization to proceed with the service work is confirmed with the customers on a car in the current service bay. Currently, the technician has to put the car back together after the diagnostics is complete and the car moved out of the service bay while they await authorization from the customer to proceed with the services.

The auto station services approximately 8 cars a day. It is estimated that this will increase by 70% with the additional (4) service bays, increasing the total number of cars serviced from 8 cars to 13 cars, for a total net increase of 5 cars a day (10 trips/day). Based on the ITE Trip Generation Manual (10th Edition), the total trips per day for the auto service station is 344 VPD. This is a much higher number than the actual trips per day that the service station has been averaging over the past 50 years. In addition, there is an existing auto service and convenience store across the street from this gas station which also services this area, reducing the total amount of trips per day for the subject property.

The AADT volumes on this portion of the roadway require most of the existing businesses, the intersection of Ivy Depot Road & Ivy Road, and the intersection of Owensville Road & Ivy Road to warrant a left turn lane. Due to the existing conditions of this portion of the road, left turn lanes can not be achieved with the railroad underpass and existing bridge over Little Ivy Creek. In addition, the increase of efficiency of the service station does not substantially increase the traffic to the property where a left turn would be warranted for the proposed auto service expansion. With the reduced speed along this portion of the roadway, and the existing traffic patterns of vehicles turning left on Owensville Road and Ivy Depot Lane, gaps are created in the traffic pattern allowing for the left turn into the subject property.

The application plan is proposing traffic and transportation improvements along the frontage of the property that will control the vehicles entering and existing the site. Currently, the front of the property allows access from Route 250 along the entire frontage of the property. The proposed application plan will create a specific entrance and exit on the property, closing the remaining portions of the property from direct access to Route 250. This will help control the number of conflict points with vehicles currently entering and exiting the site. With the proposed frontage improvements, a right turn taper will also be added from the end of the guardrail at the bridge abutment to the proposed entrance to the property. This taper will allow the vehicles to reduce speed and make the right turn into the site.

2.2 Lighting

The existing canopy over the (2) gas pump stations has (8) LED lights that will remain. There is also an existing street light along the western property line at Route 250 and an existing street light in the rear of the property where cars are currently parked for service. Additional lighting may be added to the building expansion to provide more lighting at the rear of the property for the auto service station. No additional lighting is proposed at the front of the site, at the canopy, or along the front of the existing building to remain. All new lighting shall conform with the Albemarle County ordinance and shall be full-cutoff lighting, screened to the extent possible, and limited to 0.5 footcandles at the property lines. The final site plan will include a lighting plan for any additional lighting at the rear of the property. The existing lighting on the site shall remain on during the evenings for the operation of the gas pumps. Any new lighting proposed with the project will have an overnight automatic cut-off or motion-censored cut-off added to the light to mitigate the impact of the new light fixtures.

2.3 Water Usage

The subject property (Scott's Ivy Exxon) is part of an on-going DEQ investigation (Tier III investigation) with existing monitoring wells and updated yearly inspections on the water table and quality of water on the property. The ongoing monitoring and investigation is due to an open review of an existing leaking underground storage tank on the gas station 100 feet west of the subject property. The monitoring wells have been checked and verified yearly by DEQ on the subject property and the surrounding properties in this area. Groundwater testing and monitoring was part of this overall analysis.

The auto service bay expansion proposed for the property will have a minimal effect on the current overall water usage for the business. The auto service station is not increasing in size or the number of gas pumps, so this will not create an increase of water usage. The total number of employees and technicians is not proposed to increase, based on the analysis provided in the application. Based on the VA code 12VAC5-590-690, the estimated water usage for a service station is 10 gallons per day per vehicle serviced. With the servicing of (5) additional cars a day, this will create an approximate increase of water usage by 50 gallons per day, which is a nominal increase in the water usage on the property. Renovations to the existing restrooms are proposed with modifications to the building. Overall, based on the environmental report and Tier III Water analysis on the property, the current well can accommodate the existing business and the expansion of the auto service station.

2.4 Sounds & Smell

The existing auto service station is proposing to function as it currently does and has over the past 50 years. The service station has become an essential part of the neighborhood, providing a much-needed service the community. The station is located on a 1.6 acre property that is bounded by other commercial businesses that are similar in nature, and the service station does not have an adverse effect on the noise and smells in the area.

2.5 Visual Impacts and Building Design

The existing buildings on the property will be maintained with the proposed auto service expansion. The building expansion will be added to the rear of the existing service station building, and will be taller than the existing building. The specific design of the building addition will go through the Architectural Review Process.

The existing canopy at the front of the property will remain; however, a small portion of the canopy overhang will be removed, as it currently extends approximately 6 inches into the VDOT right of way.

2.6 Landscaping

All landscaping shall conform to the landscaping standards as specified in the Albemarle County Zoning Ordinance Section 32.7.9. Street trees and landscaping shall be provided along Route 250 with the proposed transportation improvements. Grass planting areas will be created in the location where the existing pavement is removed within the VDOT right of way and along the frontage of the property to restrict access points into the site. These planting areas are shown on the application plan. The street trees shall be planted in the landscaping areas within the Right of way in accordance with the approved VDOT street trees as outlined in the VDOT design manual and regulations. Spacing of street trees shall be planted in accordance with Section 32.7.9 of the Albemarle County Code for Landscaping and Screening requirements. Street trees along the public streets shall be subject to the approval of the Albemarle County Architectural Review Board and shall meet the requirements outlined in the Architectural Review Board Design Guidelines. All other landscaping shall be subject to Section 32.7.9 of the Albemarle County Code for landscaping and screening requirements.

Screening and interior landscaping will also be part of the final site plan to provide a visual barrier and site landscaping as required the Albemarle County Ordinance along Route 250, within the parking lot areas for the service station, and along the perimeter of the parking areas. Landscaping islands shall be incorporated into the parking lot envelopes as noted on the application plan.

2.7 Grading

Grading of the site shall adhere to the existing topography on the property. Some grading will need to be performed between the existing residential house and the back of the service station to accommodate the building expansion, site circulation, and service station parking area, but the majority of the site will remain at the current grades and elevation.

2.8 Stormwater Management

All designs and engineering for the expansion of the auto service station on the property shall adhere to the State Stormwater Management regulations and Albemarle County Water Protection Ordinance. The site will accommodate the stormwater management with a combination of rain gardens, water quality swales, grass retention areas, nutrient credits, and/or other stormwater management features treat water quality and water quantity from the runoff from the site before it reaches Little Ivy Creek. The final stormwater management design will be part of the site plan and water protection ordinance plan for the development. Landscape plantings will also be incorporated into the stormwater management facility.

Protective measures for erosion and sediment control shall be installed to limit any sediment run-off from reaching Route 250 and Little Ivy Creek during the construction phases. Additional measures may include, but not be limited to, installation of silt fence with wiring backing, usage of filter socks and floc logs for protection measures, providing additional wet and dry storage area in basins below the disturbed areas, or installation of erosion control matting for all slopes with the use of tackifiers in seeding and soil stabilization applications.

GENERAL NOTES:

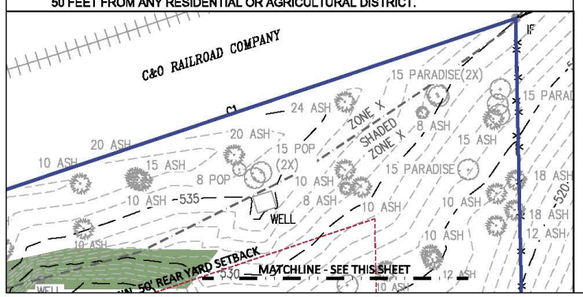
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APPLICANT: SCOTT'S IVY EXXON
4260 IVY ROAD
CHARLOTTESVILLE, VA 22903
OWNER: SR&DR LLC
1031 MILTON DRIVE
KESWICK, VA 22947
ENGINEER: COLLINS ENGINEERING, INC.
200 GARRETT STREET, SUITE K
CHARLOTTESVILLE, VA 22902
(434)293-3719
CURRENT ZONING: C-1 COMMERCIAL, WITH FLOODPLAIN, CRITICAL SLOPES, & ENTRANCE CORRIDOR OVERLAY DISTRICTS)
CURRENT/PROPOSED USE: THE CURRENT & PROPOSED USE IS AN AUTO SERVICE STATION WITH (3) EXISTING SERVICE BAYS AND (4) PROPOSED SERVICE BAYS.
PROPOSED SPECIAL USE PERMIT: IN ACCORDANCE WITH SECTION 18-22.2.16(a), A SPECIAL USE PERMIT IS BEING REQUESTED FOR THE AUTO SERVICE STATION ON THE PROPERTY WHEN NOT SERVED BY PUBLIC WATER OR AN APPROVED CENTRAL WATER SUPPLY.
ACREAGE: TOTAL ACREAGE OF PARCEL IS 1.613± ACRES
ALLOWABLE USES: THE ALLOWABLE USES FOR THIS DEVELOPMENT SHALL BE IN ACCORDANCE WITH SECTION 18-22.2
SETBACKS: FRONT BUILDING SETBACK:10' MIN.& 30' MAX. SETBACK FROM ROUTE 250
SIDE & REAR BLDG SETBACK: MIN. 50' SETBACK(ABUTTING ZONED RESIDENTIAL USES) & NO MAXIMUM SETBACK
SIDE & REAR BLDG SETBACK (ABUTTING ZONED COMMERCIAL/INDUSTRIAL): SEPARATION IN ACCORDANCE WITH CURRENT BUILDING CODE
PARKING SETBACK: 10' PARKING SETBACK FROM ROUTE 250
UTILITIES: WELL & SEPTIC
SURVEY: SURVEY AND BOUNDARY PROVIDED BY MERIDIAN PLANNING GROUP IN JANUARY, 2020.
ACCESS: THE SITE CURRENTLY HAS ACCESS FROM ROUTE 250 TO SERVICE THE SITE
PARKING: PARKING SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 18-4.12 OF THE ALBEMARLE COUNTY ZONING ORDINANCE FOR AUTOMOBILE SERVICE STATION USE. PARKING SHALL BE LOCATED WITHIN THE PARKING ENVELOPS SHOWN ON THE APPLICATION PLAN.
STORMWATER MGMT: STORMWATER MANAGEMENT WILL BE ACHIEVED FOR THE SITE IN ACCORDANCE WITH STATE STORMWATER MANAGEMENT REGULATIONS AND THE ALBEMARLE COUNTY WATER PROTECTION ORDINANCE.
FIRE & RESCUE: THIS PROJECT SHALL CONFORM WITH ALB. COUNTY FIRE & RESCUE REGULATIONS FOR FIRE PROTECTION AND ACCESS TO THE SITE.
LANDSCAPING AND BUFFERS: SEE APPLICATION PLAN FOR PROPOSED LANDSCAPING AREAS ON THE PROPERTY.
BUILDING HEIGHT: BUILDING HEIGHT SHALL BE IN ACCORDANCE WITH SECTION 18-4.20 OF THE ALBEMARLE COUNTY ZONING ORDINANCE.
PROPOSED BUILDING HEIGHT: 24 FEET +/-

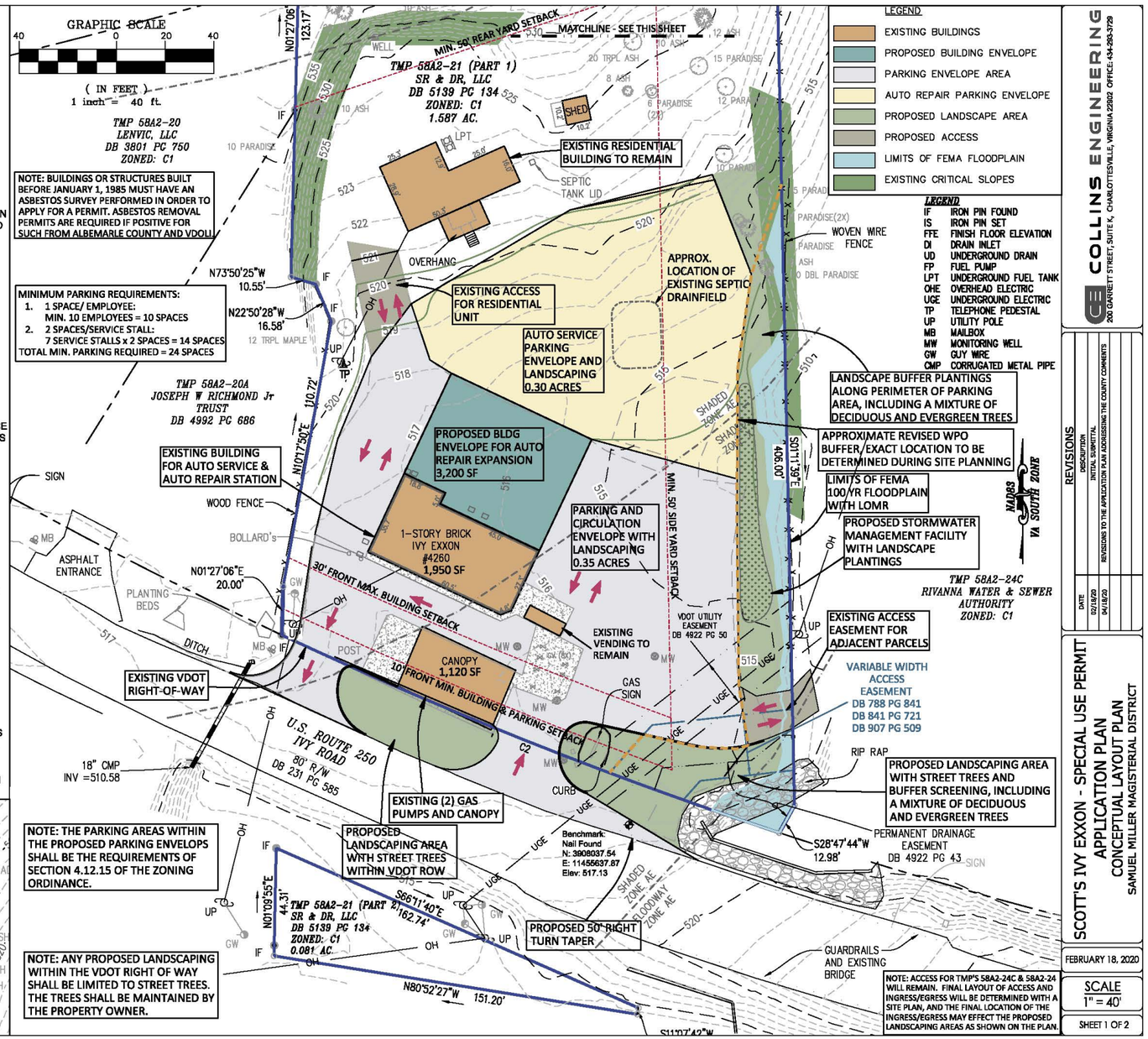
ENTRANCE CORRIDOR NOTES AND REQUIREMENTS:

1. VISIBILITY OF ALL MECHANICAL EQUIPMENT FROM THE ENTRANCE CORRIDOR SHALL BE ELIMINATED.
2. ALL SIGNS FOR THE SITE SHALL BE REVIEWED AND APPROVED BY ARB UNDER A SEPARATE SIGN APPLICATION.

NOTES:

1. THE SERVICE STATION SHALL COMPLY WITH THE REQUIREMENTS OF SECTION 18.5.1.20 OF THE ALBEMARLE COUNTY ZONING ORDINANCE. THIS INCLUDES THE SALE OR STORAGE OF THE PETROLEUM PRODUCTS SHALL SATISFY THE REQUIREMENTS ESTABLISHED BY THE FIRE PREVENTION CODE, AND NO NEW STORAGE TANKS OR LOADING FACILITIES SHALL BE LOCATED CLOSER THAN 100 FEET FROM ANY LOT LINE.
2. ALL PARTS, MATERIALS AND EQUIPMENT SHALL BE STORED WITHIN AN ENCLOSED BUILDING.
3. NO VEHICLE AWAITING REPAIR SHALL BE LOCATED ON ANY PORTION OF THE SITE SO AS TO BE VISIBLE FROM ANY PUBLIC STREET OR ANY RESIDENTIAL PROPERTY, AND SHALL BE LIMITED TO LOCATIONS DESIGNATED ON THE APPROVED SITE PLAN.
4. ALL SERVICES SHALL BE PERFORMED WITHIN AN ENCLOSED BUILDING.
5. NO BUILDINGS IN WHICH SERVICES ARE PERFORMED SHALL BE LOCATED CLOSER THAN 50 FEET FROM ANY RESIDENTIAL OR AGRICULTURAL DISTRICT.





REVISIONS

DESCRIPTION	DATE
INITIAL SUBMITTAL	02/18/20
REVISIONS TO THE APPLICATION PLAN ADDRESSING THE COUNTY COMMENTS	04/18/20

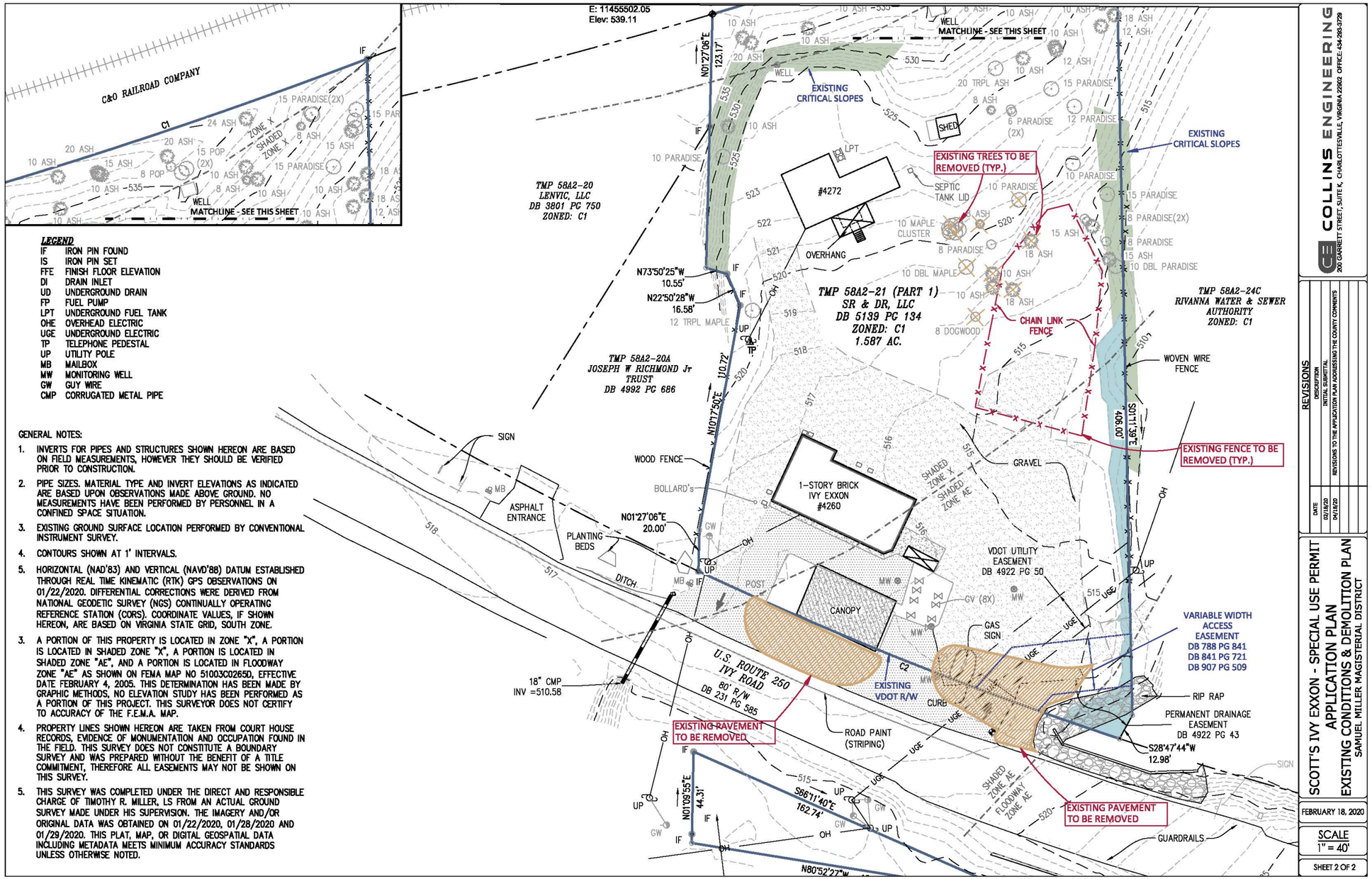
COLLINS ENGINEERING
200 GARRETT STREET, SUITE K, CHARLOTTESVILLE, VIRGINIA 22902 OFFICE: 434-293-3719

SCOTT'S IVY EXXON - SPECIAL USE PERMIT
APPLICATION PLAN
CONCEPTUAL LAYOUT PLAN
SAMUEL MILLER MAGISTERIAL DISTRICT

FEBRUARY 18, 2020

SCALE 1" = 40'

SHEET 1 OF 2


E: 11455502.05
Elev: 539.11
N01°27'06"E
123.17'
WELL
MATCHLINE - SEE THIS SHEET
EXISTING CRITICAL SLOPES
EXISTING TREES TO BE REMOVED (TYP.)
SHED
#4272
LPT
SEPTIC TANK LID
OVERHANG
TMP 58A2-20
LENVIC, LLC
DB 3801 PG 750
ZONED: C1
TMP 58A2-21 (PART 1)
SR & DR, LLC
DB 5139 PG 134
ZONED: C1
1.587 AC.
TMP 58A2-24C
RIVANNA WATER & SEWER AUTHORITY
ZONED: C1
N73°50'25"W
10.55'
N22°50'28"W
16.58'
12 TRPL MAPLE
TMP 58A2-20A
JOSEPH W RICHMOND Jr TRUST
DB 4992 PG 686
N01°17'50"E
110.72'
CHAIN LINK FENCE
WOVEN WIRE FENCE
S01°11'39"E
406.00'
EXISTING FENCE TO BE REMOVED (TYP.)
SIGN
WOOD FENCE
BOLLARD's
ASPHALT ENTRANCE
MB
PLANTING BEDS
N01°27'06"E
20.00'
1-STORY BRICK
IVY EXXON
#4260
GRAVEL
SHADED ZONE X
SHADED ZONE AE
VDOT UTILITY EASEMENT
DB 4922 PG 50
CANOPY
POST
GV (8X)
GAS SIGN
VARIABLE WIDTH ACCESS EASEMENT
DB 788 PG 841
DB 841 PG 721
DB 907 PG 509
RIP RAP
PERMANENT DRAINAGE EASEMENT
DB 4922 PG 43
S28°47'44"W
12.98'
18" CMP
INV =510.58
U.S. ROUTE 250
IVY ROAD
80' R/W
DB 231 PG 585
EXISTING VDOT R/W
CURB
ROAD PAINT (STRIPING)
EXISTING PAVEMENT TO BE REMOVED
EXISTING PAVEMENT TO BE REMOVED
N01°09'55"E
44.31'
S66°11'40"E
162.74'
N80°52'27"W
FLOODWAY ZONE AE
GUARDRAILS
DITCH
C&O RAILROAD COMPANY
ZONE X
SHADED ZONE X
C1
C2
LEGEND
IF IRON PIN FOUND
IS IRON PIN SET
FFE FINISH FLOOR ELEVATION
DI DRAIN INLET
UD UNDERGROUND DRAIN
FP FUEL PUMP
LPT UNDERGROUND FUEL TANK
OHE OVERHEAD ELECTRIC
UGE UNDERGROUND ELECTRIC
TP TELEPHONE PEDESTAL
UP UTILITY POLE
MB MAILBOX
MW MONITORING WELL
GW GUY WIRE
CMP CORRUGATED METAL PIPE
GENERAL NOTES:
1. INVERTS FOR PIPES AND STRUCTURES SHOWN HEREON ARE BASED ON FIELD MEASUREMENTS, HOWEVER THEY SHOULD BE VERIFIED PRIOR TO CONSTRUCTION.
2. PIPE SIZES, MATERIAL TYPE AND INVERT ELEVATIONS AS INDICATED ARE BASED UPON OBSERVATIONS MADE ABOVE GROUND. NO MEASUREMENTS HAVE BEEN PERFORMED BY PERSONNEL IN A CONFINED SPACE SITUATION.
3. EXISTING GROUND SURFACE LOCATION PERFORMED BY CONVENTIONAL INSTRUMENT SURVEY.
4. CONTOURS SHOWN AT 1' INTERVALS.
5. HORIZONTAL (NAD'83) AND VERTICAL (NAVD'88) DATUM ESTABLISHED THROUGH REAL TIME KINEMATIC (RTK) GPS OBSERVATIONS ON 01/22/2020. DIFFERENTIAL CORRECTIONS WERE DERIVED FROM NATIONAL GEODETIC SURVEY (NGS) CONTINUALLY OPERATING REFERENCE STATION (CORS). COORDINATE VALUES, IF SHOWN HEREON, ARE BASED ON VIRGINIA STATE GRID, SOUTH ZONE.
3. A PORTION OF THIS PROPERTY IS LOCATED IN ZONE "X", A PORTION IS LOCATED IN SHADED ZONE "X", A PORTION IS LOCATED IN SHADED ZONE "AE", AND A PORTION IS LOCATED IN FLOODWAY ZONE "AE" AS SHOWN ON FEMA MAP NO 51003C0265D, EFFECTIVE DATE FEBRUARY 4, 2005. THIS DETERMINATION HAS BEEN MADE BY GRAPHIC METHODS, NO ELEVATION STUDY HAS BEEN PERFORMED AS A PORTION OF THIS PROJECT. THIS SURVEYOR DOES NOT CERTIFY TO ACCURACY OF THE F.E.M.A. MAP.
4. PROPERTY LINES SHOWN HEREON ARE TAKEN FROM COURT HOUSE RECORDS, EVIDENCE OF MONUMENTATION AND OCCUPATION FOUND IN THE FIELD. THIS SURVEY DOES NOT CONSTITUTE A BOUNDARY SURVEY AND WAS PREPARED WITHOUT THE BENEFIT OF A TITLE COMMITMENT, THEREFORE ALL EASEMENTS MAY NOT BE SHOWN ON THIS SURVEY.
5. THIS SURVEY WAS COMPLETED UNDER THE DIRECT AND RESPONSIBLE CHARGE OF TIMOTHY R. MILLER, LS FROM AN ACTUAL GROUND SURVEY MADE UNDER HIS SUPERVISION. THE IMAGERY AND/OR ORIGINAL DATA WAS OBTAINED ON 01/22/2020, 01/28/2020 AND 01/29/2020. THIS PLAT, MAP, OR DIGITAL GEOSPATIAL DATA INCLUDING METADATA MEETS MINIMUM ACCURACY STANDARDS UNLESS OTHERWISE NOTED.
COLLINS ENGINEERING
200 GARRETT STREET, SUITE K, CHARLOTTESVILLE, VIRGINIA 22902 OFFICE 434-293-3719
REVISIONS
DESCRIPTION
DATE
INITIAL SUBMITTAL
02/18/20
REVISIONS TO THE APPLICATION PLAN ADDRESSING THE COUNTY COMMENTS
04/16/20
SCOTT'S IVY EXXON - SPECIAL USE PERMIT
APPLICATION PLAN
EXISTING CONDITIONS & DEMOLITION PLAN
SAMUEL MILLER MAGISTERIAL DISTRICT
FEBRUARY 18, 2020
SCALE
1" = 40'
SHEET 2 OF 2

SP202000006 Ivy Exxon
Attachment 4
Information provided by DEQ

The following information has been provided by Todd Pitsenberger, Petroleum and Pollution Response Program Manager, Virginia Department of Environmental Quality - Valley Regional Office. Staff's questions to Mr. Pitsenberger are followed by Mr. Pitsenberger's responses:

1. Staff question: The BTEX study for Scott's Ivy Exxon was done before the large flood in May 2018. How did that flood impact contamination of surrounding property? Did that flood threaten area wells and future well sites and drainage fields?

   Response: The flood would not be expected to have significantly impacted petroleum contamination migration or concentrations in that area. The petroleum plume is deep and still there, but concentrations have decreased as the contaminants continue to dissolve. There are two components to the petroleum contamination at these two sites (Toddsbury of Ivy and Ivy Exxon) - a shallow dissolved-phase groundwater plume approx. 10-20 feet below grade (fbg), and a deeper dissolved-phase plume approx. 80-90 fbg. Concentrations have steadily decreased since the releases at both sites were discovered due to substantial corrective action efforts at the Toddsbury site and natural attenuation at both sites.

   Scott's Ivy Exxon was recently sampled around the new year Dec 2019/Jan 2020.
   - Sampled February 13, 2020.

2. Staff question: How should members of the community proceed if they are concerned that their wells are now contaminated as a result of the May 2018 flood?

   Response: DEQ would want to know if the well is contaminated with petroleum or E.coli or some other contaminant. You indicated on the call that a resident in the area had contacted someone with the County to report their well has become "impacted" as a result of the flood in 2018. I indicated to you that I believe DEQ is unaware of that impact at this point. If it is petroleum hydrocarbon related, I would certainly want to know and could possibly offer carbon filtration to the owner as a temporary fix until the source of the contamination is confirmed and a permanent alternate water supply can be developed.

   As of now, DEQ is not aware of new supply wells that have been impacted by petroleum contamination in this area; actually three of the four wells impacted in the vicinity of the Toddsbury and Exxon sites have improved to the point that carbon filtration systems are no longer needed. The four impacted wells were located at 4226, 4260, 4282, and 4297 Ivy Road. The well at 4260 (which is a shared well serving the Exxon and a rental residence behind the station) is the only one still receiving carbon treatment at this point. If wells have been found to have petroleum contamination, DEQ can provide well owners with carbon filtration systems.

3. Staff question: Does DEQ have additional information on the leaking underground storage tank on the Toddsbury site (TMP 58A2-13)?

Response: This case has been closed. The release was found to no longer present a risk to the environment or existing users (i.e. drinking water supply wells or Little Ivy Creek or its tributaries). Case closure memo summarizing the case history, characterization, and risk assessment is attached.

4. Staff question: Given that the proposed expansion is for additional service bays only, does the expansion have any effect on the existing underground storage tank issues? The applicant estimates an additional five (5) cars would be serviced per day, which based on VA state code is about 50 gallons per day additional water usage. There is no proposed change in the number of employees.

   Response: I would not anticipate the planned expansion project having any effect on the existing UST system or the groundwater contamination situation. I would not anticipate the relatively minimal expected increase in water usage to create any concerns regarding the migration or continued natural attenuation of the existing groundwater contamination.

5. Staff question: What is the typical process for reporting groundwater contamination concerns to DEQ, and DEQ's process to respond to those concerns?

   Response: Typical DEQ Process for Groundwater Contaminants:
   - A concern is reported
   - DEQ looks into the concern
   - Once the source is identified, the property owner of the "source" is responsible for assessing the risk and mitigating/cleaning
   - Since contamination is below ground, DEQ using borings that serve as monitoring wells to test laterally and vertically to provide a best guess picture of ground contaminates and to characterize the extent of the plume, without impacting the site too much or unnecessarily
   - DEQ doesn't have the authority to drill wells if a site is not known to be contaminated. That due diligence responsibility is left to the buyer and developer. This point is really about what DEQ requires a Responsible Party (RP) to assess and consider with regard to risk to sensitive receptors when characterizing the extent and risk of a petroleum release. DEQ does have the authority to require an RP to install wells on sites not known to be contaminated for the purpose of characterizing a release, but DEQ does not require RPs to consider the future use of a property that is currently undeveloped and/or does not have a sensitive receptor (i.e. supply well, vapor receptor such as a utility or basement, pond, etc) at the time of the characterization. So in the Ivy cases, the RPs for their respective releases at Toddsbury and the Exxon were tasked with assessing risk to the supply wells, basements, utilities, and the stream which existed when they were investigating their releases, and were not tasked with assessing the risk to the undeveloped property which you are currently considering or any other properties in the vicinity that do not have sensitive human or environmental receptors.

Scott's Ivy expansion

John McNeil <johnsmcneil@gmail.com>

Mon 5/4/2020 6:44 PM

To: Tori Kanellopoulos <vkanellopoulos@albemarle.org>

CAUTION: This message originated outside the County of Albemarle email system. DO NOT CLICK on links or open attachments unless you are sure the content is safe.

Hi Tori,

I received the letter in the mail today regarding the virtual community meeting about Scott's Ivy expansion. I live at 2750 Leeds Lane, which is very close to Scott's. I have used their services several times. I would support their expansion as long as they included adding a Tesla electric charger to their property. Scott's services Tesla's so I'm guessing they would be in favor of adding a charger to promote electric vehicles. There are many Tesla owners in Ivy and we feel strongly that promoting this environmentally-friendly vehicle option is important in Albemarle. Please contact me with any questions.

Thanks,

John McNeil

Support for SP2020000006 Scott's Ivy Exxon

stephen plaskon <spp@pobox.com>

Fri 5/8/2020 2:33 PM

To: Tori Kanellopoulos <vkanellopoulos@albemarle.org>
Cc: stephen plaskon <spp@pobox.com>

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I am a resident in Ivy Virginia at 460 Marthas Way. I have been notified by Collins Engineering of the proposed expansion of Scott's Ivy Exxon that is to include four (4) additional garage service bays. I have reviewed the proposal and the project and have no objection at all to this expansion. It is well planned and well situated. In fact, I am writing to support the proposal and to encourage you to approve it. Thank you.

--
stephen plaskon
spp@pobox.com

Comment SP 202000006--Scott's Ivy Exxon

James Sofka <jsofka@aol.com>

Mon 5/11/2020 8:49 AM

To: Tori Kanellopoulos <vkanellopoulos@albemarle.org>

CAUTION: This message originated outside the County of Albemarle email system. DO NOT CLICK on links or open attachments unless you are sure the content is safe.

Ms. Kanellopoulos:

I write in response to the recent letter regarding the SP application for the addition to Scott's Ivy Exxon. While I could readily access the tinyurl link to the application and documents, which I have read in full, the online feedback link did not work, hence my direct outreach to you.

As a neighboring property owner (2850 Morgantown Road) and ten-year member of the Route 250 West Task Force I warmly support this project and urge its approval. It retains the character of the existing structure by moving the addition to the rear, improves the efficiency of a respected local Ivy business and good neighbor to the community, and does not the create water usage and traffic issues that have been a concern with service station applications in the Crozet area.

There is no proposed increase in gas pumps or request for 'convenience' retailing which would risk creating more frequent "in and out" traffic to the business. The repair facility will be drop-off/pick-up traffic and I do not anticipate this being a game-changer impact to the 250 corridor. Also, I am strongly in favor of the landscaped entrance revision which, by creating dedicated entrance and eggress lanes, makes for more efficient flow and will be vastly more aesthetically appealing to the corridor than the current asphalt slab.

From my reading, and having digested other such proposals over the years, this seems an ideal case of property and business upgrades that works with, rather than in opposition to, the existing character of a neighborhood without stress on transportation or utility infrastructure. I'd be happy to see it come to fruition.

All best,
Jim Sofka
2850 Morgantown Road
Member, Rt. 250W Task Force

Special Use Permit for Scott's Ivy Exxon Auto Service Station

Louis Eaton <valleypoint@hotmail.com>

Mon 5/11/2020 5:06 PM

To: Tori Kanellopoulos <vkanellopoulos@albemarle.org>

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Valley Point Farm concerns for Special Use Permit to expand operations for Scott's Ivy Exxon Station include the following:

**Possible extension of guard rail would impact farm vehicles delivering hay, fertilizer, fuel oil etc attempting to enter/exit US 250.

**VDOT agreed to the current guard rail configuration as part of negotiations during the replacement of the bridge on US 250 in July 2018. This has been the primary driveway entrance for Valley Point for 36 years.

**Emergency vehicles would experience great difficulty negotiating this entrance if a guard rail is extended.

**Rivanna Pump Station who shares this entrance would have difficulty with large truck tanker vehicles delivering weekly chemicals.

**Water runoff could bring greater volumes of petroleum spills than the 2018 May flood which severely damaged farm fields at Valley Point Farm.

**Increased levels of water runoff (paved parking lot) may during heavy flooding, potentially wash/flood the driveway, fields, and possibly impact Little Ivy Creek a designated Chesapeake Bay feeder stream.

Valley Point Farm concerns for the impact of expanded operations for Scott's Ivy Exxon Station.

**Impact on Valley Point Farm residents to access/exit the US 250 entrance will be significant.

**Any increase in operations logically will create more anxiety for exiting to reach the gas pumps and trying to enter onto US 250.

**Bottomline: This location is currently heavily congested with five (5) businesses located along a 5-600 foot stretch of US 250. With drivers exceeding the speed limit of 35mph routinely the potential for enhanced danger/anxiety will undoubtedly rise.

Please feel free to contact me to ensure that you have received this input and for questions or additional information at 434-977-5538 or 434-566-4476C.

Respectfully,
Louis S. and Susan E. Eaton
Valley Point Farm

RE: Ivy Exxon expansion

rich-olin@comcast.net <rich-olin@comcast.net>

Thu 5/14/2020 11:44 AM

To: Tori Kanellopoulos <vkanellopoulos@albemarle.org>

CAUTION: This message originated outside the County of Albemarle email system. DO NOT CLICK on links or open attachments unless you are sure the content is safe.

Thank you Tori.
This is very helpful. As you may know, I live on the hill across Rt 250 that overlooks this station. I like the proposed vegetation natural areas bordering Rt 250 and the limited access points. These are improvements to the existing status, and they need to be strictly required.
Things like that tend to be forgotten when construction is over. Another recommended improvement would be to improve the light shielding of the existing LED streetlamp. I believe there are designs that can both increase the desired downward illumination while at the same time reduce the "light pollution." Warmer LED lights are available too and would be an improvement. I hope this can be added to the variance requirements.
Regards,
Rich

From: Tori Kanellopoulos <vkanellopoulos@albemarle.org>
Sent: Thursday, May 14, 2020 10:01 AM
To: rich-olin@comcast.net
Subject: Re: Ivy Exxon expansion

Good Morning Rich,

Apologies that the link was not working - here is another link that may work: https://forms.office.com/Pages/ResponsePage.aspx?id=OTkvR4mW5k-vx4ObR5DL7pfdLqpjY65ApQpL1f5jP89UM1JZSVZNVDY2Tk1ZMzJESkUwSjVMTkdDVy4u

I am also attaching the application plan as a PDF, as that may be easiest to access. The following are the answers to your questions, to the best of my knowledge:

- The front of the building is not increasing - the additional four service bays are located to the rear of the building. The existing building is approximately 1,950 square feet, and the addition is 3,200 square feet. There is no change in the number of fuel pumps.
- Since there is no existing site plan, there is no formal number of parking spaces. Given that there is no proposed increase in employees, the only increase in parking requirements would be from the four (4) additional service bays, which equates to eight (8) parking spaces. The applicant is planning to locate more of the parking behind the building, as opposed to the side where it mainly is now.
- No additional lighting is proposed at this time, however any new outdoor lighting (in the future) is proposed to be motion/sensor activated, so as to not always be on. Lighting will likely be a condition for the special use permit.
- I do not believe a turn lane will be required with this proposal, however that will be a VDOT determination.

This application is currently scheduled for a Planning Commission public hearing on June 16, at 6 PM. Given the current situation with COVID, this will likely be a virtual public hearing held via Zoom. The agenda, staff report, and information on how to participate will be available approximately one week prior to the meeting.

If you would like to contact the applicant as well for additional information, you may reach out to Scott Collins at scott@collins-engineering.com. Please let me know if you have any additional questions or comments as well.

Best,

Tori

From: rich-olin@comcast.net <rich-olin@comcast.net>
Sent: Wednesday, May 13, 2020 4:24 PM
To: Tori Kanellopoulos <vkanellopoulos@albemarle.org>
Subject: FW: Ivy Exxon expansion

CAUTION: **This message originated outside the County of Albemarle email system. DO NOT CLICK on links or open attachments unless you are sure the content is safe.**

Hello,
Can you provide more information on this expansion? I refer to a letter I received from Collins Engineering, but the websites they gave lead nowhere that I can see.
I would like to know where these new bays will be located. Will they increase the frontage footprint? Will there be additional parking needed and if so where will it be? Will there be any increase in night time lighting? Will an turn lane be required?
In general I believe any expansion would be contrary to the current atmosphere of the Ivy Corner neighborhood.
Thank you for your consideration.
Rich Olin
2628 Dick Woods Rd.

FW: SP2020-6 Ivy Exxon Application

Rick Richmond <jwr@mkpc.com>

Wed 5/13/2020 3:35 PM

To: Tori Kanellopoulos <vkanellopoulos@albemarle.org>

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PS. Noise abatement is a concern and I don't see where it is addressed.

Joseph W. Richmond, Jr.
McCallum & Kudravetz, P.C.
250 East High Street
Charlottesville, VA 22902
(434) 293-8191 - Main
(434) 220-5999 - Direct
(434) 296-9861 – FAX
jwr@mkpc.com

From: Tori Kanellopoulos [mailto:vkanellopoulos@albemarle.org]
Sent: Wednesday, May 06, 2020 11:28 AM
To: Rick Richmond
Subject: SP2020-6 Ivy Exxon Application

Hi Rick,

I am following up on our phone call this morning regarding SP2020-6, Ivy Exxon. Attached is the resubmittal application, the resubmittal application plan and narrative, and staff comments (VDOT comments are included - you'll need to keep scrolling as it was a separate letter).

It sounds as though the links were not working well for you, but just in case this is the link to documents in CountyView: https://lfweb.albemarle.org/weblink/search.aspx?dbid=3&searchcommand=%7b%5bCDD-Planning%5d:%5bApplicationNumber%5d=%22SP202000006%22%7d. If this doesn't work, though, the most current documents are attached to this email.

Also, Mariah Gleason (mgleason@albemarle.org) is reviewing the nearby request for the new vet clinic (SP2020-5). I believe review comments have been given, but no public hearing is yet scheduled.

Please let me know if you have any follow up comments or questions.

Best,

Tori

SP202000006- Scott's Ivy Exxon

Samantha Lucas <splucard@embarqmail.com>

Fri 5/15/2020 9:35 AM

To: Tori Kanellopoulos <vkanellopoulos@albemarle.org>

CAUTION: This message originated outside the County of Albemarle email system. DO NOT CLICK on links or open attachments unless you are sure the content is safe.

Ms. Kanellopoulos,

I'm the owner of 4226 Ivy Road, a property situated nearby and at a slightly higher elevation than Scott's Ivy Exxon. I purchased the property over 20 years ago and am well-acquainted with 4260, the site of Scott's Ivy Exxon. My family and I were well acquainted with the property's former owner and purveyor as well as the pre-existing problems with leakage of hazardous materials from storage containers at the site. Our water supply was directly affected, for several years the EPA monitored output from elaborate systems installed to filter our well-water. Unfortunately, while the filters effectively filtered significant portions of hazardous materials, they also produced a highly sulfuric odor that rendered our water supply unpalatable. Little Ivy Creek, the primary water supply that feeds our well, remains contaminated with hazardous material. We regularly walk the stream between 4260 and our nearby property and note a sheen of petroleum or similar product in small pools along the bank.

We're also well-aware of the nature and volume of services provided by the current owners of Scott's Ivy Exxon and those provided by the former owner of Ivy Exxon. The prior owner operated a service station, offering a limited number of relatively quick fixes like oil & tire changes and automobile inspections. It was a low-key business with limited traffic and a neighborhood feel. We had a friendly relationship with the owner and were frequent customers. When the business changed hands, its nature changed dramatically. Scott's Ivy Exxon offers higher volume, full-service repairs, everything, it would seem, except body work. We know this because we were customers for such a repair on a single occasion after which he decided against giving them return business. Even Scott's Ivy Exxon's website clearly describes the business as both a *repair* and service shop. The change in the nature of the business has resulted in a significant increase in the number of automobiles that sit in the parking lot at 4260, often for days at a time. It is an unsightly change.

I've read through the documents provided at the county website and would ask that you consider the following:

1. Scott's Ivy Exxon clearly has been and intends to continue to operate as an automobile REPAIR shop, not a small-town service station.
2. The change in the volume and nature of the business, specifically the number of parked vehicles there, has already negatively impacted the traffic around and appearance of the site as well as the property values of surrounding homes. The proposed expansion can be reasonably expected to exacerbate all of these issues.
3. Route 250 is an increasingly busy and critical emergency roadway used quite often when there are problems on interstate 64, specifically around the problematic 114 and 118 exits. We do not need more traffic through and a large-volume auto repair business in the quarter mile stretch of road that constitutes the little town of Ivy or at the already-tricky interchange of Route 250 and the Ivy Depot Road.
4. The sole two-story building in the "town" of Ivy is a small, converted farmhouse containing a very small business. Characterizing a two-story addition and a several-bay auto repair business as consistent with other structures in Ivy is absolutely false. Even along areas zoned for business on route 29 in Charlottesville, two-story auto repair shops are highly unusual.

5. The idea that approximately $75,000 in associated costs to link Scott's Ivy Exxon to county water and sewer is cost-prohibitive for the owner is preposterous when one compares it to the costs nearby home-owners like me will be forced to bear if our ground-water remains or is further contaminated by the business at 4260, not to mention the decreased property values associated with recent and proposed changes to the site.

While I was unaware of the contaminated water supply when I purchased my home over 20 years ago, I was well-aware of the service station. I considered it a convenience similar to the small store, nursery, restaurant, and charming string of businesses located in the converted motel nearby. Learning of the contaminated well-water and our subsequent struggle to resolve it were distressing but we managed. We've weathered the change in owners at the Exxon station, the loss of its friendly neighborhood feel, and the increased volume of traffic and unsightly numerous parked cars. The latest proposed changes-- namely an expansion that is inconsistent with the look, character, or nature of surrounding businesses and homes as well as the increased risk to our groundwater supply-- are unacceptable. I respectfully request the assistance of the county to ensure home-owner interests are represented and this special use permit is rejected.

Many thanks,

Samantha Lucas

Responses Received from Microsoft Forms Online Feedback (as of 06-08-20)

Name: Kate Marks

Comments: This is a historic area and the expansion would be completely out of keeping with the neighborhood. Scott's Ivy Exxon should seek a new location if they seek to expand. They chose to move to this rural location from their previous facility in Barrack's Road. If there were interested in a larger facility they should seek another location again where such a facility would be more in keeping with the area (possibly US 29). The trade-off of moving to a small rural area, is that you must keep your business in keeping with that area.

March 3, 2020

Mr. Todd A. Pitsenberger
Petroleum Program Manager
Virginia Department of Environmental Quality
Valley Regional Office
4411 Early Road
P.O. Box 3000
Harrisonburg, Virginia 22801

ECS Project No. 47-9894

Re: Subphase-5 Groundwater Monitoring Report
Ivy Exxon - 4260 Ivy Road, Charlottesville, Virginia
PC 2013-6113

Dear Mr. Pitsenberger,

On behalf of our client, Mr. Roger Gibson, we are pleased to submit this monitoring report with the results of the monitoring well gauging and sampling that was conducted at the Ivy Exxon site on February 13, 2020. All groundwater data and sampling data collected to date are presented in this report.

Background

In 2013, Analytical Services, Inc. (ASI) conducted a Phase I Environmental Site Assessment (ESA) on the Ivy Exxon, located at 4260 Ivy Road in Charlottesville, Virginia. The ESA revealed that the site has been used as a gasoline station since at least the 1950s. It also revealed that there have been two documented past releases from underground storage tanks (USTs) at the site. The first release was reported in February 1997 and the second release was reported in November 1998 following the removal of three 6,000-gallon gasoline USTs. Both releases have since been closed. ASI also conducted a Phase II Subsurface Investigation in 2013. The Phase II Subsurface Investigation revealed that the area near the site's gasoline UST basin had been impacted by a petroleum release. An elevated concentration of total petroleum hydrocarbons (TPH) gasoline range organics (GRO) above Virginia Department of Environmental Quality (DEQ) reporting limits was detected in a soil sample collected from a boring located down-gradient from the UST basin. Elevated concentrations of benzene, toluene, ethylbenzene, and xylenes (BTEX) were detected in a groundwater sample collected from the same boring above Virginia Voluntary Remediation Program (VRP) Tier III screening levels.

On April 17, 2013, the DEQ directed that a Site Characterization Report (SCR) study be conducted at the site. The SCR study concluded that contaminant concentrations at the site posed a potential threat to human and environmental receptors, as the subject site's domestic well was found to be impacted by MTBE and the potential existed for impact to Little Ivy Creek. Two addendums were written for the SCR to further assess petroleum contamination at the site and the site was monitored quarterly in 2014.

Carbon filtration was installed in the onsite supply well and in the supply wells at the business to the west of the site and the Sponski-Lucas residence to the east of the site. Culligan has been monitoring these supply wells on behalf of the DEQ since the installation of the carbon treatment systems. The treatment systems at the business to the west of the site and the Sponski-Lucas residence were removed during the summer of 2018, as contaminant levels had decreased to the point that carbon filtration was determined to no longer be necessary. A carbon treatment system is still used by the subject site's supply well, although petroleum concentrations have steadily decreased in the well since release case inception such that no contamination was detected in the April and October 2019 sampling events completed by Culligan. On February 3, 2020, DEQ requested that ECS complete a round of gauging and groundwater monitoring of the site's monitoring wells to evaluate the possibility of modifying the sampling interval and use of carbon filtration at the site's supply well.

Site Location, Hydrology, and Regional Geology

The Ivy Exxon site is located at 4260 Ivy Road in Charlottesville, Virginia (Figure 1). The elevation of the study area portion of the subject site is approximately 514 feet above mean sea level (amsl). The subject site slopes gently to the east toward Little Ivy Creek. The site is within the western portion of the Piedmont Physiographic Province, and is underlain by crystalline rock of the Blue Ridge Anticlinorium. Bedrock lithology beneath the site is porphyroblastic-biotite-plagioclase-augen gneiss (stratigraphic symbol Ybg), which is Middle Proterozoic (Grenville) in age (Virginia Division of Mineral Resources, 2003).

Storm water drainage from the site drains to the southeast toward Little Ivy Creek, which is located immediately adjacent to the site's southeastern boundary at a distance of 120 feet from the subject site's UST basin (Figure 1). Little Ivy Creek flows to the northeast, where it becomes a tributary to the Rivanna River. The Rivanna River supplies water to the Rivanna River Reservoir, which provides water to the City of Charlottesville, Virginia. The Rivanna River converges with the James River, which is a major tributary of the Chesapeake Bay, after flowing out of the Rivanna River Reservoir. No surface water bodies exist on the site.

Monitoring Well Gauging, Purging, and Sampling

Monitoring well gauging and sampling was performed on February 13, 2020. ECS collected well gauging data from overburden monitoring wells MW-1, MW-2, MW-3, MW-6, MW-7, MW-8, piezometer P-1, and bedrock monitoring well BW-2. ECS did not collect a sample from MW-4, MW-5, and BW-1. The well casing at MW-4 was caved in approximately 7 feet below ground surface (bgs) and the well cap and manway had been removed. ECS was unable to locate monitoring well MW-5 and bedrock well BW-1 within the parking area.

The well gauging data is presented below in Table 1. Depth-to-groundwater measurements recorded during this monitoring event and past monitoring events are presented in Table A-1 within Attachment A. Groundwater elevation values are approximated based on topographic mapping. Laboratory reports are included as Attachment B. Locations of the wells at the site and groundwater equipotential mapping are depicted on Figure 2.

Table 1 - Monitoring Well Gauging Results from February 13, 2020.

Monitoring Well	Monitoring Well Type	Total Well Depth[a] (feet btoc[b])	TOC[c] Elevation (feet amsl[d])	Depth to Water (feet btoc)	Groundwater Elevation (feet amsl)
MW-1	Overburden	15	514.29	9.20	505.09
MW-2	Overburden	14	513.25	8.31	504.94
MW-3	Overburden	13	513.39	8.42	504.97
MW-4	Overburden	14	513.15	--[e]	--
MW-5	Overburden	20	512.23	--	--
MW-6	Overburden	15	513.20	8.17	505.03
MW-7	Overburden	15	514.29	9.38	504.91
MW-8	Overburden	15	514.14	8.08	506.06
P-1	Streambank Piezometer	6.78	509.83	5.26	504.57
P-2	Streambank Piezometer	8.27	509.85	--	--
BW-1	Bedrock	60	513.95	--	--
BW-2	Bedrock	70	513.07	8.21	504.86

[a]As measured during previous monitoring events.
[b]btoc = below top of casing.
[c]TOC = top of casing.
[d]amsl = above mean sea level.
[e]--- no data collected.

ECS purged approximately three well volumes from each well prior to completing sampling. The water was removed from the well with a dedicated disposable bailer and twine. Free product was not observed in any of the monitoring wells. The purge water was dumped on the ground. Approximately 3.5 gallons of water were removed from MW-1, MW-2, MW-3, MW-6, MW-7, and MW-8. Approximately 0.5 gallons of water were removed from P-1 and approximately 30 gallons of water were removed from BW-2. ECS collected a sample from MW-1, MW-2, MW-3, MW-6, MW-7, MW-8, P-1, and BW-2 and submitted the samples for laboratory analysis of BTEX and methyl tert-butyl ether (MTBE) via U.S. Environmental Protection Agency (EPA) Method 8021B. Groundwater samples were placed on ice and submitted for laboratory analysis to Pace Analytical in Mount Juliet, Tennessee.

Groundwater Analytical Results

Analytical results of all detected constituents from the February 13, 2020 monitoring event are shown in Table 2 below. Groundwater analytical data recorded during this monitoring event and past monitoring events are presented in Table A-2 within Attachment A and a map showing groundwater petroleum concentrations is included as Figure 3.

Table 2 - Groundwater Analytical Results from February 13, 2020.

Well ID	Benzene (µg/L[a])	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE[b] (µg/L)
MW-1	30.2	18.9	508	59.6	<1.0
MW-2	17.7	<1.0	1.27	11.1	<1.0
MW-3	20.9	5.96	19.2	17.1	<1.0
MW-6	5.88	<1.0	2.12	4.19	<1.0
MW-7	4.33	<1.0	14.0	13.3	<1.0
MW-8	<0.5	<1.0	<0.5	<1.5	<1.0
P-1	<0.5	<1.0	<0.5	<1.5	<1.0
BW-2	<0.5	<1.0	<0.5	<1.5	628
Virginia VRP[c] Tier II Residential Intrusion Groundwater Screening Level	*5.0*	*1,000.0*	*700.0*	*10,000.0*	*140.0*

[a]µg/L – micrograms per liter
[b]MTBE – methyl tert-butyl ether
[c]VRP – Voluntary Remediation Program

Benzene was detected in five of the eight monitoring wells at concentrations between 4.33 and 30.2 micrograms per liter (µg/L). Four of the five detected concentrations of benzene were above the Virginia VRP Tier II Residential Groundwater Screening Level of 5.0 µg/L. Toluene was detected in two of the eight groundwater wells (MW-1 at 18.9 µg/L and MW-3 at 5.96 µg/L). The detected concentrations of toluene were below the Virginia VRP Tier II Residential Groundwater Screening Level of 1,000.0 µg/L. Ethylbenzene was detected in five of the eight monitoring wells between 1.27 and 508 µg/L. The detected concentrations of ethylbenzene were below the Virginia VRP Tier II Residential Groundwater Screening Level of 700.0 µg/L. Total xylenes were detected in five of the eight monitoring wells between 4.19 and 59.6 µg/L. The detected concentrations of total xylenes were below the Virginia VRP Tier II Residential Groundwater Screening Level of 10,000.0 µg/L. MTBE was detected in one of the eight groundwater wells (BW-2 at 628 µg/L). The detected concentration of MTBE was above the Virginia VRP Tier II Residential Groundwater Screening Level of 140.0 µg/L.

The concentrations of toluene, ethylbenzene, total xylenes, and MTBE in MW-1 and MW-2 on February 13, 2020 were less than the concentrations of these constituents during the previous monitoring event completed in December 2014. The concentrations of benzene had increased in MW-1 and MW-2 from December 2014 to February 2020. The concentrations of ethylbenzene, total xylenes, and MTBE in MW-3 on February 13, 2020 were less than the concentrations of these constituents in December 2014. The concentrations of toluene and benzene had increased in MW-3 from December 2014 to February 2020. The concentrations of BTEX and MTBE in MW-6, MW-7, MW-8, P-1, and BW-2 on February 13, 2020 were less than the concentrations of these constituents in December 2014. Overall, the data collected during this monitoring event appear to indicate that petroleum concentrations in the site's overburden and bedrock aquifer have generally declined over the past five years.

Please feel free to contact me at (540) 785-6624 if you have any comments or questions regarding this report.

Sincerely,
ECS Mid-Atlantic, LLC

Michael L. Maloy, CPG
Principal Geologist

Thomas P. Nelson, CPG
Senior Hydrogeologist

Abby Conklin-Muchnick, EIT
Environmental Project Manager

cc: Mr. Roger Gibson, by mail

FIGURES



Figure 1: Site Layout Map

Ivy Exxon Site
4260 Ivy Road
Charlottesville, VA

Legend

- Subject Site
- Subject Site Supply Well
- Stream

N

0 50 100 200 Feet

ECS Project No. 47-9894



Figure 2: Site Monitoring Wells and Groundwater Elevations

Ivy Exxon Site
4260 Ivy Road
Charlottesville, VA

Legend

- Subject Site
- Groundwater Equipotential Contour (C.I. = 0.2 ft.)
- Stream

Monitoring Well

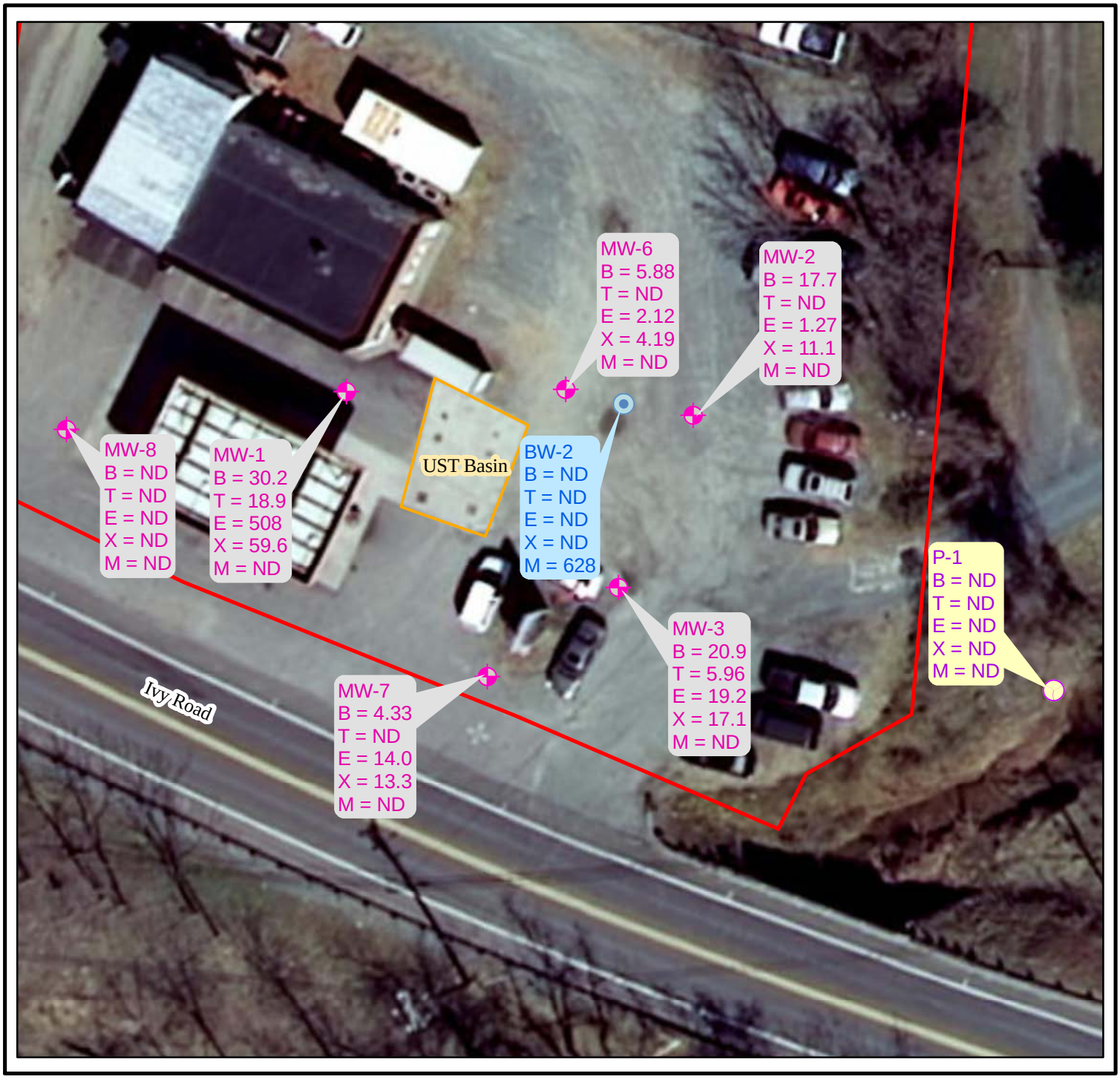
- Overburden Monitoring Well
- Bedrock Monitoring Well
- Streambank Piezometer

0 20 40 80 Feet

N

Map Notes:
(1) Groundwater elevations measured on 2/13/2020 in units of feet amsl;
(2) Only overburden and piezometer monitoring well data were used to generate groundwater equipotential contrours.

ECS Project No. 47-9894



Legend

- Subject Site
- UST Basin

Monitoring Well

- Overburden Monitoring Well
- Bedrock Monitoring Well
- Streambank Piezometer

0 20 40 80 Feet

Figure 3: Groundwater Sampling Results

Ivy Exxon Site
4260 Ivy Road
Charlottesville, VA

N

Map Notes:
(1) Sampling data from 2/13/2020;
(2) Units are micrograms per liter;
(3) B = benzene, T = toluene, E = ethylbenzene, X = total xylenes, M = methyl tert-butyl ether.

ECS Project No. 47-9894

ATTACHMENT A

DATA TABLES

Table A-1
Historical Groundwater Elevation Data
Ivy Exxon

Well Identification	Total Well Depth (feet bgs[a])	TOC [b] Elevation (feet amsl[c])	Date Gauged	Depth to Water from TOC (feet)	Product Thickness (feet)	Groundwater Elevation (feet amsl)
MW-1	15	514.29	5/16/2013	9.55	0	504.74
			5/28/2013	9.82	0.01	504.47
			7/23/2013	9.29	0	505
			9/9/2013	9.98	0	504.31
			2/6/2014	8.9	0	505.39
			5/20/2014	7.88	0	506.41
			9/5/2014	10.54	0	503.75
			12/4/2014	9.88	0	504.41
			2/13/2020	9.20	0	505.09
MW-2	14	513.25	5/16/2013	8.78	0	504.47
			5/28/2013	9.08	0	504.17
			7/23/2013	8.54	0	504.71
			9/9/2013	9.17	0	504.08
			2/6/2014	8.14	0	505.11
			5/20/2014	7.17	0	506.08
			9/5/2014	9.69	0	503.56
			12/4/2014	9.04	0	504.21
			2/13/2020	8.31	0	504.94
MW-3	13	513.39	5/16/2013	8.66	0	504.73
			5/28/2013	9.07	0	504.32
			7/23/2013	8.57	0	504.82
			2/6/2014	8.16	0	505.23
			5/20/2014	7.29	0	506.1
			9/5/2014	9.69	0	503.7
			12/4/2014	9.08	0	504.31
			2/13/2020	8.42	0	504.97
MW-4	14	513.15	5/16/2013	9.09	0	504.06
			5/28/2013	9.32	0	503.83
			7/23/2013	8.89	0	504.26
			9/9/2013	9.39	0	503.76
			2/6/2014	8.46	0	504.69
			5/20/2014	7.88	0	505.27
			9/5/2014	9.82	0	503.33

Well Identification	Total Well Depth (feet bgs[a])	TOC [b] Elevation (feet amsl[c])	Date Gauged	Depth to Water from TOC (feet)	Product Thickness (feet)	Groundwater Elevation (feet amsl)
			12/4/2014	9.25	0	503.9
			2/13/2020	--[d]	--	--
MW-5	20	512.23	7/23/2013	7.3	0	505.85
			9/9/2013	8.29	0	504.86
			2/6/2014	6.84	0	506.31
			5/20/2014	5.27	0	507.88
			9/5/2014	9.08	0	504.07
			12/4/2014	8.11	0	505.04
			2/13/2020	--	--	--
MW-6	15	513.20	7/23/2013	8.26	0	504.94
			2/6/2014	7.91	0	505.29
			5/20/2014	6.92	0	506.28
			9/5/2014	9.52	0	503.68
			12/4/2014	8.87	0	504.33
			2/13/2020	8.17	0	505.03
MW-7	15	514.29	7/23/2013	9.43	0	504.86
			9/9/2013	10.00	0	504.29
			2/6/2014	9.03	0	505.26
			5/20/2014	8.22	0	506.07
			9/5/2014	10.42	0	503.87
			12/4/2014	9.84	0	504.45
			2/13/2020	9.38	0	504.91
MW-8	15	514.14	7/23/2013	7.93	0	506.21
			9/9/2013	9.05	0	505.09
			2/6/2014	7.48	0	506.66
			5/20/2014	6.07	0	508.07
			9/5/2014	9.90	0	504.24
			12/4/2014	8.87	0	505.27
			2/13/2020	8.08	0	506.06
P-1	6.78	509.83	7/23/2013	5.81	0	504.02
			7/31/2013	5.96	0	503.87
			8/16/2013	6.07	0	503.76
			9/9/2013	6.18	0	503.65
			2/6/2014	5.33	0	504.50
			5/20/2014	4.86	0	504.97
			9/5/2014	6.59	0	503.24

Well Identification	Total Well Depth (feet bgs[a])	TOC [b] Elevation (feet amsl[c])	Date Gauged	Depth to Water from TOC (feet)	Product Thickness (feet)	Groundwater Elevation (feet amsl)
			12/4/2014	6.00	0	503.83
			2/13/2020	5.26	0	504.57
P-2	8.27	509.85	7/23/2013	6.51	0	503.34
			7/31/2013	6.45	0	503.40
			8/16/2013	6.50	0	503.35
			9/9/2013	6.56	0	503.29
			2/6/2014	6.00	0	503.85
			5/20/2014	5.87	0	503.98
			9/5/2014	6.75	0	503.10
			12/4/2014	6.43	0	503.42
			2/13/2020	--	--	--
BW-1	60	513.95	9/9/2013	9.11	0	504.84
			9/24/2013	9.49	0	504.46
			2/6/2014	7.79	0	506.16
			5/20/2014	6.70	0	507.25
			9/5/2014	6.75	0	507.2
			12/4/2014	6.43	0	507.52
			2/13/2020	--	--	--
BW-2	70	513.07	9/9/2013	9.01	0	504.06
			9/24/2013	9.27	0	503.8
			2/6/2014	7.96	0	505.11
			5/20/2014	7.03	0	506.04
			9/5/2014	9.53	0	503.54
			12/4/2014	8.91	0	504.16
			2/13/2020	8.21	0	504.86

[a]bgs = below ground surface
[b]Depth to water values are expressed as feet below top of well casing
[c]amsl = above mean sea level
[d]-- = no data collected

Table A-2
Historical Groundwater Quality Data

Well ID	Sampling Date	Benzene (µg/L[a])	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	Total BTEX[b] (µg/L)	TPH-GRO[c] (µg/L)	MTBE[d] (µg/L)	Chloro-methane (µg/L)	Notes
MW-1	5/16/2013	73	<10	4,700	510	5,283	17,000	95	NA[e]	Method 8021B
	7/23/2013	58	11	3,900	520	4,489	18,000	65	NA	
	2/6/2014	67	<25	3,500	410	3,977	NA	86	NA	
	5/20/2014	62	8.7	1,500	214	1,784.70	NA	78	NA	
	9/5/2014	74	46	3,000	293	3,413	NA	440	NA	
	12/4/2014	27	27	2,300	220	2,574	NA	45	NA	
	2/13/2020	30.2	18.9	508	59.6	NA	NA	<1.0	NA	
MW-2	5/16/2013	4.0	<1.0	10.0	6.4	20.4	520	8.5	NA	Method 8021B
	7/23/2013	4.3	<1.0	1.0	5.1	10.4	780	10	NA	
	2/6/2014	3.6	1.2	<1.0	8.2	13	NA	11	NA	
	5/20/2014	<1.0	<1.0	9.8	3.9	13.7	NA	6.5	NA	
	9/5/2014	6.0	2.8	3.2	7.2	19.2	NA	9.8	NA	
	12/4/2014	8.0	1.8	6.0	18.3	34.1	NA	9.2	NA	
	2/13/2020	17.7	<1.0	1.27	11.1	NA	NA	<1.0	NA	
MW-3	5/16/2013	21	<1.0	47	16.2	84.2	1,800	25	NA	Method 8021B
	7/23/2013	13	<1.0	53	15.1	81.1	1,600	14	NA	
	2/6/2014	15	3.8	51	31.1	100.9	NA	17	NA	
	5/20/2014	7.0	2.8	20	10.7	40.5	NA	12	NA	
	9/5/2014	29	4.0	50	40.4	123.4	NA	24	NA	
	12/4/2014	19	2.8	50	32.8	104.6	NA	25	NA	
	2/13/2020	20.9	5.96	19.2	17.1	NA	NA	<1.0	NA	
MW-4	5/16/2013	31	<1.0	33	15.5	79.5	1,600	14	NA	Method 8021B
	7/23/2013	30	<1.0	25	15.8	70.8	2,400	15	NA	
	2/6/2014	18	2.6	7.2	13.3	41.1	NA	14	NA	
	5/20/2014	3.1	1.2	1.6	5.5	11.4	NA	9.4	NA	
	9/5/2014	19	3.5	15	15.6	54.1	NA	11	NA	
	12/4/2014	17	6.2	9.2	12.1	44.5	NA	11	NA	

Well ID	Sampling Date	Benzene (µg/L[a])	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	Total BTEX[b] (µg/L)	TPH-GRO[c] (µg/L)	MTBE[d] (µg/L)	Chloro-methane (µg/L)	Notes
MW-5	7/23/2013	<1.0	<1.0	<1.0	<3.0	<6.0	<100	<1.0	NA	Method 8021B
	2/6/2014	<1.0	<1.0	<1.0	<3.0	<6.0	NA	1.0	NA	
MW-6	7/23/2013	<1.0	<1.0	<1.0	<3.0	<6.0	<100	5.7	NA	Method 8021B
	2/6/2014	1.7	<1.0	1.7	<3.0	<7.4	NA	9.6	NA	
	5/20/2014	2.7	<1.0	<1.0	<3.0	2.7	NA	9.3	NA	
	9/5/2014	9.1	2.9	22	34.6	68.6	NA	14	NA	
	12/4/2014	6.7	1.3	13	23.2	44.2	NA	13	NA	
	2/13/2020	5.88	<1.0	2.12	4.19	NA	NA	<1.0	NA	
MW-7	7/23/2013	44	14	110	135.8	303.8	3,600	21	NA	Method 8021B
	2/6/2014	20	2.8	59	75.4	157.2	NA	16	NA	
	5/20/2014	55	15	150	227.6	447.6	NA	16	NA	
	9/5/2014	25	1.5	45	48.6	120.1	NA	13	NA	
	12/4/2014	5.2	1.2	16	18	40.4	NA	7.2	NA	
	2/13/2020	4.33	<1.0	14.0	13.3	NA	NA	<1.0	NA	
MW-8	7/23/2013	<1.0	<1.0	<1.0	<3.0	<6.0	<100	<1.0	NA	Method 8021B
	2/6/2014	<1.0	<1.0	<1.0	<3.0	<6.0	NA	<1.0	NA	
	2/13/2020	<0.5	<1.0	<0.5	<1.5	NA	NA	<1.0	NA	
P-1	7/23/2013	<1.0	<1.0	<1.0	<3.0	<6.0	NA	<1.0	<1.0	Method 8260B
	2/6/2014	<1.0	<1.0	<1.0	<3.0	<6.0	NA	<1.0	<1.0	
	2/13/2020	<0.5	<1.0	<0.5	<1.5	NA	NA	<1.0	<1.0	Method 8021B
P-2	7/23/2013	<1.0	<1.0	<1.0	<3.0	<6.0	NA	1.1	<1.0	Method 8260B
	2/6/2014	<1.0	<1.0	<1.0	<3.0	<6.0	NA	<1.0	<1.0	
BW-1	9/9/2013	<1.0	<1.0	<1.0	<3.0	<6.0	390	360	<1.0	Method 8260B
	2/6/2014	<1.0	<1.0	<1.0	<3.0	<6.0	NA	320	<1.0	
	5/20/2014	<1.0	<1.0	<1.0	<3.0	<6.0	NA	330	<1.0	
	9/5/2014	<1.0	<1.0	<1.0	<3.0	<6.0	NA	250	<1.0	
	12/4/2014	<1.0	<1.0	<1.0	<3.0	<6.0	NA	310	<1.0	
BW-2	9/9/2013	<1.0	<1.0	<1.0	<3.0	<6.0	1,700	1,600	<1.0	Method

Well ID	Sampling Date	Benzene (µg/L[a])	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	Total BTEX[b] (µg/L)	TPH-GRO[c] (µg/L)	MTBE[d] (µg/L)	Chloro-methane (µg/L)	Notes
	2/6/2014	<1.0	<1.0	<1.0	<3.0	<6.0	NA	1,000	<1.0	8260B
	5/20/2014	<1.0	<1.0	<1.0	<3.0	<6.0	NA	22	<1.0	
	9/5/2014	<1.0	<1.0	<1.0	<3.0	<6.0	NA	1,200	<1.0	
	12/4/2014	<1.0	<1.0	<1.0	<3.0	<6.0	NA	1,500	<1.0	
	2/13/2020	<0.5	<1.0	<0.5	<1.5	NA	NA	628	NA	Method 8021B
Scott's Ivy Domestic Well	5/28/2013	<1.0	<1.0	<1.0	<3.0	<6.0	NA	20	<1.0	Method 8260B
	7/23/2013	<1.0	<1.0	<1.0	<3.0	<6.0	NA	<1.0	2.9	Sample collected after installation of water treatment system using Method 8260B
Richmond Domestic Well	7/31/2013	<1.0	<1.0	<1.0	<3.0	<6.0	NA	6	<1.0	Method 8260B, western adjoining property
Eaton Domestic Well	2/6/2014	<1.0	<1.0	<1.0	<3.0	<6.0	NA	<1.0	<1.0	Method 8260B, 4222 Ivy Road
Sponski Domestic Well	2/6/2014	<1.0	<1.0	<1.0	<3.0	<6.0	NA	11	<1.0	Method 8260B, 4226 Ivy Road
Hammond Domestic Well	2/6/2014	<1.0	<1.0	<1.0	<3.0	<6.0	NA	<1.0	<1.0	Method 8260B, 727 Pine Hill Lane. Note: detection of acetone
	5/20/2014	<1.0	<1.0	<1.0	<3.0	<6.0	NA	<1.0	<1.0	
	9/5/2014	<1.0	<1.0	<1.0	<3.0	<6.0	NA	<1.0	<1.0	

Well ID	Sampling Date	Benzene (µg/L[a])	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	Total BTEX[b] (µg/L)	TPH-GRO[c] (µg/L)	MTBE[d] (µg/L)	Chloro-methane (µg/L)	Notes
	12/4/2014	<1.0	<1.0	<1.0	<3.0	<6.0	NA	<1.0	<1.0	of 16 µg/L on May 20, 2014

[a] µg/L – micrograms per liter
[b] BTEX – benzene, toluene, ethylbenzene, and xylenes
[c] TPH-GRO – total petroleum hydrocarbons gasoline range organics
[d] MTBE – methyl tert-butyl ether
[e] NA – constituent not analyzed

ATTACHMENT B

LABORATORY REPORT

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

February 21, 2020

ECS Mid-Atlantic LLC - Charl. Va

Sample Delivery Group:	L1189664
Samples Received:	02/14/2020
Project Number:	
Description:	Scott's Ivy Exxon

Report To:

Mr. Tom Nelson
4004 Hunterstand Court; Ste 102
Charlottesville, VA 22911

Entire Report Reviewed By:

Heather J Wagner
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.



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MW-1 L1189664-01 GW

Collected by | Collected date/time 02/13/20 14:50 | Received date/time 02/14/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC) by Method 8021	WG1428932	1	02/16/20 17:34	02/16/20 17:34	BMB	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8021	WG1431581	10	02/20/20 21:34	02/20/20 21:34	ADM	Mt. Juliet, TN

MW-2 L1189664-02 GW

Collected by | Collected date/time 02/13/20 14:40 | Received date/time 02/14/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC) by Method 8021	WG1428932	1	02/16/20 17:56	02/16/20 17:56	BMB	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8021	WG1431581	1	02/20/20 21:57	02/20/20 21:57	ADM	Mt. Juliet, TN

MW-3 L1189664-03 GW

Collected by | Collected date/time 02/13/20 14:40 | Received date/time 02/14/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC) by Method 8021	WG1428932	1	02/16/20 18:19	02/16/20 18:19	BMB	Mt. Juliet, TN

MW-6 L1189664-04 GW

Collected by | Collected date/time 02/13/20 14:55 | Received date/time 02/14/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC) by Method 8021	WG1428932	1	02/16/20 18:41	02/16/20 18:41	BMB	Mt. Juliet, TN

MW-7 L1189664-05 GW

Collected by | Collected date/time 02/13/20 14:30 | Received date/time 02/14/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC) by Method 8021	WG1428932	1	02/16/20 19:03	02/16/20 19:03	BMB	Mt. Juliet, TN

MW-8 L1189664-06 GW

Collected by | Collected date/time 02/13/20 14:35 | Received date/time 02/14/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC) by Method 8021	WG1428932	1	02/16/20 19:25	02/16/20 19:25	BMB	Mt. Juliet, TN

BW-2 L1189664-07 GW

Collected by | Collected date/time 02/13/20 15:05 | Received date/time 02/14/20 08:45

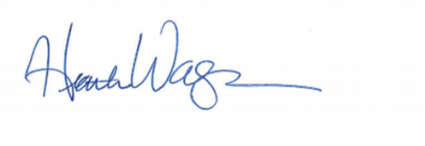
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC) by Method 8021	WG1428932	1	02/16/20 19:48	02/16/20 19:48	BMB	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8021	WG1431581	10	02/20/20 22:19	02/20/20 22:19	ADM	Mt. Juliet, TN

P-1 L1189664-08 GW

Collected by | Collected date/time 02/13/20 14:15 | Received date/time 02/14/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC) by Method 8021	WG1428932	1	02/16/20 20:10	02/16/20 20:10	BMB	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Heather J Wagner
Project Manager

Volatile Organic Compounds (GC) by Method 8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Benzene	0.0302		0.000500	1	02/16/2020 17:34	WG1428932
Toluene	0.0189		0.00100	1	02/16/2020 17:34	WG1428932
Ethylbenzene	0.508		0.00500	10	02/20/2020 21:34	WG1431581
Total Xylene	0.0596		0.00150	1	02/16/2020 17:34	WG1428932
Methyl tert-butyl ether	ND		0.00100	1	02/16/2020 17:34	WG1428932
(S) a,a,a-Trifluorotoluene(PID)	*122*		*79.0-125*		*02/16/2020 17:34*	WG1428932
(S) a,a,a-Trifluorotoluene(PID)	*101*		*79.0-125*		*02/20/2020 21:34*	WG1431581

Volatile Organic Compounds (GC) by Method 8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Benzene	0.0177		0.000500	1	02/16/2020 17:56	WG1428932
Toluene	ND		0.00100	1	02/16/2020 17:56	WG1428932
Ethylbenzene	0.00127		0.000500	1	02/20/2020 21:57	WG1431581
Total Xylene	0.0111		0.00150	1	02/16/2020 17:56	WG1428932
Methyl tert-butyl ether	ND		0.00100	1	02/16/2020 17:56	WG1428932
(S) a,a,a-Trifluorotoluene(PID)	*105*		*79.0-125*		*02/16/2020 17:56*	WG1428932
(S) a,a,a-Trifluorotoluene(PID)	*105*		*79.0-125*		*02/20/2020 21:57*	WG1431581

Volatile Organic Compounds (GC) by Method 8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Benzene	0.0209		0.000500	1	02/16/2020 18:19	WG1428932
Toluene	0.00596		0.00100	1	02/16/2020 18:19	WG1428932
Ethylbenzene	0.0192		0.000500	1	02/16/2020 18:19	WG1428932
Total Xylene	0.0171		0.00150	1	02/16/2020 18:19	WG1428932
Methyl tert-butyl ether	ND		0.00100	1	02/16/2020 18:19	WG1428932
(S) a,a,a-Trifluorotoluene(PID)	*109*		*79.0-125*		*02/16/2020 18:19*	WG1428932

Volatile Organic Compounds (GC) by Method 8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Benzene	0.00588		0.000500	1	02/16/2020 18:41	WG1428932
Toluene	ND		0.00100	1	02/16/2020 18:41	WG1428932
Ethylbenzene	0.00212		0.000500	1	02/16/2020 18:41	WG1428932
Total Xylene	0.00419		0.00150	1	02/16/2020 18:41	WG1428932
Methyl tert-butyl ether	ND		0.00100	1	02/16/2020 18:41	WG1428932
(S) a,a,a-Trifluorotoluene(PID)	*101*		*79.0-125*		*02/16/2020 18:41*	WG1428932

Volatile Organic Compounds (GC) by Method 8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Benzene	0.00433		0.000500	1	02/16/2020 19:03	WG1428932
Toluene	ND		0.00100	1	02/16/2020 19:03	WG1428932
Ethylbenzene	0.0140		0.000500	1	02/16/2020 19:03	WG1428932
Total Xylene	0.0133		0.00150	1	02/16/2020 19:03	WG1428932
Methyl tert-butyl ether	ND		0.00100	1	02/16/2020 19:03	WG1428932
(S) a,a,a-Trifluorotoluene(PID)	*104*		*79.0-125*		*02/16/2020 19:03*	WG1428932

Volatile Organic Compounds (GC) by Method 8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Benzene	ND		0.000500	1	02/16/2020 19:25	WG1428932
Toluene	ND		0.00100	1	02/16/2020 19:25	WG1428932
Ethylbenzene	ND		0.000500	1	02/16/2020 19:25	WG1428932
Total Xylene	ND		0.00150	1	02/16/2020 19:25	WG1428932
Methyl tert-butyl ether	ND		0.00100	1	02/16/2020 19:25	WG1428932
(S) a,a,a-Trifluorotoluene(PID)	*99.6*		*79.0-125*		*02/16/2020 19:25*	WG1428932

Volatile Organic Compounds (GC) by Method 8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Benzene	ND		0.000500	1	02/16/2020 19:48	WG1428932
Toluene	ND		0.00100	1	02/16/2020 19:48	WG1428932
Ethylbenzene	ND		0.000500	1	02/16/2020 19:48	WG1428932
Total Xylene	ND		0.00150	1	02/16/2020 19:48	WG1428932
Methyl tert-butyl ether	0.628		0.0100	10	02/20/2020 22:19	WG1431581
(S) a,a,a-Trifluorotoluene(PID)	*87.2*		*79.0-125*		*02/16/2020 19:48*	WG1428932
(S) a,a,a-Trifluorotoluene(PID)	*100*		*79.0-125*		*02/20/2020 22:19*	WG1431581

Volatile Organic Compounds (GC) by Method 8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Benzene	ND		0.000500	1	02/16/2020 20:10	WG1428932
Toluene	ND		0.00100	1	02/16/2020 20:10	WG1428932
Ethylbenzene	ND		0.000500	1	02/16/2020 20:10	WG1428932
Total Xylene	ND		0.00150	1	02/16/2020 20:10	WG1428932
Methyl tert-butyl ether	ND		0.00100	1	02/16/2020 20:10	WG1428932
(S) a,a,a-Trifluorotoluene(PID)	*99.0*		*79.0-125*		*02/16/2020 20:10*	WG1428932

Method Blank (MB)

(MB) R3501672-2 02/16/20 15:19

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U		0.000190	0.000500
Toluene	U		0.000412	0.00100
Ethylbenzene	U		0.000160	0.000500
Total Xylene	U		0.000510	0.00150
Methyl tert-butyl ether	U		0.000340	0.00100
(S) a,a,a-Trifluorotoluene(PID)	*101*			*79.0-125*

Laboratory Control Sample (LCS)

(LCS) R3501672-1 02/16/20 14:11

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.0500	0.0536	107	77.0-122	
Toluene	0.0500	0.0535	107	80.0-121	
Ethylbenzene	0.0500	0.0508	102	80.0-123	
Total Xylene	0.150	0.147	98.0	47.0-154	
Methyl tert-butyl ether	0.0500	0.0492	98.4	68.0-122	
(S) a,a,a-Trifluorotoluene(PID)			*102*	*79.0-125*	

Method Blank (MB)

(MB) R3501989-3 02/20/20 17:57

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ethylbenzene	U		0.000160	0.000500
Methyl tert-butyl ether	U		0.000340	0.00100
(S) a,a,a-Trifluorotoluene(PID)	*99.3*			*79.0-125*

Laboratory Control Sample (LCS)

(LCS) R3501989-1 02/20/20 16:50

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Ethylbenzene	0.0500	0.0508	102	80.0-123	
Methyl tert-butyl ether	0.0500	0.0473	94.6	68.0-122	
(S) a,a,a-Trifluorotoluene(PID)			*101*	*79.0-125*	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
	The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

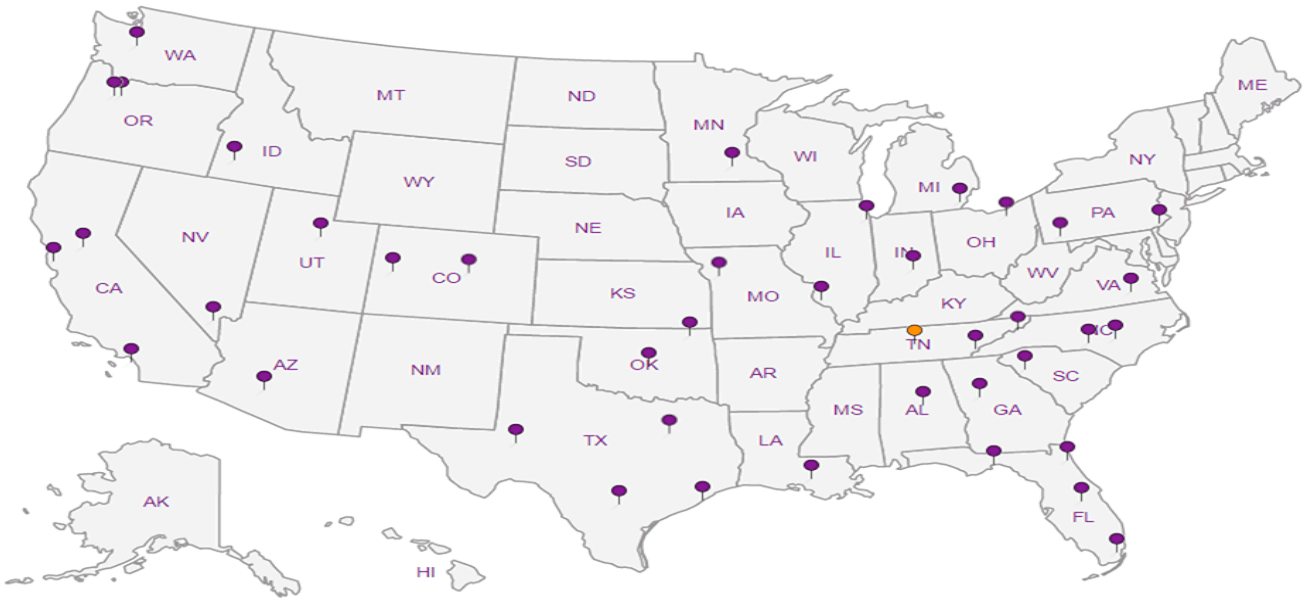
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

1941621

Section A Required Client Information:

Company: ECS Mid-Atlantic
Address: 4004 Hunterstand Ct., Ste. 102
Charlottesville, VA 22911
Email To: tnelson@ecslimited.com
Phone: 540-785-6624 Fax:
Requested Due Date/TAT: Standard 5-day

Section B Required Project Information:

Report To: Tom Nelson
Copy To:
Purchase Order No.:
Project Name: Scott's Ivy Exxon
Project Number:

Section C Invoice Information:

Attention: Tom Nelson
Company Name:
Address: Same
Pace Quote Reference:
Pace Project Manager: Heather Wagner
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: VA

Requested Analysis Filtered (Y/N)

H034

ITEM #	Section D Required Client Information — SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N: BTEX (8021B)	MTBE (8021B)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-1	WT	G			2/13/20	14:50		2	1			X					X	X		-01
2	MW-2						14:40						X					X	X		02
3	MW-3						14:40						X					X	X		03
4	~~MW-4~~												X					X	X		
5	~~MW-5~~												X					X	X		
6	MW-6						14:55						X					X	X		04
7	MW-7						14:30						X					X	X		05
8	MW-8						14:35						X					X	X		06
9	[redacted] ~~BW-1~~												X					X	X		
10	[redacted] BW-2						15:05						X					X	X		07
11	P-1						14:15						X					X	X		08
12																					

Matrix Codes — MATRIX / CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

1189664

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
	[signature] /ECS	2/13/20	16:00	[signature]	2/14/20	0845

SAMPLE CONDITIONS

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
1.2+			
.8=			
1.5			
HM A2			

*Note: Sample labels marked as preserved with other preservative but are actually preserved w/ HCl

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Tom Nelson

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 02/13/20

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

RAD SCREEN: <0.5 mR/hr

NCF

Pace Analytical National Center for Testing & Innovation
Cooler Receipt Form

Client: ECS CCVA	1189664	
Cooler Received/Opened On: 7/9/20 Temperature:	1.5	
Received By: Tanner Ln		
Signature:		

Receipt Check List	NP	Yes	No
COC Seal Present / Intact?	✓		
COC Signed / Accurate?		✓	
Bottles arrive intact?		✓	
Correct bottles used?		✓	
Sufficient volume sent?		✓	
If Applicable			
VOA Zero headspace?		✓	
Preservation Correct / Checked?			

Kelsey Stephenson



Login #: L1189664	Client:ECSCCVA	Date:02/14	Evaluated by:Kelsey S

Non-Conformance (check applicable items)

	Sample Integrity		Chain of Custody Clarification		
	Parameter(s) past holding time		Login Clarification Needed		**If Broken Container:**
	Temperature not in range		Chain of custody is incomplete		Insufficient packing material around container
	Improper container type		Please specify Metals requested.		Insufficient packing material inside cooler
	pH not in range.		Please specify TCLP requested.		Improper handling by carrier (FedEx / UPS / Courie
	Insufficient sample volume.		Received additional samples not listed on coc.		Sample was frozen
	Sample is biphasic.		Sample ids on containers do not match ids on coc		Container lid not intact
	Vials received with headspace.		Trip Blank not received.		**If no Chain of Custody:**
X	Broken container		Client did not "X" analysis.		Received by:
	Broken container:		Chain of Custody is missing		Date/Time:
	Sufficient sample remains				Temp./Cont. Rec./pH:
					Carrier:
					Tracking#

Login Comments: Received 1 of 2 broken vials for MW-1

Client informed by:		Call		Email		Voice Mail		Date:	Time:
TSR Initials:	Client Contact:								

Login Instructions:proceed with unbroken vial

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

VALLEY REGIONAL OFFICE
P.O. Box 3000, Harrisonburg, Virginia 22801
(540) 574-7800 Fax (540) 574-7878
www.deq.virginia.gov

Matthew J. Strickler
Secretary of Natural Resources

David K. Paylor
Director

Amy Thatcher Owens
Regional Director

May 2, 2019

Mr. Mike Jones
Charlottesville Oil Company, Inc.
PO Box 6340
Charlottesville, VA 22906
(Sent via email only)

Re: Petroleum Release – Toddsbury of Ivy, 4297 Ivy Road, Albemarle County
Facility FAC ID: 6-015515
Decision to Close Case, DEQ Tracking Number: PC# 2001-6134

Dear Mr. Jones:

Based on a review of the file associated with the above-reference investigation, **this case is considered to be closed,** and no further investigation or corrective action is required at this time. Should significant environmental, health or safety problems develop in the future, additional testing and/or corrective action may be required in accordance with applicable State and Federal regulations.

In accordance with 12 VAC 5-630-450 of the Virginia Department of Health Private Well Regulations, **the monitoring wells installed in conjunction with this investigation should be properly abandoned within 90 days to prevent future degradation of groundwater at the site. Please properly abandon the monitoring wells and provide a brief report of the abandonment procedures to this office by August 2, 2019.** Since the monitoring well was installed to meet regulatory requirements administered by DEQ, no permits or fees are required by the local health department. Well abandonment is a reimbursable activity if the proper preapproval protocol is followed. In order for the work to be eligible for reimbursement, an Activity Authorization Form (AAF) must be submitted to, and approved by, our office **prior** to closure activities abandonment.

Virginia Law prohibits the payment of corrective action and third party liability reimbursement claims which are filed more than two years after DEQ closes a case. **All claims for this release must be received by DEQ no later than May 2, 2021 in order to be eligible**

for reimbursement. Thank you for your continued patience and cooperation. If you have any questions or concerns or if we can be of further assistance, please contact David Fitt at (540) 574-7851 or david.fitt@deq.virginia.gov.

Sincerely,

T.A. Pitsenberger

Todd A. Pitsenberger
Petroleum Program Manager

cc: Petroleum Remediation File
Jeff Sitler (JAS) – via email

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
VALLEY REGIONAL OFFICE

4411 Early Road Harrisonburg, VA 22801

SUBJECT: PC 01-6134 – RECOMMENDATION FOR CASE CLOSURE
FAC ID#: 6-015515
SITE NAME: Toddsbury of Ivy
LOCATION: 4297 Ivy Road, Ivy, Albemarle County
TO: UST File
FROM: David A. Fitt DAF
DATE: May 2, 2019

Case Initiation: 2/8/2001 – Compliance Inspector reported three inconclusive SIRs for the 3,000-gallon regular gasoline UST and two inconclusive SIRs for the 3,000-gallon plus gasoline UST. No previous PC investigations have been performed at this facility.

Work Requested/Performed: DEQ requested a site check, which included soil borings adjacent to the dispenser island and piping trench. The samples were collected approximately 18 inches below grade and analyzed for TPH-GRO. Based upon the results, DEQ requested submission of an SCR to include installation of three monitoring wells. The SCR was submitted in January 2002 with documentation of groundwater contamination, including impact to the onsite potable water supply well. A CFU was installed following Culligan's assessment of the well. The first SCR Addendum included installation of a fourth monitoring well and sampling of the creek in multiple locations. Based upon the widespread presence of MTBE concentrated around the tank basin (but no free product), DEQ requested one year of quarterly monitoring which concluded in mid-2003. A second year of monitoring was requested which included pumping on the most contaminated wells in an attempt to determine if free product was present on the groundwater. Following the third monitoring report of the second year, the consultant recommended that a Corrective Action Plan (CAP) be developed. DEQ requested CAP development in early 2004.

The CAP submitted in June 2004 proposed a low-flow pump-and-treat system pumping from two severely impacted monitoring wells. DEQ requested an amendment to the proposed CAP that was submitted in two parts, one in December 2004 and the other in March 2005. DEQ approved the CAP on March 10, 2005. Two of the three tanks at the facility were voluntarily removed from the ground (the third tank was oriented under a portion of the structure preventing its removal) by the RP in September 2005 which was documented in a Phase II Initial Abatement Measures Report dated October 4, 2005. A total of 578.69 tons of highly contaminated soil was removed for disposal at Reco Biotechnology in Richmond. Groundwater extraction piping was installed in the tank basin to enhance recovery. A fifth monitoring well was also installed at that time adjacent to the tank basin. New tanks were installed at the facility in January 2006 that prompted the removal of an additional 583.41 tons of contaminated soil down-gradient of the previous tank basin location. Documentation of CAP Implementation was submitted to DEQ in May 2006 following system start-up. The system consisted of a cargo trailer contained SVE system with an oil-water separator and aeration drums. Water was pumped from multiple extraction points (MW-2 and MW-5) and discharged to an infiltration trench installed in the vicinity of the former tank basin above the known contaminant plume. The CAP endpoints included CFU removal from the on-site potable well (or provisions for replacement if the well concentrations warrant) and the treatment endpoints of 1,000 µg/L for benzene and MTBE in groundwater beneath the site for two consecutive quarters.

The system was in service from May 2006 until August 2013. In December 2007, the potable well was connected to the treatment system so it could pump and treat contaminated water in the potable well at a rate of 0.5 gallons per minute as deemed necessary. SVE operation was stopped in November 2008 based upon the asymptotic petroleum vapor concentrations measured in the vadose zone. MW-6, a deeper MW installed to a depth of 80 feet below grade, was added as a groundwater extraction point in June 2009. With extraction from MW-6, the air stripping capabilities of the treatment system were augmented. Pumping from MW-6 ceased in March 2012 based upon no detections of MBTEXN in the potable well for several quarters. By September 2012, the contamination was again observed in the potable well, thus pumping and treating from MW-6 was restarted.

In August 2013, potable wells at 4272 and 4282 Ivy Road yielded analytical data indicating petroleum contamination. Those properties are adjacent to the Ivy Exxon (FAC ID: 6-028008). The contamination initiated a case at the Exxon (PC: 13-6113). At that time, Albemarle County was contacted about a possible municipal waterline extension to address the three impacted potable wells. As part of that investigation, groundwater investigation was performed at the subject site before the December 2013 CAPI report was submitted. Three monitoring wells, two deep and one shallow, were installed at the subject site. Data collected at the two facilities was not conclusive regarding responsibility for the identified potable well impacts. In April 2016, the on-site potable well was statistically analyzed for CFU deactivation and qualified for CFU removal. In September 2016, DEQ decided not to pursue the waterline extension. In February 2017, the state contractor removed the CFU from the property. No additional investigation or remediation was performed or required at the site.

Nature/Extent of Contamination: Widespread residual-phase contamination was identified during the tank closure and tank installation activities. Between the excavation and disposal of more than 1,000 tons of contaminated soil and SVE activities, any remaining soil contamination is minor and is not considered to be significantly impacting groundwater any longer. Dissolved-phase contamination in the shallow aquifer was also significant in two particular locations - adjacent to the former tank basin and 40 feet east of the former tank basin. MW-2 yielded MTBE concentrations as high as 56,000 µg/L and benzene as high as 11,500 µg/L. The shallow groundwater contamination was nearly cleaned up as remedial activities ceased. After the treatment system was shut down in 2013, MW-2 yielded no MTBE or benzene concentrations above the detectable limits. Dissolved-phase contamination within the on-site potable well indicated a deeper aquifer impact, but only minor, with maximum MTBE concentrations less than 15 µg/L and benzene concentrations less than 4 µg/L. The potable well concentrations have not been detectable since 2014.

The discovery of dissolved-phase impact to potable wells east of the site across Route 250 prompted additional deep aquifer characterization at the site. The two deep monitoring wells were both impacted by dissolved-phase contamination, with the worst being down-gradient of the former tank basin where MTBE concentrations were detected at a maximum of 9,800 µg/L, and less significant BTEX contamination, maximum concentrations of 7,782 µg/L of which benzene was only 108 µg/L. Between data collected at the subject site and at the Ivy Exxon facility, deep aquifer contamination appears to be heading easterly and likely becoming combined beneath the Ivy Exxon. The deep aquifer is recharged via fractured bedrock beneath the site. Ivy Creek which runs through the southeast portion of the property did not yield detectable petroleum concentrations. A rudimentary groundwater sampling point, a hand dug hole near the edge of the creek, yielded MTBE concentrations less than 5 µg/L in the early stages of remedial efforts, but was BDL afterwards.

Receptors/Risk Assessment: The site and surrounding area utilize groundwater wells for potable water supplies. The on-site well was impacted for nearly 13 years, but has yielded no detectable petroleum concentrations since 2014 and is no longer considered at risk from this release. The impact to the potable wells at 4272 and 4282 Ivy Road may or may not have been impacted by the contamination from the subject site, however, considering the contamination from and proximity to the Ivy Exxon; those impacts are being addressed by PC 13-6113. Although several other potable wells were identified during this investigation, they are not considered at risk based upon estimated groundwater flow direction and remedial efforts. Ivy Creek is located approximately 200 feet south of the former tank basin; however, sampling indicates that the creek has not been impacted by this release of petroleum. The structure on the subject site is slab-on-grade; however, no vapor impact was ever observed and based upon the excavation and remedial activities future vapor risk associated with this release is minimal. No underground utilities were identified to be at risk from the contamination beneath the site. Based upon the investigation performed, this release is no longer considered to pose a significant risk to human health or the environment.

Recommendation: No further action and case closure.

CONCURRENCES							
SYMBOL	Petroleum	Petroleum					
SURNAME	Fitt	Gregory L. Clark					
DATE	5/2/2019	5-2-19	5/2/19				

Limited Phase II Investigation Report

Scott's Ivy Exxon Site
Charlottesville, Virginia

ANALYTICAL SERVICES, INC.

Limited Phase II Investigation Report

Scott's Ivy Exxon Site – 4260 Ivy Road
Charlottesville, Virginia

Prepared for:

Mr. Scott Ramm
Scott's Ivy Exxon
4260 Ivy Road
Charlottesville, Virginia 22903

Prepared by:

Analytical Services, Incorporated
402 N. West Street
Culpeper, Virginia 22701

Date: April 12, 2013

Limited Phase II Investigation Report

Scott's Ivy Exxon Site – 4260 Ivy Road
Charlottesville, Virginia

Prepared for:

Mr. Scott Ramm
Scott's Ivy Exxon
4260 Ivy Road
Charlottesville, Virginia 22903

Prepared by:

Analytical Services, Incorporated
402 N. West Street
Culpeper, Virginia 22701

Michael L. Maloy, CPG
Senior Geologist, Principal

Thomas P. Nelson, PG
Hydrogeologist

Date: April 12, 2013

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1.0 Introduction

Analytical Services, Inc. (ASI) is pleased to provide the following report documenting our findings during a limited investigation performed at the Scott's Ivy Exxon site located at 4260 Ivy Road in Charlottesville, Virginia. The investigation was performed at the request of our client, Mr. Scott Ramm, as part of the due diligence process for a future real estate transaction. The investigation consisted of a subsurface investigation at the site and a review of documents from an open leaking underground storage tank (LUST) site located within 100 feet of the Scott's Ivy Exxon site.

The Scott's Ivy Exxon site is currently being operated as a gasoline and diesel fueling station and as an automotive repair shop. Two buildings are present at the site; the southern building is used as an automotive repair shop (service building) and the northern building is residential (residential building). Gasoline and diesel fueling dispensers are present to the south of the service building. The gasoline fueling island is supplied by two active underground storage tanks (USTs). According to the Virginia UST database, these tanks have capacities of 8,000 gallons and 12,000 gallons, and were installed in 1998. The diesel fueling dispenser is supplied by a 500-gallon aboveground storage tank (AST). The residential building is supplied by a heating oil UST of unknown capacity. A railroad runs along the northern boundary of the site.

The subsurface investigation focused on the gasoline UST basin, an oil change pit, a diesel AST, an out-of-service hydraulic lift and the reported location of a used oil UST and kerosene UST near the northern side of the service building that may, or may not, have been previously removed (see Section 1.1). Your Locator, a private utility locating service, was used to supplement Miss Utility's clearance and line marking at the site. The private utility locator was also used to search the northern side of the service building for indications of the presence of potential USTs where the used oil UST and kerosene UST were reported to have previously existed. Additionally, the investigation addressed the existing residential structure which may have been used as a gasoline station prior to the 1950s. Investigation conducted at the residential structure included utilizing metal locating equipment to screen the yard area for the presence of metallic anomalies, conducting soil borings and sampling, and assessing the subsurface near an existing heating oil UST. In addition shallow soils were sampled near the railroad that lies along the site's northern boundary.

A Geoprobe® direct push drill rig, operated by Bedford Well Drilling, was utilized to collect soil cores and samples from near the UST basin, near the diesel AST, near the reported used oil tank and kerosene tank, and near the residential building. The subsurface investigation consisted of soil characterization, field screening of soil using a photoionization detector (PID), soil sampling, and laboratory analysis of the soil samples to provide a screening-level assessment of overburden soils for the presence of potential contaminants. A grab sample of groundwater was also collected from one boring located near the UST basin. A site location map has been provided as Figure 1 and site layout maps showing site features and sampling locations have been provided as Figures 2a and 2b.

1.1 Summary of Phase I Environmental Site Assessment

ASI completed a Phase I Environmental Site Assessment (ESA) of the Scott's Ivy Exxon site on February 28, 2013 (Analytical Services Inc. 2013). The ESA revealed that the site has been used as a gasoline station since at least the 1950s, and possibly longer. There have been two documented past releases from USTs at the site. The first release was reported in February 1997 (PC#1997-5102) and the second release was reported in November 1998 (PC#1999-5133) following the removal of three 6,000-gallon gasoline USTs. A soil concentration of 85 milligrams per kilogram (mg/Kg) was documented in the vicinity of the UST basin during the investigation of PC#1997-5102 and a soil concentration of 143.2 mg/Kg was documented in the vicinity of the UST basin during the investigation of PC#1999-5133. Both releases have since been closed.

The investigation also identified that four USTs have been removed from the ground in the past. These tanks include three 6,000-gallon gasoline USTs and one 500-gallon kerosene UST according to Virginia UST database records. All three of the 6,000-gallon gasoline USTs were removed in October 1998 and the 500-gallon kerosene UST was reported to have been removed at an unknown date.

The Phase I ESA revealed a correspondence dated March 7, 1997 between the Virginia Department of Environmental Quality (DEQ) and a former owner of the Scott's Ivy Exxon site, Mr. Roy Bailey, Jr. In the letter, the Virginia DEQ recommends the proper closure of two inactive USTs, a 250-gallon used oil tank and a 250-gallon kerosene tank. Although Mr. Roger Gibson, the current property owner, believes that these USTs were removed by Mr. Bailey, closure documentation within the Virginia DEQ's records was not found.

ASI recommended that a Phase II ESA be completed to investigate potential impacts associated with:

-historical use of petroleum storage tanks, oil change pit and hydraulic lift cylinder;
-potentially existing waste oil and/or kerosene UST;
-offsite release at Toddsbury of Ivy property
-residence, heating oil UST and potential use as a former gasoline station
-railroad

In addition, ASI also recommended an inventory of ASTs at the Scotts Ivy Exxon site along with an estimate of aggregate AST storage volume.

2.0 Subsurface Investigation

2.1 Service Building

On March 21, 2013, ASI personnel supervised the completion of five soil borings to a depth of 8–16 feet below ground surface (bgs) in the area of the service building. The borings were completed with a direct push Geoprobe® drill rig and were identified as

Boring 1, 2, 3, 4, and 5 (Figure 2b). Additionally, ASI personnel used a hand-auger to bore to a depth of 5.3 feet bgs near the used oil UST. The hand-augered sample collected near the service building is identified as Service Building: Auger (Figure 2b). A soil sample was also collected in the service building, beneath the concrete building foundation in an oil-changing bay, and is identified as Sub-Slab (Figure 2b).

Utility clearance was requested from Miss Utility and a private utility locator was also used to further screen the work area for underground utilities prior to drilling. Continuous sampling cores (48 inches in length) were extracted during drilling. The soil cores were visually inspected and logged by an ASI geologist. Soil samples were then collected at appropriate intervals, as determined by ASI personnel based on field observations, and placed in a sealable plastic bag. Each bagged sample was field-screened for the presence of volatile organic compound (VOC) vapors via a PID. Recorded PID readings that exceeded two parts per million (ppm) have been summarized in Table 1.

Soil samples collected from selected borings were submitted for laboratory analysis. ASI personnel determined which samples to submit for laboratory analysis based on PID readings and boring proximity to site features of interest. The following samples collected from borings near the service building were submitted for laboratory analysis: **(1)** soil samples identified as Boring 1 and Boring 2 were submitted for analysis of total petroleum hydrocarbons- (TPH) gasoline range organics (GRO) via method 8015B. The sample collected from Boring 1 was a composite sample from depth intervals 8.0–10.0 feet bgs, 10.8–11.8 feet bgs, and 13.5–14.5 feet bgs, with the majority of the sample being collected from the 10.8–11.8 feet bgs interval. The Boring 2 sample was collected from the 7.0–8.0 feet bgs interval. **(2)** Soil sample identified as Boring 3 was submitted for analysis of TPH-GRO and TPH-diesel range organics (DRO) via method 8015B. This sample was collected from depth intervals 8.5–10.0 feet bgs and 10.5–12.0 feet bgs. **(3)** Soil sample identified as Boring 5 was submitted for analysis of oil and grease (O&G) via method 1664. This sample was collected from depth interval 4.0–8.0 feet bgs. **(4)** Soil sample identified as Sub-Slab was submitted for laboratory analysis of O&G via method 1664. This sample was collected from a depth of less than one foot below the bottom of the concrete building foundation.

In addition to the soil samples, a disposable bailer was used to collect a groundwater sample from Boring 1. The groundwater sample, identified as Boring 1, was collected from an open borehole and submitted for analysis of benzene, toluene, ethylbenzene, and xylene (BTEX) via method 8021. While no measurable free product was observed in Boring 1, the water did possess a petroleum odor.

Table 2 summarizes the results of the TPH-GRO, TPH-DRO, and oil and grease constituents detected in soil samples that were submitted for laboratory analysis, and Table 3 summarizes the results of the BTEX constituents detected in the Boring 1 groundwater sample that was submitted for laboratory analysis. The tables include Virginia DEQ/Voluntary Remediation Program (VRP) screening levels for comparison

purposes. A copy of the laboratory report and chain-of-custody documentation provided by Phase Separation Science, Inc. has been included in Appendix A.

2.2 Residential Building and Adjoining Railroad

Two soil borings were completed to depths of six and 12 feet bgs in the reported vicinity of the residential building at the site. The borings were identified as Borings 6 and 7 (Figure 2b). Additionally, one hand-augered boring was completed to a depth of 4.6 feet bgs in the vicinity of the residential building's heating oil tank and a second hand-augered boring was completed to a depth of less than one foot bgs within 10 feet of the railroad. The hand-augered borings were identified H.O. Tank: Auger and Railroad: Auger, respectively (Figure 2b). None of the soil samples from Boring 6, Boring 7, H.O. Tank: Auger, nor Railroad: Auger exceeded two ppm.

Soil samples collected from selected borings were submitted for laboratory analysis. ASI personnel determined which samples to submit for laboratory analysis based on PID readings and boring proximity to site features of interest. The following samples collected from borings near the residential building were submitted for laboratory analysis: **(1)** soil sample identified as Boring 6 was submitted for analysis of TPH-GRO via method 8015B. This sample was collected from depth interval 4.0–6.0 feet bgs. **(2)** Soil sample identified as H.O. Tank was submitted for analysis of TPH-DRO via method 8015B. This sample was a composite of material collected from the ground surface to a depth of 4.6 feet bgs. **(3)** Soil sample identified as Railroad was submitted for analysis of polychlorinated biphenyls (PCBs) via method 8082A. This sample was a composite of material collected from directly beneath the concrete building foundation to a depth of less than one foot beneath the bottom of the foundation. Table 2 summarizes the results of the TPH-GRO, TPH-DRO, and PCB constituents detected in these soil samples.

Table 1
Summary of Soil Sample PID Readings Greater than 2 Parts Per Million

Soil Boring Identification	Total Boring Depth (feet)	PID[a] Readings (ppm[b]) (sample interval in feet below ground surface)					
		6.5-8.0 feet	7.0-8.0 feet	8.0-10.0 feet	10.8-11.8 feet	13.5-14.5 feet	14.5-16.0 feet
Boring 1	16	32.3	NS[c]	326	1,875	348	106
Boring 2	12	NS	22.3	NS	NS	NS	NS
Boring 3	12	No readings greater than 2 ppm in boring					
Boring 4	12	No readings greater than 2 ppm in boring					
Boring 5	8	No readings greater than 2 ppm in boring					
Boring 6	6	No readings greater than 2 ppm in boring					
Boring 7	12	No readings greater than 2 ppm in boring					
Service	5.3	No readings greater than 2 ppm in boring					

Building: Auger		
H.O. Tank: Auger	4.6	No readings greater than 2 ppm in boring
Railroad: Auger	<1	No readings greater than 2 ppm in boring
Sub-Slab	<1	No readings greater than 2 ppm in boring

[a]PID = photoionization detector
[b]ppm = parts per million
[c]NS = sample not collected from this depth interval

Table 2
Soil Sampling Results
(Sampled March 21, 2013)

Boring Identification	TPH-GRO[a] (mg/Kg[b])	TPH-DRO[c] (mg/Kg)	Oil and Grease (mg/Kg)	PCB[d] (mg/Kg)
Boring 1	1,300	NA[e]	NA	NA
Boring 2	0.240	NA	NA	NA
Boring 3	NA	<5.3	NA	NA
Boring 5	NA	NA	<62	NA
Boring 6	<0.130	NA	NA	NA
H.O. Tank	NA	<4.8	NA	NA
Railroad	NA	NA	NA	<0.14 for all analyzed PCB constituents
Sub-Slab	NA	NA	<150	NA
VDEQ[f] Limit (mg/Kg)	100	None Provided	None Provided	None Provided
VVRP[g] Tier III Screening Concentration: Soil Restricted Commercial /Industrial (mg/Kg)	None Provided	None Provided	None Provided	0.74 mg/Kg for Total PCBs

Red indicates exceedance in screening concentration value
[a]TPH-GRO = total petroleum hydrocarbons-gasoline range organics
[b]mg/Kg = milligrams per kilogram
[c]TPH-DRO = total petroleum hydrocarbons-diesel range organics
[d]PCB = polychlorinated biphenyls
[e]NA = sample not analyzed for this constituent
[f]VDEQ = Virginia Department of Environmental Quality
[g]VVRP = Virginia Voluntary Remediation Program

Table 3
Groundwater Sampling Results
(Sampled March 21, 2013)

Benzene, Toluene, Ethylbenzene, and Xylene via Method 8021B		
Constituent	**Boring 1 Concentration (µg/L[a])**	**VVRP[b] Tier III Commercial Groundwater Screening Level (µg/L)**
Benzene	210	43.9
Toluene	180	8,050
Ethylbenzene	4,200	27.6
m,p-Xylenes	12,000	None Provided
o-Xylene	470	206
Xylenes total	12,470	206

Red indicates exceedance in screening concentration value
[a]µg/L = micrograms per liter
[b]VVRP = Virginia Voluntary Remediation Program

3.0 Document Review of Adjoining Leaking Underground Storage Tank Site

Analytical Services, Inc. reviewed documents from the Toddsbury of Ivy LUST site (PC#01-6134), which is located less than 100 feet southwest of the Scott's Ivy Exxon site, at the intersection of Highway 250 and Ivy Depot Road, in Charlottesville, Virginia. The documents were obtained from the DEQ via a freedom of information request. Based on the document review, the Toddsbury of Ivy site had been operating as a gasoline station since at least the early 1950's and contained three 3,000-gallon USTs at the time of initial investigation. A Site Characterization Report (SCR) was completed by Jeffrey A. Sitler Environmental Service, Inc. (JAS), from Charlottesville, Virginia, in January 2002 (JAS 2002a) and an addendum to the SCR was completed in April 2002 (JAS 2002b) in response to an inconclusive pressure test to the piping lines at the site. Both of these reports are included in Appendix B.

The SCR included the installation and sampling of four monitoring wells in the shallow groundwater system between November 2001 and February 2002. Groundwater levels were measured and groundwater samples were collected from these wells to determine groundwater flow direction, gradient, and contamination levels. It was determined that groundwater from the shallow aquifer flows in an east-southeast direction toward Little Ivy Creek, under a gradient of 0.01–0.03, and discharges into the creek. Laboratory analysis of the samples for TPH-GRO, BTEX, and methyl tert-butyl ether (MTBE) indicated elevated levels of benzene and highly elevated levels of MTBE in the immediate vicinity of the site's UST basin. Laboratory analysis also indicated elevated levels of MTBE in a monitoring well located 75 feet downgradient from the UST basin, although levels were two orders of magnitude less than the concentration measured in the

immediate vicinity of the UST basin. Overall, the investigation showed that a release had occurred at an unknown time from the site's USTs, and that although elevated levels of benzene and MTBE were present in the groundwater near the USTs, the lateral extent of the plumes was minimal.

TPH-GRO, BTEX, and MTBE were monitored in the site's wells from February 2002 to March 2004. During this monitoring period, contaminants in the source area did not diminish appreciably and concentrations increased in the downgradient monitoring well. Also during this monitoring period, it was determined that the groundwater contamination plume had approximate dimensions of 75 feet in width by 125 feet in length. A request for a Corrective Action Plan (CAP) was then issued by the Virginia DEQ in March 2004, which was developed by JAS (JAS 2004) and is included in Appendix B.

The final CAP consisted of conducting the following actions: (1) Removal of two of the site's three USTs and inactivate the third UST that is located beneath a building; (2) excavate contaminated soil in the vicinity of the UST basin; (3) install a groundwater pumping system to remove dissolved-phase contaminants from the shallow groundwater system, including the installation of a recovery well completed to a depth of 80 feet bgs into the fractured bedrock; (4) install a soil-vapor extraction (SVE) system in the vicinity of the source area to removed adsorbed-phase contaminants in the vadose zone and free-phase gasoline on the surface of the water table; and (5) quarterly monitoring of the site.

As of the most recent CAP monitoring report, dated February 28, 2013, TPH-GRO and BTEX levels were below laboratory detection limits in all of the monitoring wells. Additionally, MTBE levels were below laboratory detection limits in all of the site's wells except the 80-feet deep recovery well and the furthest downgradient monitoring well. Concentrations of MTBE in these wells were 4.9 micrograms per liter (µg/L) and 2.0 µg/L, respectively (JAS 2013). A copy of this report is included in Appendix B.

4.0 Above Ground Storage Tank Inventory

ASI performed an inventory of ASTs at the site in an attempt to determine if AST aggregate storage volume triggers Spill Prevention, Control, and Countermeasures Plan (SPCC) requirements for the site. The following ASTs were identified at the site:

Exterior Tanks	
Diesel AST -	500 gallons
Waste Oil AST (rectangular)-	300 gallons
Motor Oil 1 -	275 gallons
Motor Oil 2 -	275 gallons
Green Heating Oil AST -	275 gallons
Red Heating Oil* -	275 gallons
Subtotal	1,900 gallons

Interior Tanks		
Pit Waste Oil 1 -		275 gallons
Pit Waste Oil 2 -		275 gallons
	Subtotal	550 gallons
	Total	2,450 gallons

* reported to be out of service

The existing aggregate volume for the site is deemed to be 2,450 gallons plus any existing 55-gallon drums that are onsite which contain oil. According to EPA personnel heating ASTs used for heating oil at commercial business locations are to be included within the sites aggregate AST storage. The aggregate AST volume was found to exceed the 1,320 gallon aggregate storage threshold for SPCC Plan requirements.

5.0 Discussion of Findings

5.1 Soil Characterization

Similar geologic conditions were encountered in Borings 1 and 2, which were installed in close proximity to each other on the eastern portion of the site. A dark red colored, silty-clay layer was encountered in both borings from beneath the surface fill to a depth of approximately seven feet bgs. Beneath this layer was a light brown colored, silty-clay layer with a higher percentage of silt than in the overlying layer, and was present to a depth of 11 feet bgs. A fine- to coarse-grained, poorly sorted, angular, saturated sand layer was encountered at a depth of 11 feet in both borings, and was approximately one foot thick. Finally, interbedded sand and silty-clay layers were encountered from 12–16 feet bgs in Boring 1. The sand at this interval was fine- to coarse-grained, poorly sorted, angular, saturated, and contained gravels with a diameter of greater than one inch, and the silty-clay at this interval was light brown colored and soft, with moderate plasticity. The most prominent sand layer at the 12–16 feet bgs interval was encountered at 14.1–15.5 feet bgs, and the most prominent silty-clay layer was encountered at 12.0–13.5 feet bgs. It is likely that the geologic material observed in these borings from 7–16 feet bgs are fluvial deposits from a stream located approximately 150 feet east of the borings.

Similar geologic conditions were encountered in Borings 3, 4, 5, 6, and 7. Dark red colored, silty-clay with some sand and gravel was encountered in Borings 3, 4, and 5 to a depth of 4–7 feet bsg. Highly weathered saprolite was encountered beneath this layer to the total depth of these borings. Borings 6 and 7 encountered the same saprolite directly beneath the surface-fill material.

The hand-augered borings showed similar geologic conditions as well. Dark red colored, silty-clay was encountered from beneath the surface-fill material to total augering depth in all of the augered borings.

Soil collected from the Geoprobe® and hand-augered borings provided insight into geologic conditions at the subject property. The borings indicate that unconsolidated overburden sediment is thickest in the vicinity of Borings 1 and 2, as evidenced by these borings not encountering the saprolite that was observed in all of the other Geoprobe® borings. The investigation also revealed that saprolite is within four feet of the surface throughout much of the subject property, as evidenced by the soil cores collected from Borings 3 through 7. The investigation revealed that the brown, silty-clay layers and sand layers observed in Borings 1 and 2, which appear to be of fluvial origin, pinch out before extending westward to the other borings. It is likely that these sand layers have the ability to transmit groundwater at a relatively fast flow rate.

5.2 Soil and Groundwater Sampling

Existing UST Basin Area

Groundwater analytical results of a sample collected from Boring 1 indicate that concentrations of benzene, ethylbenzene, o-xylene, and total xylenes exceed Virginia VRP Tier III screening levels (Table 2). Additionally, soil analytical results of a sample collected from Boring 1 indicate that the concentration of TPH-GRO exceeds the Virginia DEQ UST reporting level for TPH (Table 3). None of concentrations of other analyzed constituents in the soil and groundwater samples collected from the site exceeded Virginia VRP or DEQ screening levels.

Based on soil and groundwater sampling and analytical results generated from this limited Phase II Subsurface Investigation, the area in the vicinity of the UST basin has been impacted by a release of petroleum hydrocarbons. An elevated TPH concentration, found to be above the Virginia DEQ action level, was detected in soil at the site within the gasoline range (TPH-GRO). Additionally, concentrations of BTEX constituents were measured in groundwater from Boring 1 that exceeded Virginia VRP Tier III screening levels. It is likely that the source of this release is associated with either historical or current gasoline USTs used at the site. The existing UST tank pit is located in an apparent upgradient location and in close proximity to Boring 1. Further evidence toward the gasoline UST(s)/pit being the source of the release is that the TPH-GRO concentration measured in the Boring 2 soil sample, which is located in an apparent upgradient direction from the UST basin and Boring 1, contained a relatively low TPH-GRO concentration.

The Virginia DEQ requires that a release of petroleum resulting in soil samples exhibiting TPH concentrations of greater than 100 mg/Kg be reported. Given that the TPH-GRO concentrations noted in soil sample Boring 1 is above 100 mg/Kg, a copy of this report should be submitted to the Virginia DEQ.

Potential Used Oil UST and Kerosene UST

During investigation of the area where both a used oil and kerosene tank had reportedly existed, no direct evidence of an existing buried tank was identified and no evidence of petroleum impact to soils within the areas investigated were found. A metal line does

exist from the oil change pit to the area north of the station, however, it abruptly appears to stop based on utility locating equipment readings.

Diesel AST and Hydraulic Lift

A single boring and soil sampling completed in close proximity to the diesel AST and the western most service bay did not yield any evidence of petroleum impacted soil. The out-of-service hydraulic lift should be accessed and any remaining hydraulic oil removed. Removal of the lift is recommended and at such time a better assessment of the soil conditions beneath the lift could be made.

Residence and Railroad

It remains unclear whether the existing building was used as a gasoline station. The existing porch on the structure has been built over deteriorating concrete steps that suggest the building has been in its current location for an extended period of time. The owner of the property had indicated that the building may have been moved to its present location and that the building may have once been closer to the road (Rt. 250). Two relatively small metallic anomalies were identified in the front (southern side) of the residential structure with utility locating equipment. A soil boring was completed near each area and no direct evidence of a tank or petroleum impact was identified. A soil boring was also completed adjacent to a heating oil UST that lies along the northern side of the residence. Again, no evidence of petroleum impact to soils was noted.

A shallow boring was completed near the railroad track and screened with a PID. No elevated PID readings were observed. The sample was submitted for analysis of PCBs and no detection was identified.

5.3 Adjoining Leaking Underground Storage Tank Site

ASI reviewed documents provided by the Virginia DEQ related to the Toddsbury of Ivy LUST site, located on the southwestern adjoining property. The documents showed that a release had occurred from the site's gasoline USTs sometime prior to November 2001, resulting in a benzene and MTBE groundwater contamination plume. A CAP was implemented at the site in 2004 that consisted of UST removal/closure, contaminated soil excavation, installation of a groundwater pumping system and SVE system, and quarterly monitoring.

The CAP actions have reduced concentrations of all contaminants of concern with the exception of MTBE to below laboratory detection limits. Concentrations of MTBE were detected at levels exceeding laboratory detection limits in two of the site's wells during the most recent sampling event, although both wells' concentrations were less than 5 µg/L. Additionally, site data from back to 2001 indicates that the site's groundwater contamination plume has a minimal lateral extent, and discharges to Little Ivy Creek.

It is unlikely that contaminated groundwater from the Toddsbury of Ivy site has impacted groundwater at the Scott's Ivy Exxon site. Shallow groundwater at the Toddsbury of Ivy site has been documented to flow in an east-southeast direction, toward Little Ivy Creek.

Based on this information, it is likely that Scott's Ivy Exxon is located hydraulically cross-gradient from the Toddsbury of Ivy site. Additionally, the maximum lateral extent of the Toddsbury of Ivy site's groundwater contaminant plume has been defined, as determined during site monitoring, and does not extend beneath the Scott's Ivy Exxon site.

5.4 AST Inventory

Based on identified inventory of above ground storage tanks (ASTs) used at the site, and the apparent aggregate storage volume of the existing ASTs, the site does require a Tier 1 Spill Prevention, Control, and Countermeasures Plan (SPCC).

6.0 Conclusions

ASI has performed a limited Phase II Subsurface Investigation to provide a screening level assessment of overburden soils and groundwater for the presence of potential contaminants that may be present at the Scott's Ivy Exxon site. The subsurface investigation focused on concerns identified within a Phase I ESA previously prepared for the site (ASI 2013).

Based on soil and groundwater sampling and analytical results generated from this limited Phase II Subsurface Investigation, the area in the vicinity of the gasoline UST basin has been impacted by a release of petroleum hydrocarbons. An elevated concentration of TPH-GRO was measured in a soil sample collected from a boring located hydraulically downgradient from the UST basin, and elevated concentrations of BTEX constituents were measured in a groundwater sample collected from the same boring. The TPH-GRO concentration measured in the soil sample exceeded the Virginia DEQ UST reporting levels for TPH-GRO. Additionally, benzene, ethylbenzene, o-xylene, and total xylenes concentrations measured in the groundwater sample exceeded Virginia VRP Tier III screening levels. As such, a copy of this report should be submitted to the Virginia DEQ.

The results from this limited Phase II Subsurface Investigation are considered useful for screening purposes. However, additional subsurface investigation is recommended to characterize the nature and extent of the petroleum contaminant plume that exists in the area of the existing UST basin.

Based on identified inventory of above ground storage tanks used at the site, and the apparent aggregate storage volume of the existing ASTs, the site does require a Tier 1 Spill Prevention, Control, and Countermeasures Plan (SPCC).

Limited subsurface investigation and sampling conducted at other areas of concern did not yield evidence of environmental impact at the time of this investigation and at the locations investigated.

7.0 Limitations

The work performed in conjunction with this project, and the data developed, are intended as a description of available information at the sample locations indicated and the dates specified. Generally accepted industry standards were used in the preparation of this report. Laboratory data are intended to approximate actual conditions at the time of sampling. Results from future sampling and testing may vary significantly as a result of natural conditions, a changing environment, or the limits of analytical capabilities. This report does not warrant against future operations or conditions, nor does it warrant against operations or conditions present of a type or at a specific location not investigated. The limited sampling conducted was intended to approximate subsurface conditions by extrapolation between data points. Actual subsurface conditions may vary.

ASI has based its recommendations on observable conditions and analytical results from an independent analytical laboratory, which is solely responsible for the accuracy of its methods and results.

8.0 References

[ASI] Analytical Services, Inc. 2013. Phase I Environmental Site Assessment for the Scott's Ivy Exxon site, Charlottesville, Virginia. Report dated 2/28/2013.

[JAS] Jeffrey A. Sitler Environmental Service, Inc. 2002a. Site Characterization Report for Toddsbury of Ivy site (PC#01-6134). Submitted to Virginia Department of Environmental Quality, 01/03/2002.

[JAS] Jeffrey A. Sitler Environmental Service, Inc. 2002b. Site Characterization Report Addendum for Toddsbury of Ivy site (PC#01-6134). Submitted to Virginia Department of Environmental Quality, 04/18/2002.

[JAS] Jeffrey A. Sitler Environmental Service, Inc. 2004. Corrective Action Plan for Toddsbury of Ivy site (PC#01-6134). Submitted to Virginia Department of Environmental Quality, 06/08/2004.

[JAS] Jeffrey A. Sitler Environmental Service, Inc. 2013. CAPI Monitoring Report CAPI Subphase No. 24 for Toddsbury of Ivy site (PC#01-6134). Submitted to Virginia Department of Environmental Quality, 02/28/2013.

Figures

Appendix A

Laboratory Analytical Results

Analytical Report for

Analytical Services, Inc.(VA)

Certificate of Analysis No.: 13032603

Project Manager: Mike Maloy
Project Name : Scott's Ivy Exxon
Project Location: Ivy, VA
Project ID : 3351

April 2, 2013

Phase Separation Science, Inc.
6630 Baltimore National Pike
Baltimore, MD 21228
Phone: (410) 747-8770
Fax: (410) 788-8723

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PHASE SEPARATION SCIENCE, INC.

April 2, 2013

Mike Maloy
Analytical Services, Inc.(VA)
402 N West Street
Culpepper, VA 22701

Reference: PSS Work Order(s) No: **13032603**
Project Name: Scott's Ivy Exxon
Project Location: Ivy, VA
Project ID.: 3351

Dear Mike Maloy :

This report includes the analytical results from the analyses performed on the samples received under the project name referenced above and identified with the Phase Separation Science (PSS) Work Order(s) numbered **13032603**.

All work reported herein has been performed in accordance with current NELAP standards, referenced methodologies, PSS Standard Operating Procedures and the PSS Quality Assurance Manual unless otherwise noted in the Case Narrative Summary. PSS is limited in liability to the actual cost of the sample analysis done.

PSS reserves the right to return any unused samples, extracts or related solutions. Otherwise, the samples are scheduled for disposal, without any further notice, on April 30, 2013. This includes any samples that were received with a request to be held but lacked a specific hold period. It is your responsibility to provide a written request defining a specific disposal date if additional storage is required. Upon receipt , the request will be acknowledged by PSS, thus extending the storage period.

This report shall not be reproduced except in full, without the written approval of an authorized PSS representative. A copy of this report will be retained by PSS for at least 5 years, after which time it will be disposed of without further notice, unless prior arrangements have been made.

We thank you for selecting Phase Separation Science, Inc. to serve your analytical needs. If you have any questions concerning this report, do not hesitate to contact us at 410-747-8770 or info@phaseonline.com.

Sincerely,

Dan Prucnal

Dan Prucnal
Laboratory Manager

Sample Summary

Client Name: Analytical Services, Inc.(VA)

Project Name: Scott's Ivy Exxon

Work Order Number(s): 13032603

Project ID: 3351

The following samples were received under chain of custody by Phase Separation Science (PSS) on 03/26/2013 at 10:30 am

Lab Sample Id	Sample Id	Matrix	Date/Time Collected
13032603-001	Boring 1	GROUND WATER	03/21/13 12:00
13032603-002	Boring 1	SOIL	03/21/13 12:00
13032603-003	Boring 3	SOIL	03/21/13 12:00
13032603-004	Boring 5	SOIL	03/21/13 12:00
13032603-005	Boring 6	SOIL	03/21/13 12:00
13032603-006	Boring 2	SOIL	03/21/13 12:00
13032603-007	H.O. Tank	SOIL	03/21/13 12:00
13032603-008	Railroad	SOIL	03/21/13 12:00
13032603-009	Sub-slab	SOIL	03/21/13 12:00

Please reference the Chain of Custody and Sample Receipt Checklist for specific container counts and preservatives. Any sample conditions not in compliance with sample acceptance criteria are described in Case Narrative Summary.

Notes:

1. The presence of a common laboratory contaminant such as methylene chloride may be considered a possible laboratory artifact. Where observed, appropriate consideration of data should be taken.
2. The following analytical results are never reported on a dry weight basis: pH, flashpoint, moisture and paint filter test.
3. Drinking water samples collected for the purpose of compliance with SDWA may not be suitable for their intended use unless collected by a certified sampler [COMAR 26.08.05.07.C.2].
4. The analyses of 1,2-dibromo-3-chloropropane (DBCP) and 1,2-dibromoethane (EDB) by EPA 524.2 and calcium, magnesium, sodium and iron by EPA 200.8 are not currently promulgated for use in testing to meet the Safe Drinking Water Act and as such cannot be used for compliance purposes. The listings of the current promulgated methods for testing in compliance with the Safe Drinking Water Act can be found in the 40 CFR part 141.1, for the primary drinking water contaminates, and part 141.3, for the secondary drinking water contaminates.
5. The analyses of chlorine, pH, dissolved oxygen, temperature and sulfite for non-potable water samples tested for compliance for Virginia Pollution Discharge Elimination System (VDPES) permits and Virginia Pollutant Abatement (VPA) permits, have a maximum holding time of 15 minutes established by 40CFR136.3.

Standard Flags/Abbreviations:

- B A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
- C Results Pending Final Confirmation.
- E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
- Fail The result exceeds the regulatory level for Toxicity Characteristic (TCLP) as cited in 40 CFR 261.24 Table 1.
- J The target analyte was positively identified below the reporting limit but greater than the LOD.
- LOD Limit of Detection. An estimate of the minimum amount of a substance that an analytical process can reliably detect. An LOD is analyte and matrix specific.
- ND Not Detected at or above the reporting limit.
- RL PSS Reporting Limit.
- U Not detected.

Case Narrative Summary

Client Name: Analytical Services, Inc.(VA)

Project Name: Scott's Ivy Exxon

Work Order Number(s): 13032603

Project ID: 3351

Any holding time exceedances, deviations from the method specifications, regulatory requirements or variations to the procedures outlined in the PSS Quality Assurance Manual are outlined below.

Sample Receipt:

All sample receipt conditions were acceptable.

General Comments:

Results reported on an as received basis for sample 'Sub-Slab'.

NELAP accreditation was held for all analyses performed unless noted below. See www.phaseonline.com for complete PSS scope of accreditation.

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6630 BALTIMORE NATIONAL PIKE
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BALTIMORE, MD 21228
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PHASE SEPARATION SCIENCE, INC.

CERTIFICATE OF ANALYSIS

No: 13032603

Analytical Services, Inc.(VA), Culpepper, VA

April 2, 2013

Project Name: Scott's Ivy Exxon
Project Location: Ivy, VA
Project ID: 3351

Sample ID: Boring 1 **Date/Time Sampled: 03/21/2013 12:00** **PSS Sample ID: 13032603-001**
Matrix: GROUND WATER **Date/Time Received: 03/26/2013 10:30**

BTEX — Analytical Method: SW-846 8021B — Preparation Method: 5030B

USEPA methods recommend that the appearance of detectable levels of the 8021B compounds below be confirmed when unfamiliar samples are analyzed.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Benzene	**210**	ug/L	25		25	03/27/13	03/27/13 13:51	1035
Toluene	**180**	ug/L	25		25	03/27/13	03/27/13 13:51	1035
Ethylbenzene	**4,200**	ug/L	25		25	03/27/13	03/27/13 13:51	1035
m,p-Xylenes	**12,000**	ug/L	50		25	03/27/13	03/27/13 13:51	1035
o-Xylene	**470**	ug/L	25		25	03/27/13	03/27/13 13:51	1035

Sample ID: Boring 1 **Date/Time Sampled: 03/21/2013 12:00** **PSS Sample ID: 13032603-002**
Matrix: SOIL **Date/Time Received: 03/26/2013 10:30** **% Solids: 82**

Total Petroleum Hydrocarbons-GRO — Analytical Method: SW-846 8015C — Preparation Method: 5030

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
TPH-GRO (Gasoline Range Organics)	**1,300,000**	ug/kg	12,000		100	03/27/13	03/27/13 20:30	1035

Sample ID: Boring 3 **Date/Time Sampled: 03/21/2013 12:00** **PSS Sample ID: 13032603-003**
Matrix: SOIL **Date/Time Received: 03/26/2013 10:30** **% Solids: 73**

Total Petroleum Hydrocarbons - DRO — Analytical Method: SW-846 8015 C — Preparation Method: 3550

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
TPH-DRO (Diesel Range Organics)	ND	mg/kg	5.3		1	03/26/13	03/26/13 21:20	1040

Total Petroleum Hydrocarbons-GRO — Analytical Method: SW-846 8015C — Preparation Method: 5030

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
TPH-GRO (Gasoline Range Organics)	ND	ug/kg	130		1	03/27/13	03/27/13 17:46	1035

Sample ID: Boring 5 **Date/Time Sampled: 03/21/2013 12:00** **PSS Sample ID: 13032603-004**
Matrix: SOIL **Date/Time Received: 03/26/2013 10:30** **% Solids: 80**

Oil and Grease — Analytical Method: EPA 1664 A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Oil & Grease, Total Recovered	ND	mg/kg	62		1	04/01/13	04/01/13 09:50	1028

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6630 BALTIMORE NATIONAL PIKE
ROUTE 40 WEST
BALTIMORE, MD 21228
410-747-8770
800-932-9047
FAX 410-788-8723

PHASE SEPARATION SCIENCE, INC.

CERTIFICATE OF ANALYSIS

No: 13032603

Analytical Services, Inc.(VA), Culpepper, VA

April 2, 2013

Project Name: Scott's Ivy Exxon
Project Location: Ivy, VA
Project ID: 3351

Sample ID: Boring 6 **Date/Time Sampled: 03/21/2013 12:00** **PSS Sample ID: 13032603-005**
Matrix: SOIL **Date/Time Received: 03/26/2013 10:30** **% Solids: 77**

Total Petroleum Hydrocarbons-GRO — Analytical Method: SW-846 8015C — Preparation Method: 5030

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
TPH-GRO (Gasoline Range Organics)	ND	ug/kg	130		1	03/27/13	03/27/13 18:13	1035

Sample ID: Boring 2 **Date/Time Sampled: 03/21/2013 12:00** **PSS Sample ID: 13032603-006**
Matrix: SOIL **Date/Time Received: 03/26/2013 10:30** **% Solids: 75**

Total Petroleum Hydrocarbons-GRO — Analytical Method: SW-846 8015C — Preparation Method: 5030

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
TPH-GRO (Gasoline Range Organics)	**240**	ug/kg	130		1	03/27/13	03/27/13 18:41	1035

Sample ID: H.O. Tank **Date/Time Sampled: 03/21/2013 12:00** **PSS Sample ID: 13032603-007**
Matrix: SOIL **Date/Time Received: 03/26/2013 10:30** **% Solids: 82**

Total Petroleum Hydrocarbons - DRO — Analytical Method: SW-846 8015 C — Preparation Method: 3550

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
TPH-DRO (Diesel Range Organics)	ND	mg/kg	4.8		1	03/26/13	03/27/13 09:55	1040

Sample ID: Railroad **Date/Time Sampled: 03/21/2013 12:00** **PSS Sample ID: 13032603-008**
Matrix: SOIL **Date/Time Received: 03/26/2013 10:30** **% Solids: 77**

Polychlorinated Biphenyls — Analytical Method: SW-846 8082 A — Preparation Method: 3550
Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.14		1	03/27/13	03/27/13 17:20	1029
PCB-1221	ND	mg/kg	0.14		1	03/27/13	03/27/13 17:20	1029
PCB-1232	ND	mg/kg	0.14		1	03/27/13	03/27/13 17:20	1029
PCB-1242	ND	mg/kg	0.14		1	03/27/13	03/27/13 17:20	1029
PCB-1248	ND	mg/kg	0.14		1	03/27/13	03/27/13 17:20	1029
PCB-1254	ND	mg/kg	0.14		1	03/27/13	03/27/13 17:20	1029
PCB-1260	ND	mg/kg	0.14		1	03/27/13	03/27/13 17:20	1029

Sample ID: Sub-slab **Date/Time Sampled: 03/21/2013 12:00** **PSS Sample ID: 13032603-009**
Matrix: SOIL **Date/Time Received: 03/26/2013 10:30**

Oil and Grease — Analytical Method: EPA 1664 A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Oil & Grease, Total Recovered	ND	mg/kg	150		1	04/01/13	04/01/13 09:50	1028

Final 1.000

SAMPLE CHAIN OF CUSTODY/AGREEMENT FORM

PHASE SEPARATION SCIENCE, INC.

www.phaseonline.com
email: info@phaseonline.com

(1) *CLIENT: Analytical Services, Inc. *OFFICE LOC. Culpeper, VA
*PROJECT MGR: Mike Maloy *PHONE NO.: (540) 829-5640
EMAIL: Maloyasi@aol.com FAX NO.: ( )
*PROJECT NAME: Scott's Ivy Exxon PROJECT NO.: 3351
SITE LOCATION: Ivy, VA P.O. NO.:
SAMPLER(S): TPN, MLM DW CERT NO.:

PSS Work Order #: 13032603 PAGE 1 OF 1

Matrix Codes: SW=Surface Wtr DW=Drinking Wtr GW=Ground Wtr WW=Waste Wtr O=Oil S=Soil L=Liquid SOL=Solid A=Air WI=Wipe

(2)

LAB NO	*SAMPLE IDENTIFICATION	*DATE (SAMPLED)	*TIME (SAMPLED)	MATRIX (See Codes)	No. CONTAINERS	SAMPLE TYPE C=COMP G=GRAB	Preservatives Used	Analysis/Method Required (3) * Method 1664; O&G	TPH-GRO	TPH-DRO	PCBs	Method 8021-BTEX	REMARKS
1	Boring 1	3/21/13	12:00	GW	2	G					X		
2	Boring 1			S	#2	G			X				
3	Boring 3			S	1	G			X	X			
4	Boring 5			S	1	G		X					
5	Boring 6			S	1	G			X				
6	Boring 2			S	1	G			X				
7	~~House Auger~~ H.O. Tank			S	1	G				X			
8	Railroad			S	1	G					X		
9	Sub-Slab	↓	↓	S	1	G		X					

(5)

Relinquished By: (1)	Date	Time	Received By:
Im	3/25/13	4:00pm	UPS
Relinquished By: (2) UPS 1ZX097V30395424104	Date 3/26/13	Time 1030A	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date	Time	Received By:

(4)

*Requested TAT (One TAT per COC)
☐ 5-Day ☐ 3-Day ☐ 2-Day
☐ Next Day ☐ Emergency ☐ Other

Data Deliverables Required:
COA QC SUMM CLP LIKE OTHER
☐ ☐ ☐ _____

# of Coolers: 1
Custody Seal: INTACT-COOLER
Ice Present: YES Temp: 2°c
Shipping Carrier: UPS-G

Special Instructions:

DW COMPLIANCE? YES ☐
EDD FORMAT TYPE: _____
STATE RESULTS REPORTED TO: MD ☐ DE ☐ PA ☐ VA ☐ WV ☐ OTHER _____

6630 Baltimore National Pike • Route 40 West • Baltimore, Maryland 21228 • (410) 747-8770 • (800) 932-9047 • Fax (410) 788-8723

The client (Client Name), by signing, or having client's agent sign, this "Sample Chain of Custody/Agreement Form", agrees to pay for the above requested services per the latest version of the Service Brochure or PSS-provided quotation including any and all attorney's or other reasonable fees if collection becomes necessary. * = REQUIRED

Phase Separation Science, Inc

Sample Receipt Checklist

Work Order #	13032603	**Received By**	Rachel Davis
Client Name	Analytical Services, Inc.(VA)	**Date Received**	03/26/2013 10:30:00 AM
Project Name	Scott's Ivy Exxon	**Delivered By**	UPS
Project Number	3351	**Tracking No**	1zx097v30395424104
Disposal Date	04/30/2013	**Logged In By**	Rachel Davis

Shipping Container(s)

No. of Coolers	1	Ice	Present
		Temp (deg C)	2
Custody Seal(s) Intact?	Yes	Temp Blank Present	No
Seal(s) Signed / Dated?	Yes		

Documentation

		Sampler Name	TPN, MLM
		MD DW Cert. No.	N/A
COC agrees with sample labels?	Yes		
Chain of Custody	Yes		

Sample Container

		Custody Seal(s) Intact?	Not Applicable
Appropriate for Specified Analysis?	Yes	Seal(s) Signed / Dated	Not Applicable
Intact?	Yes		
Labeled and Labels Legible?	Yes		

Total No. of Samples Received 9

Total No. of Containers Received 11

Preservation

Metals	(pH<2)	N/A
Cyanides	(pH>12)	N/A
Sulfide	(pH>9)	N/A
TOC, COD, Phenols	(ph<2)	N/A
TOX, TKN, NH3, Total Phos	(pH<2)	N/A
VOC, BTEX (VOA Vials Rcvd Preserved)	(pH<2)	Yes
Do VOA vials have zero headspace?		Yes

Comments: (Any "No" response must be detailed in the comments section below.)

For any improper preservation conditions, list sample ID, preservative added (reagent ID number) below as well as documentation of any client notification as well as client instructions. Samples for pH, chlorine and dissolved oxygen should be analyzed as soon as possible, preferably in the field at the time of sampling. Samples which require thermal preservation shall be considered acceptable when received at a temperature above freezing to 6°C. Samples that are hand delivered on the day that they are collected may not meet these criteria but shall be considered acceptable if there is evidence that the chilling process has begun such as arrival on ice.

Samples Inspected/Checklist Completed By: Rachel Davis — Rachel Davis — Date: 03/26/2013

PM Review and Approval: Amy Friedlander — Amy Friedlander — Date: 03/26/2013

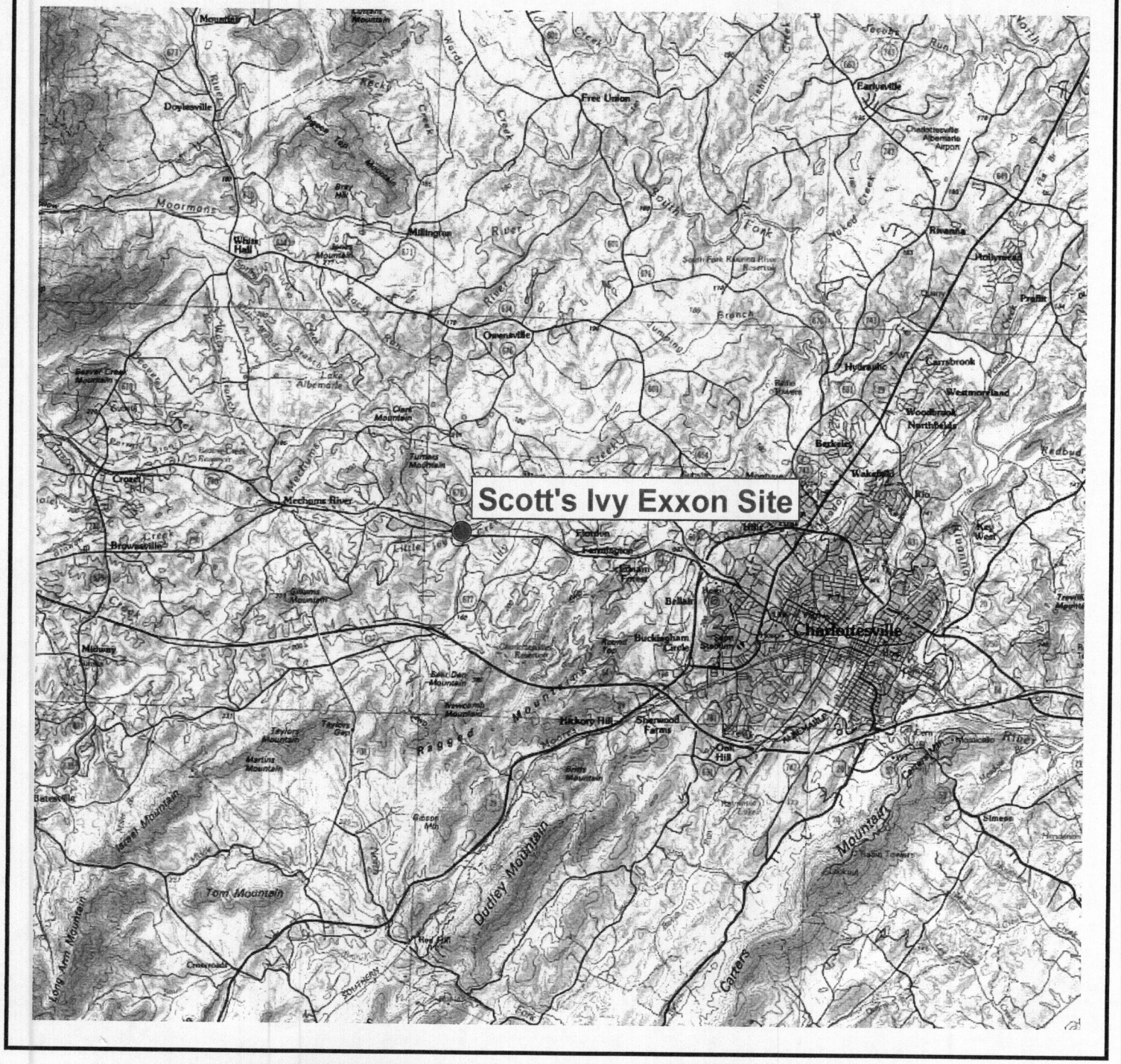


FIGURE 1: SITE LOCATION MAP

Scott's Ivy Exxon
4260 Ivy Road
Charlottesville, VA

Legend

● Scott's Ivy Exxon Site

0 1.5 3 6 Miles

N

ANALYTICAL SERVICES, INC.

ASI Project # 3351



FIGURE 2a: SITE LAYOUT MAP

Legend

- Property Boundary
- Ivy Creek
- UST Basin
- Domestic Well

Scott's Ivy Exxon
4260 Ivy Road
Charlottesville, VA

N

0 75 150 300 Feet

ANALYTICAL SERVICES, INC.

ASI Project # 3351



FIGURE 2b: BORING LOCATIONS MAP

Scott's Ivy Exxon
4260 Ivy Road
Charlottesville, VA

Legend

Property Boundary

Boring

0 75 150 300 Feet

N

ANALYTICAL SERVICES, INC.

ASI Project # 3351

Appendix B

Toddsbury of Ivy Virginia Department of Environmental Quality Documents

SITE CHARACTERIZATION REPORT
ADDENDUM

DEQ-VALLEY
JAN 23 2002
TO:
FILE:

TODDSBURY OF IVY
Albemarle County

PC # 01-6134
FAC ID # _____ *(for DEQ use)*

Submitted to:

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Department of Environmental Quality
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Prepared for:

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Prepared by:

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January 3, 2002

SITE SUMMARY

YES Site currently developed

NO Offsite drinking water wells potentially threatened

YES Onsite drinking water well potentially threatened

NO Surface water affected

NO Surface water potentially threatened

NO Liquid phase hydrocarbons on groundwater

YES Dissolved phase present in groundwater above water quality standards

NO Sump, basement, or utility affected

NO Sump, basement, or utility potentially threatened

NO Residual phase present that may leach into groundwater at concentrations of concern

NO Residual phase levels in backfilled soils that merit abatement

Site recommended for: **One additional monitoring well and Post-SCR Monitoring.**

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1.0 INTRODUCTION

Jeffrey A. Sitler Environmental Services, Inc., (JAS) was contracted by Charlottesville Oil Company, Rt. 250 West, Charlottesville, Virginia to prepare this Site Characterization Report (SCR) for the property known as Toddsbury of Ivy Market located on US Route 250 in Ivy, Virginia, in Albemarle County, (the "Site" shown in Figure 1).

The objectives of this SCR are to characterize the Site, determine environmental conditions at the Site, investigate the geology and hydrogeology in the vicinity of the Site, evaluate the risks associated with the contamination, and present remedial alternatives to mitigate the contamination at the Site if necessary. This SCR has been prepared following Department of Environmental Quality (DEQ) guidance.

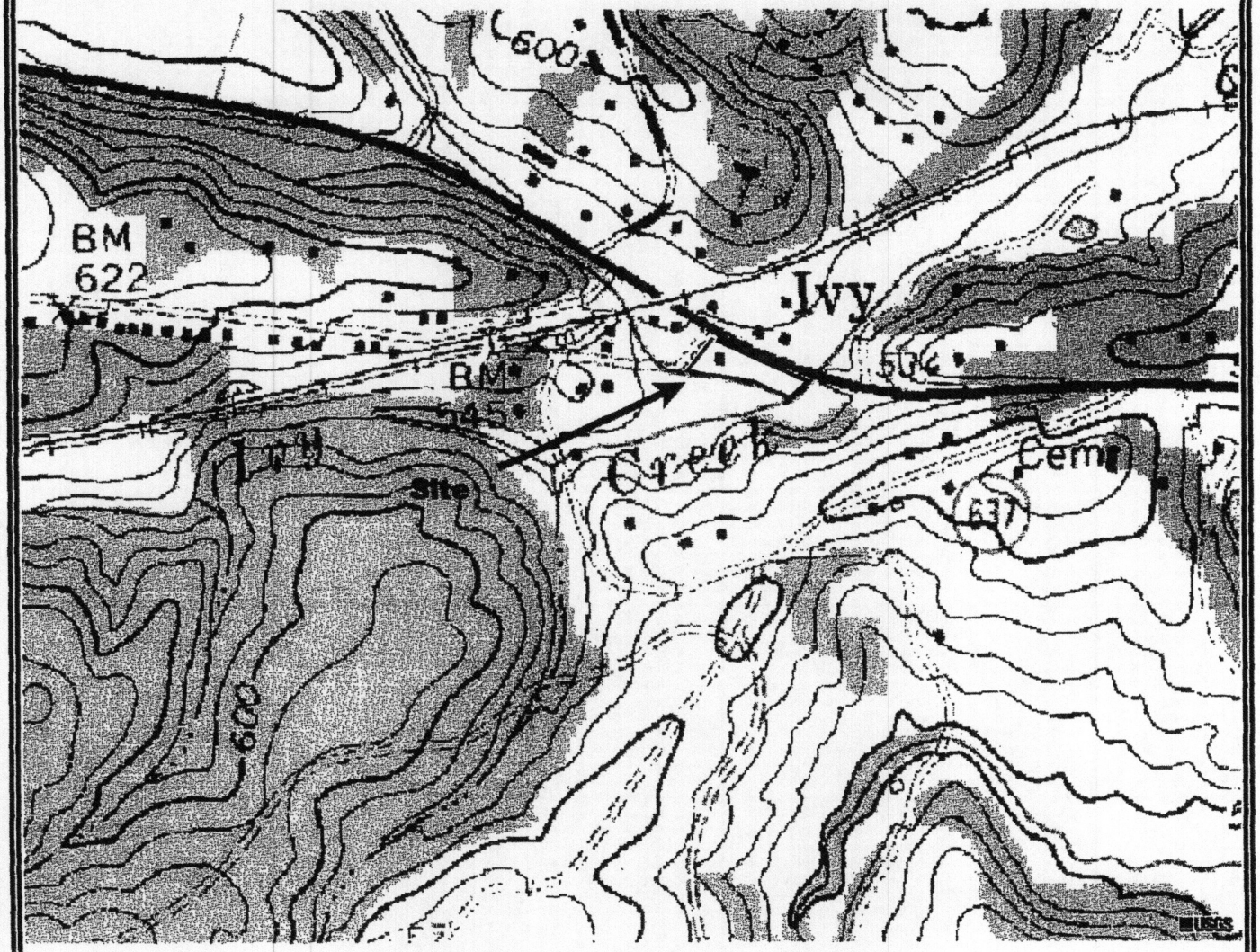
1.1 SITE HISTORY

The Site has been operated as a gas station since at least the early 1950's. Charlottesville Oil Company owns the three gasoline underground storage tanks (USTs) that are currently in service as shown in the site plan in Figure 2. There also is one unused kerosene (?) UST located at the northwest corner of the market building. Figure 3 shows the 1994 USGS aerial photograph for the area of the Site, and Figure 4 shows a ground-view photograph of the front of the Site looking southwest from Route 250.

As a result of an inconclusive pressure test on the lines, on March 27, 2001, JAS completed four hand borings to a depth of four feet below the surface along the supply lines and pump island. Each soil sample was analyzed for total petroleum hydrocarbons-gasoline range organics (TPH-GRO, aka volatile TPH) by EPA Method 8015. The soil analysis indicates the following.

Sample	TPH-GRO
S-1	34.6 mg/kg
S-2	BDL
S-3	BDL
S-4	68.6 mg/kg

The soil samples from each hole did not have any strong gasoline fuel odors. These results indicated that significant leakage had not occurred from the piping at the Site.

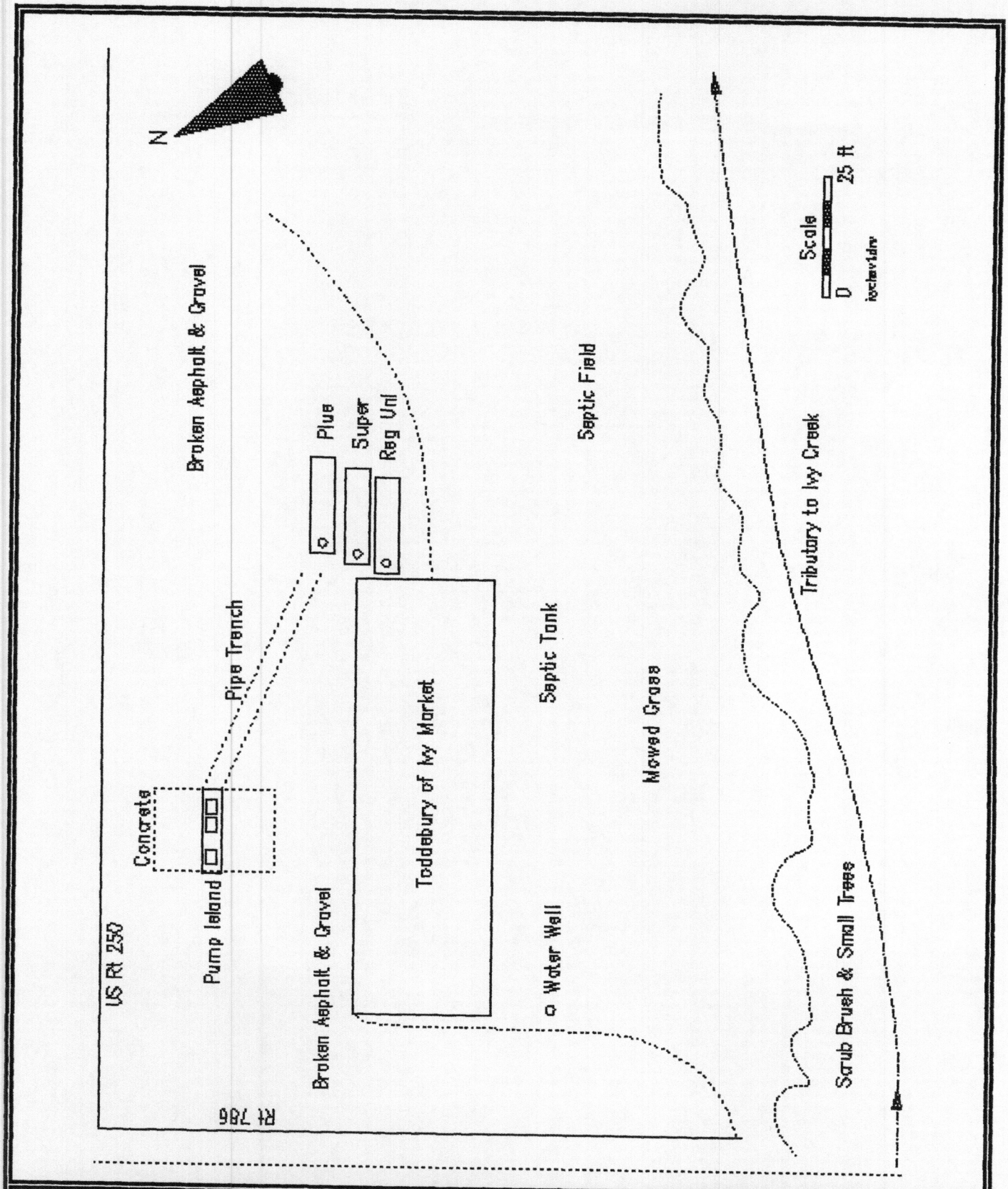


Scale

0 **500 ft**

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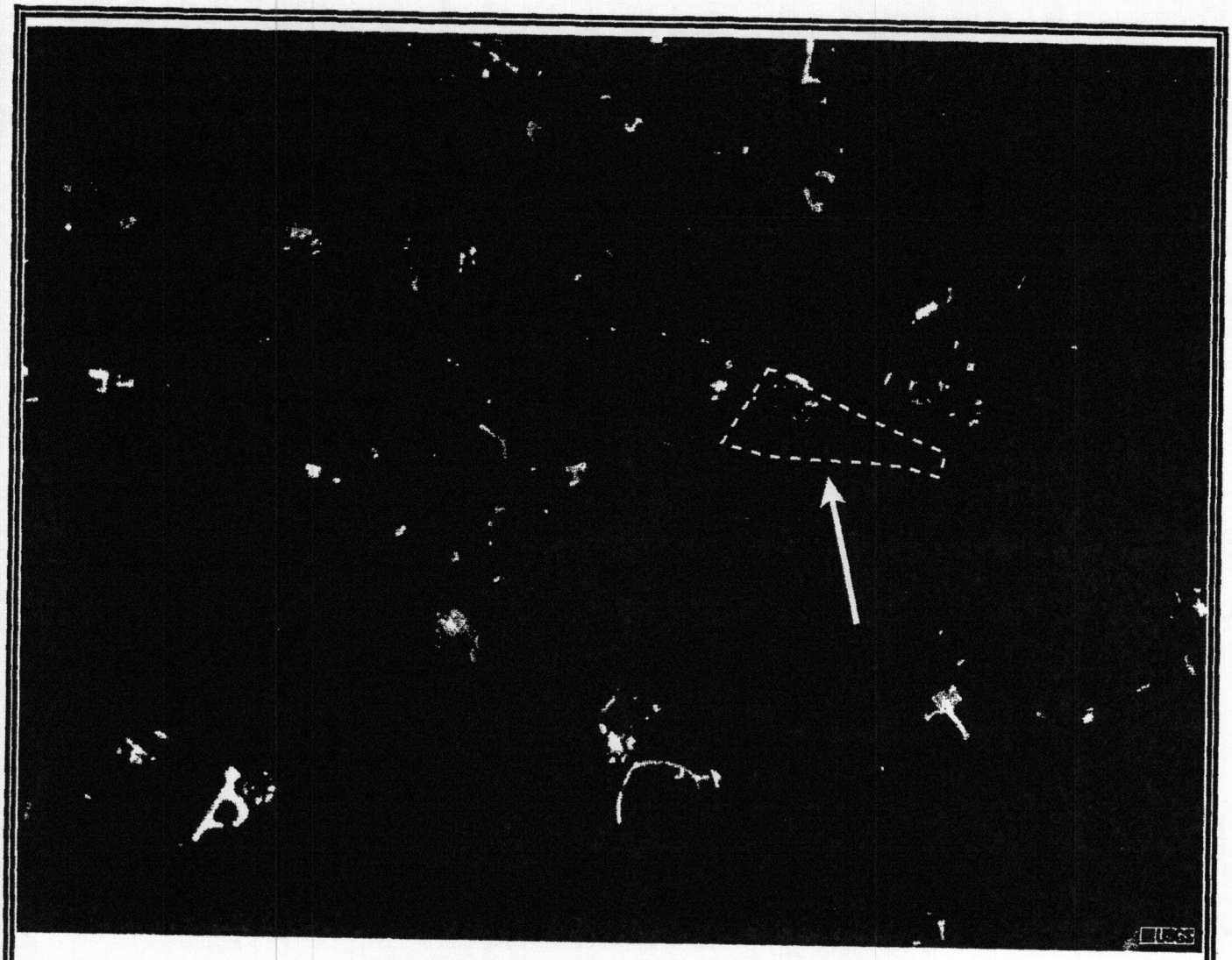
Figure 1 - Site Location
Topographic Map
Toddsbury of Ivy



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Figure 2 - Site Plan
Toddsbury of Ivy



Scale

0 **200 ft**

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Figure 3 - 1994 USGS Aerial Photograph
Toddsbury of Ivy



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Figure 4 - Photograph of Toddsbury of Ivy

Table 1. UST Information							
UST No.	Regulated	Contents	Type	UST/AST	Size Gallons	Est. Age Years	Status
1	Yes	Super Unleaded Gasoline	Steel	UST	3,000	Unknown	In Service
2	Yes	Plus Unleaded Gasoline	Steel	UST	3,000	Unknown	In Service
3	Yes	Regular Unleaded Gasoline	Steel	UST	3,000	Unknown	In Service
4	No	Kerosene	Steel	UST	550?	Unknown	Out of Service prior to 1986

Mike Jones of Charlottesville Oil Company has hypothesized that the line test was affected by faulty foot valves at the end of the lines in the tanks. Subsequent to the soil sampling results, the Department of Environmental Quality (DEQ) issued a directive to complete a Site Characterization Report (SCR) for the Site. An extension to January 18, 2002 for the SCR deadline was granted by Todd Pitsenberger on January 2, 2002.

1.2 SITE DESCRIPTION

The Site is known as Toddsbury of Ivy and is located on the southeast corner of the intersection of State Route 786 and US Route 250 in the village of Ivy, Albemarle County, Virginia. The approximately rectangular Site has an area of about one-half acre with 200 feet fronting Route 250 and a 100-foot depth from Route 250 on the north side to a small stream on the south side. The Site contains a building that houses a small deli/grocery and storage rooms as shown in the photograph in Figure 4. The structure is a mixture of slab-on-grade and crawl space. The three in-service gasoline USTs are located at the east end of the building.

2.0 SITE ASSESSMENT

2.1 SITE LOCATION AND DESCRIPTION

The Site is located in the central portion of Albemarle County. Topographically, the Site is at an elevation of about 535 feet above mean sea level with the ground surface on the Site being

relatively flat (Figure 1). The ground slopes imperceptibly to the south where runoff enters a small unnamed perennial tributary to Little Ivy Creek that flows along the southern boundary of the Site. The Site has its own private drinking water supply well located in the rear of the market near the southwest corner of the building. A private septic system is located in the rear on the east end of the property. Electric service is provided by Virginia Power via overhead cables, and telephone service is provided by Sprint via underground cables.

2.2 RECEPTOR SURVEY

A preliminary receptor survey was performed for the Site to identify public and private water supply sources, i.e., wells, springs, and surface water intakes, within the immediate vicinity of the Site. In summary, there are no public water supply wells or public surface water intakes within more than one-half mile of the Site. However, there are private drinking water wells on adjoining properties.

Surface Water

The local surface water drainage system is within the Rivanna River Basin. At the local scale, the runoff from the Site drains south into the small unnamed perennial tributary to Little Ivy Creek located along the southern boundary of the Site as shown in Figure 1. This tributary enters Little Ivy Creek within 100 feet of the Site. The Site is probably within both the 100- and 500-year flood plains. It is not believed that there are statutory wetlands on the Site.

Water Supplies

The residents and businesses in the area of the Site obtain drinking water from private water supply wells. There are no public water supplies in the area of the Site. The following lists the private water supply wells immediately adjacent to the Site.

Toddsbury of Ivy, drilled well located about 100 feet southwest of the UST basin, unknown depth, sampled November 29, 2001 for the SCR.

Ivy Nursery and US Post Office, located about 200 feet southwest of the UST basin, not sampled.

Exxon Service Station, located on the opposite side of Route 250 about 200 feet northeast of the UST basin, not sampled.

There are numerous businesses and residential water wells further from the Site that have not been listed.

2.3 HISTORICAL RELEASES

Charlottesville Oil Company does not have any specific knowledge concerning historical releases at the Site. However, Mike Jones stated that since the USTs are 3,000 gallon capacities, there may have been times when a delivery caused overflow of product onto the ground.

2.4 REGIONAL GEOLOGY

The Site is within the Blue Ridge Physiographic Province which was developed on metamorphic rocks of primarily gneiss and schist and covers the Commonwealth of Virginia from along Route 29 to the base of the Blue Ridge. The bedrock in the vicinity of the Site consists of the Middle Proterozoic-age porphyroblastic biotite-plagioclase augen gneiss, believed to be a metamorphosed igneous intrusion. The gneiss has been radiometrically dated at slightly more than one billion years old (Virginia Geologic Map-Expanded Explanation, Virginia Department of Mines, Minerals, and Energy, 1993). Overlying the bedrock is saprolite, or weathered bedrock, that grades from nearly unweathered bedrock at depth up to completely weathered soil consisting of clay and silt at the surface. Typically, the thickness of the saprolite is thin to nonexistent in stream valleys to more than 50 feet thick in upland areas. At the Site the unconsolidated soil was found to be 12 to15 feet thick where the auger drill met refusal on the bedrock surface.

2.5 REGIONAL HYDROGEOLOGY

Groundwater occurs in both the unconsolidated soil and the underlying bedrock under unconfined conditions. Most of the rocks of the Blue Ridge province are not known as good aquifers. Drilled wells in the area generally have yields that range from two gallons per minute (gpm) to 20 gpm, with the average closer to three to five gpm with well depth ranging from 75 feet to 400 feet. In some cases, bored or hand dug wells have been utilized. These shallow wells rely on groundwater produced from the highly weathered bedrock at the bedrock-saprolite

gradational interface. For the most part, the bedrock does not have appreciable primary porosity or permeability, but produces water from fractures, joints, and fault zones. Therefore, in order for a bedrock well to be successful, the well must intersect fractures and joints that are capable of yielding groundwater at rates and volumes required by the end user. The typical low yield produced by wells in the Blue Ridge has resulted in the development of public water supplies for larger towns and cities that are almost always developed from surface-water sources, such as the Rivanna Water and Sewer Authority for Charlottesville.

Recharge to the groundwater in the Blue Ridge occurs over broad areas as a result of the infiltration of precipitation into the saprolite. The Virginia Department of Mines, Minerals, and Energy estimates that 15% of all precipitation infiltrates as recharge to groundwater. With an average rainfall of 47 inches (Charlottesville, 1961-1990), 7.0 inches of rainfall is recharged to the aquifer in an average year.

The water table in the Blue Ridge generally mimics the topographic surface with the water table being closer to the surface in valleys than in uplands. The resulting groundwater flow is from the upland areas to streams and rivers, providing base flow when no stormwater runoff occurs. Based on the topography in the area of the Site, groundwater would be expected to flow to the south and east, ultimately discharging into either the small tributary on the south side of the Site or into Little Ivy Creek within 200 feet of the USTs to the east.

2.6 RELEASE ASSESSMENT

2.6.1 Release Confirmation

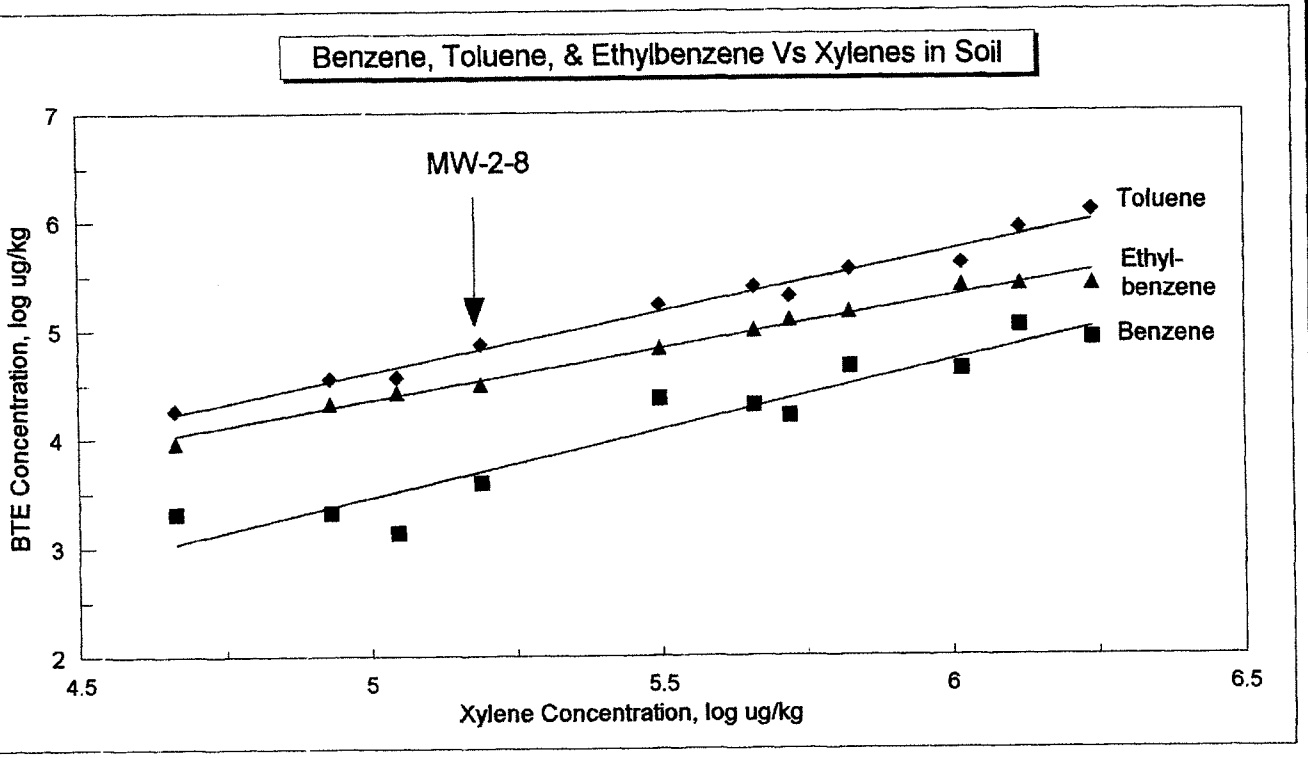
One soil sample was collected from the south edge of the UST basin in MW-2 at a depth of eight feet. No soil samples were collected from the other two monitoring wells due to the absence of any gasoline odors. The laboratory report is provided in Appendix C and summarized in Table 2. The analysis of soil sample MW-2-8 had a TPH-GRO concentration of 1,060 mg/kg and benzene of 3,920 μg/kg.

Figure 5 shows a comparison of the log benzene, log toluene, and log ethylbenzene plotted as dependent variables on the y-axis versus log xylenes on the x-axis. The data represents 12 soil analyses from nine sites around Charlottesville including the one sample from the Site

Table 2. Soil Sampling Analytical Results

Well	Sample ID/Depth	Volatile TPH-GRO mg/kg	Benzene µg/kg	Toluene µg/kg	Ethyl-Benzene µg/kg	Xylenes µg/kg	MTBE µg/kg
MW-2	MW-2-8	1,060	3,920	73,000	31,300	155,000	BDL

Notes: BDL - Below Detection Limit
mg/kg - Milligrams Per Kilogram
ug/kg - Micrograms Per Kilogram



Linear Regression Data

Benzene vs Xylenes	B = 1.25 log {Xylene}-2.80	r = 0.95
Toluene vs Xylenes	T = 1.12 log {Xylene}-1.01	r = 0.99
Ethylbenzene vs Xylenes	E = 0.96 log {Xylene}-0.42	r = 0.99

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Figure 5 - Comparison of Ratios of BTE to Xylenes in Soil

(MW-2-8). The straight lines in Figure 5 are the regression lines. The regression analyses indicated correlation coefficients of from 0.95 for benzene versus xylenes to 0.99 for the other two relationships. The eight other sites included in Figure 5 had leaking USTs with either free product present or very high concentrations. The ratios of benzene, toluene, and ethylbenzene to xylene in MW-2-8 relative to the other data indicate that the tank basin is the source of contamination similar to the other sites included in the data base.

2.6.2 Investigative Methods

2.6.2.1 Soil Borings/Monitoring Wells

For the SCR, three soil borings/monitoring wells were installed at the Site in locations recommended by the DEQ and modified in the field due to utility and other restrictions. JAS and Certified Environmental Drilling, of Earlysville, Virginia, mobilized onsite on November 28, 2001 and installed the borings/monitoring wells by hollow-stem auger drill rig. All drilling was supervised by Lyle R. Silka, Virginia certified professional geologist, and was in accordance with standard health and safety practices. The total boring depths were 15 feet for MW-1 and MW-2, and 12 feet for MW-3. The borings were shallow due to refusal of the auger on the top of bedrock. Geologic samples were inspected at five-foot intervals for characterization of the geology and assessing the presence of hydrocarbon contamination. Decontaminated drill stems were used for the borings.

Each soil sample was logged for lithology, inspected for petroleum odors, examined for visual petroleum staining, and tested for total volatile hydrocarbon vapors. Boring logs are presented in Appendix A. One soil sample was collected from MW-2 at a depth of 8 feet where strong gasoline odor and staining were found. Since there was no odor or staining in either of the other two borings, no soil samples were collected from them. The soil sample was collected in a one laboratory-supplied four-ounce glass jar with Teflon septum. The container was labeled and stored on ice and delivered by overnight Federal Express to Maryland Spectral Services, Inc. in Baltimore, Maryland, for analysis of total petroleum hydrocarbons gasoline range organics (TPH-GRO) by EPA Method 5035/8015, and benzene, toluene, ethylbenzene, total xylenes (BTEX) and methyl-tertiary-butyl-ether (MTBE) by EPA Method 5035/8021. Section 2.7 presents a review of the analytical results. All samples collected for laboratory analysis were handled in accordance with standard chain-of-custody and quality assurance controls.

The soil borings were converted to monitoring wells using flush-threaded, two-inch diameter, schedule 40 PVC casing and 0.01-inch factory-slotted PVC screen with a threaded end cap. The wells were installed by assembling and lowering the PVC screen and blank casing into the open borehole to the total depth of the boring. A #2 filter sand was placed around the screen to a height of two feet above the screen, followed by a two-foot bentonite-chip seal that was hydrated in place. From the top of the bentonite seal to the surface, a cement grout mix was placed in the annulus around the casing. Each well was completed with a flush-mount, bolt-down, metal well protector set in concrete at the surface. A locking well cap and padlock were placed on each well casing. Monitoring well depths and screened intervals were selected in the field based on the depth at which groundwater was encountered in order to provide ample open screen above the water table to allow for seasonal fluctuations and allow sufficient screen below the water table to allow for groundwater sampling. The geologic logs of the borings/monitoring wells are presented in Appendix A.

2.6.2.2 Well Development and Elevation Survey

Each monitoring well was purged of approximately three well volumes of water to develop the well and bring in fresh groundwater from the surrounding aquifer. The well purging was accomplished using a pre-cleaned plastic bailer. The relative elevation of the top of casing (TOC) for each monitoring well and the stream at the downstream sampling location was determined by surveying with a rod and transit. A local elevation datum was established for the TOC for MW-1 at 535 feet based on the 7.5 minute USGS topographic map. The horizontal position of the wells on the Site was determined relative to the building using a 200-foot fiberglass tape measure. Appendix A provides the elevation survey results.

2.6.2.3 Aquifer Test

An aquifer test was not completed at the Site. The typical test consists of a single-well slug or recovery method that produces hydraulic conductivity estimates that are usually a factor of 10 too low because the single-well test is isolated to a small aquifer volume. Since there is a perennial stream next to the Site, the water table configuration was used to match predicted water table elevations produced by a drain-field analysis presented by Jacob Bear.[1]

---

[1] Jacob Bear, 1979, Groundwater Hydraulics, McGraw-Hill, NY, page 180.

2.6.3 Groundwater Monitoring

Data on the depth to the water table and thickness of LPH in each monitoring well were collected on the undisturbed water column in each monitoring well prior to purging and sampling the well. An electronic oil/water interface probe capable of detecting both LPH and water to an accuracy of 0.01 feet was used. Also, the presence of LPH was checked by lowering a transparent plastic bailer into the water table to collect any LPH on the water table.

2.6.4 Groundwater Sampling and Analysis

Groundwater samples were obtained from monitoring wells MW-1, -2, and -3, from the onsite water supply well, and from upstream and downstream locations on November 29, 2001. Each monitoring well was purged of approximately three well volumes of water using a separate pre-cleaned plastic bailer. The water supply well sample was collected from outside spigot in front of the market after letting the water run for about 15 minutes. The stream samples were obtained by collecting a sample directly from the flowing stream. Each water sample was placed into two laboratory-supplied 40-milliliter glass vials with Teflon septa in a manner to exclude all air from the vials. All sample bottles were labeled, placed on ice, and delivered via overnight Federal Express under standard chain-of-custody procedures to MSS. Water samples were analyzed for TPH-GRO, BTEX, and MTBE, except for the water supply sample that was analyzed for volatile organics by EPA Method 8260. The laboratory analytical results are discussed in Section 2.7.2.

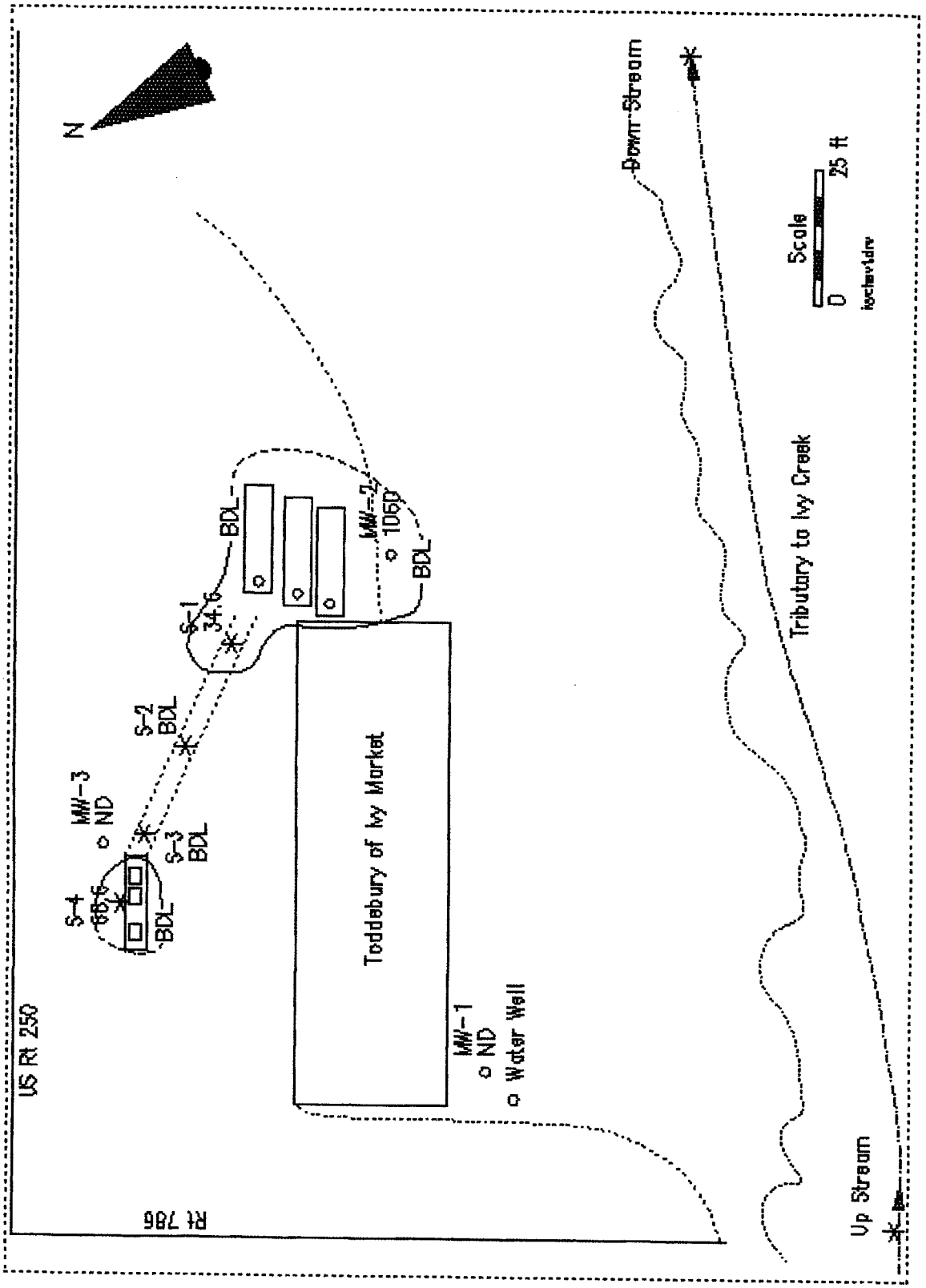
2.7 LABORATORY ANALYTICAL RESULTS

2.7.1 Soil Analytical Results

Table 2, above, presented the results of TPH-GRO, BTEX, and MTBE analyses of the soil sample collected from MW-2. The full laboratory report is presented in Appendix B. Figure 6 shows the estimated extent of residual-phase contamination as TPH-GRO and includes the analytical results from both the SCR and the line sampling study.

2.7.2 Groundwater Analytical Results

The results of the groundwater analyses are summarized in Table 3 and reported in Appendix B. Figures 7 and 8 show the extent of dissolved benzene and MTBE, respectively. The full laboratory report is presented in Appendix B.



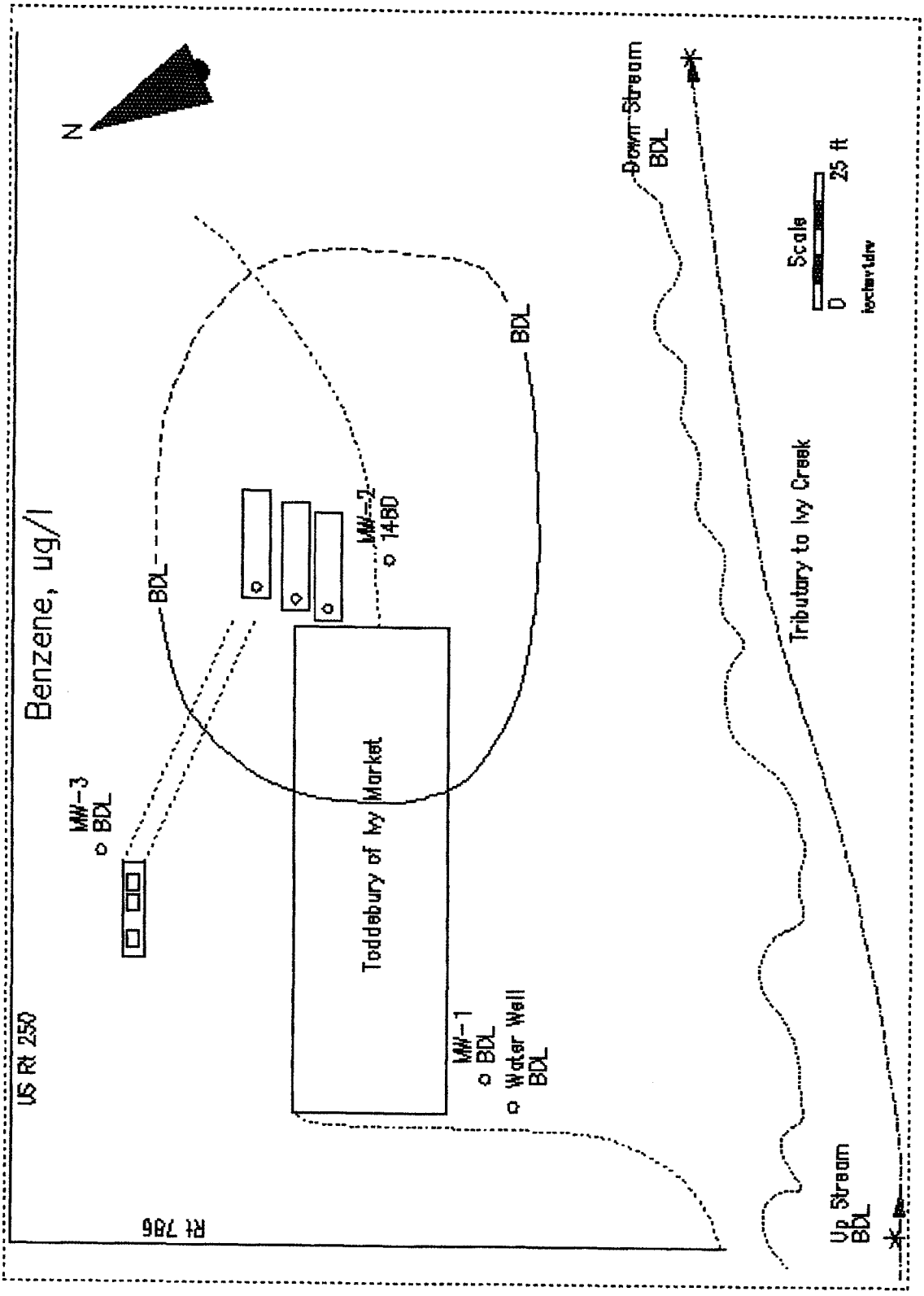
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Figure 6 - Extent of Residual Soil Contamination as TPH-GRO
Toddsbury of Ivy
Ivy, Virginia

Table 3. Groundwater Analytical Results

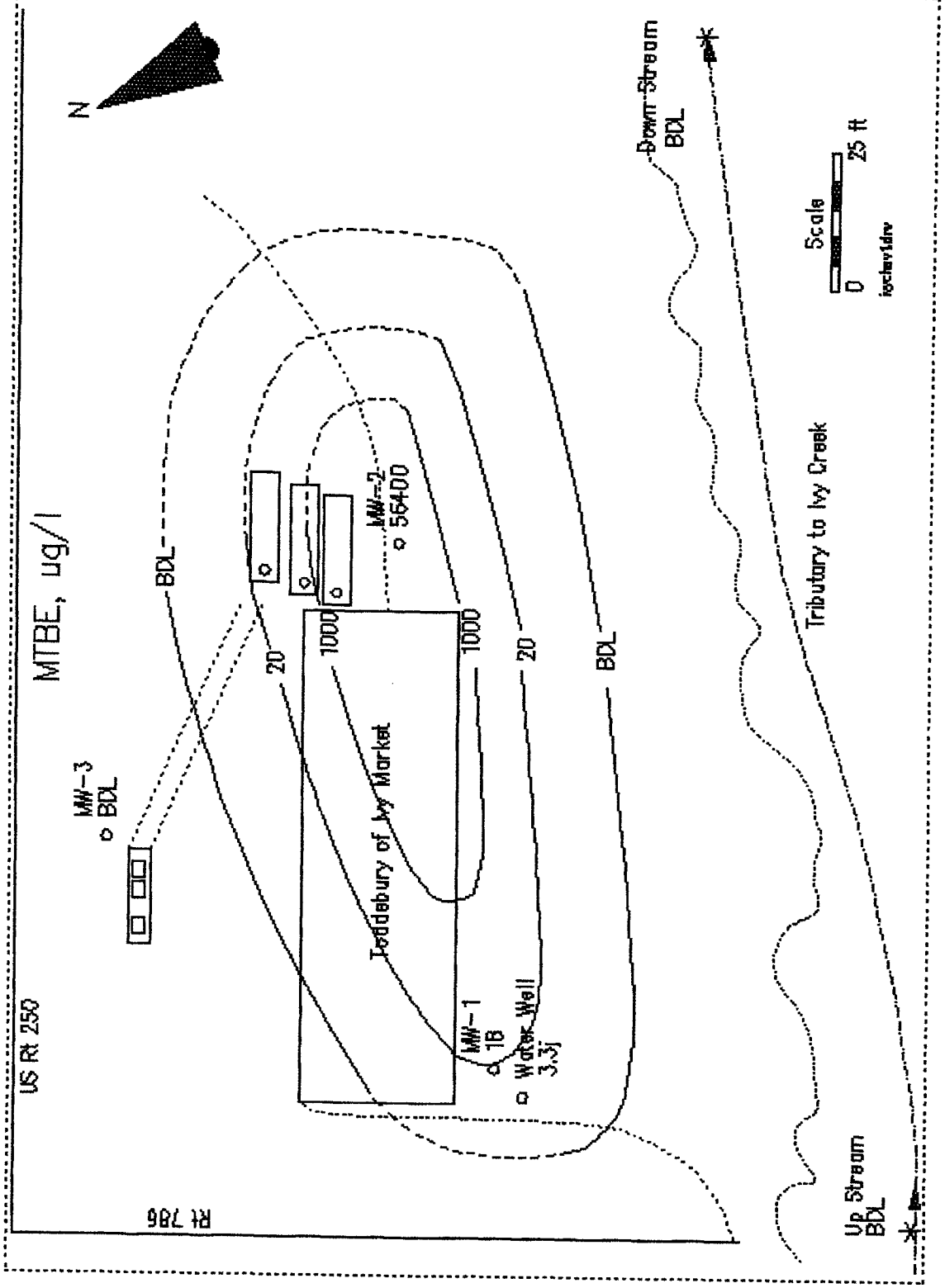
Well No.	Date Sampled	Water Depth feet	LPH in	TPH-GRO µg/l	Benzene µg/l	Toluene µg/l	Ethyl-Benzene µg/l	Xylenes µg/l	MTBE µg/l
MW-1	11/29/01	6.59	0	BDL	BDL	BDL	BDL	BDL	18
MW-2	11/29/01	8.52	0	BDL	1480	1420	BDL	900	56400
MW-3	11/29/01	7.70	0	BDL	BDL	BDL	BDL	BDL	BDL
Onsite Water Well	11/29/01		0	BDL	BDL	BDL	BDL	BDL	3.3j
Up Stream	11/29/01			BDL	BDL	BDL	BDL	BDL	BDL
Down Stream	11/29/01	12.66		BDL	BDL	BDL	BDL	BDL	BDL

Notes: ND - Not Determined
µg/kg - Micrograms Per Kilogram
BDL - Below Detection Limit
LPH - Liquid Petroleum Hydrocarbon
j - Estimated value
NA - Not applicable



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Figure 7 - Dissolved Benzene in Groundwater, μg/l, 11/29/01
Toddsbury of Ivy
Ivy, Virginia



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Figure 8 - Dissolved MTBE in groundwater, $\mu g/l$, 11/29/01
Toddsbury of Ivy
Ivy, Virginia

Based on Figure 7 and 8, the dissolved contamination at the Site is primarily limited to the vicinity of the gasoline UST basin. Dissolved benzene was found at 1,480 μg/l and MTBE was at 56,400 μg/l in MW-2. However, MTBE was reported at 18 μg/l in MW-1 and at an estimated 3.3 μg/l in the water supply well.

2.8 SITE GEOLOGY AND HYDROGEOLOGY

The Site is underlain by 12 to 15 feet of red-brown clayey silt to silt soil with cobbles in the lower depths. It is not known whether the soil represents a saprolite or a reworked floodplain sediment. Underlying the soil is the well-indurated bedrock. The depth to the water table ranged from 6.5 to 8.5 feet below the surface. Thus, the shallow aquifer is from 5.5 to 6.5 feet thick in the vicinity of the monitoring wells.

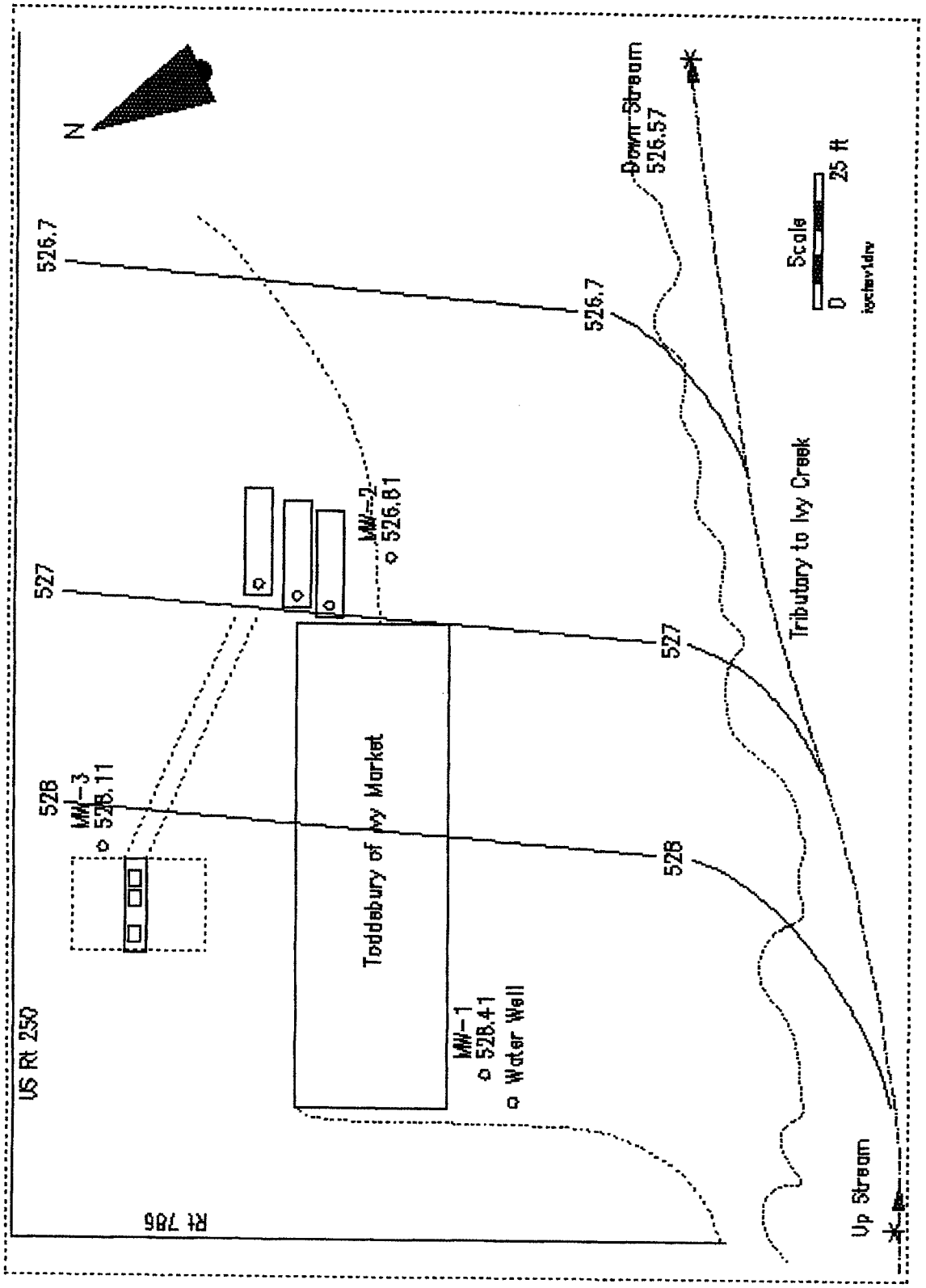
A water-table contour map is presented in Figure 9 that indicates the principal groundwater flow direction is to the southeast toward Little Ivy Creek. Since the small stream along the south side of the Site has continued to flow throughout the recent drought, the water table contours have been curved around to indicate that some groundwater flows into the small tributary. On the sampling date, the flow in the small tributary was low, estimated to be less than one gallon per minute. From Figure 9, the gradient toward Little Ivy Creek is about 0.03 under the market, but flattens out east of the store to an estimated 0.01. The change in gradient may be due to heterogeneities in aquifer permeability.

2.8.1 Hydraulic Conductivity and Groundwater Flow Velocity

The hydraulic conductivity for the shallow aquifer was estimated by comparing the water table elevations in the stream and the monitoring wells to the predicted elevations based on the model presented by Jacob Bear.[2] The Bear model estimates the seepage to parallel drains given uniform recharge and hydraulic conductivity. The uniform recharge was set at 0.0016 feet per day (7.0 inches per year). While the two-drain model assumption is not strictly adhered to in this situation with the tributary on the south flowing eastward into Little Ivy Creek on the east and uplands to the west and north, the extrapolated flow lines are relatively parallel through MW-1, MW-3, and

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[2] Jacob Bear, 1979, Groundwater Hydraulics, McGraw-Hill, NY, page 180.



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Figure 9 - Water Table Elevation as of 11/29/01
Toddsbury of Ivy
Ivy, Virginia

MW-2. If they are parallel, than, along that line, the water table should not be significantly different from the modeled case. Two analyses are reported here: A predicted water table elevation that matches the observed water tables with a drain spacing of 400 feet and 800 feet. The results are presented in Figure 10. The estimated average hydraulic conductivity for the shallow aquifer is between 14 and 32 feet per day. Since the shallow aquifer is primarily within a silty soil, the effective porosity is estimated to be on the order of 0.2. With these parameter estimates, the groundwater velocity is estimated to be on the order of 1.6 to 2.1 feet per day, using the following equation:

$$v = Ki/n_e \qquad \textbf{Equation (1)}$$

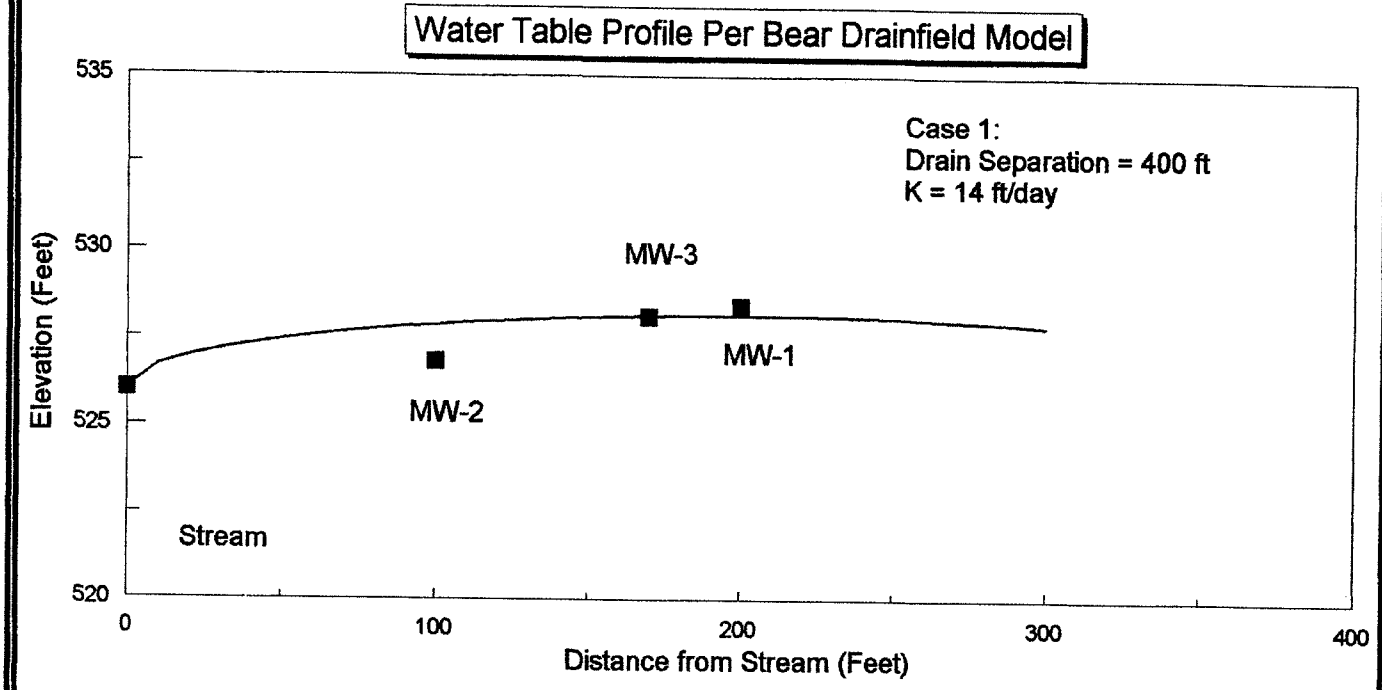
where v is the groundwater seepage velocity, (feet per day),
K is the hydraulic conductivity (14 - 32 feet per day),
i is the hydraulic gradient (0.01 - 0.03 feet per foot), and
n_e is the effective porosity (0.2, dimensionless).

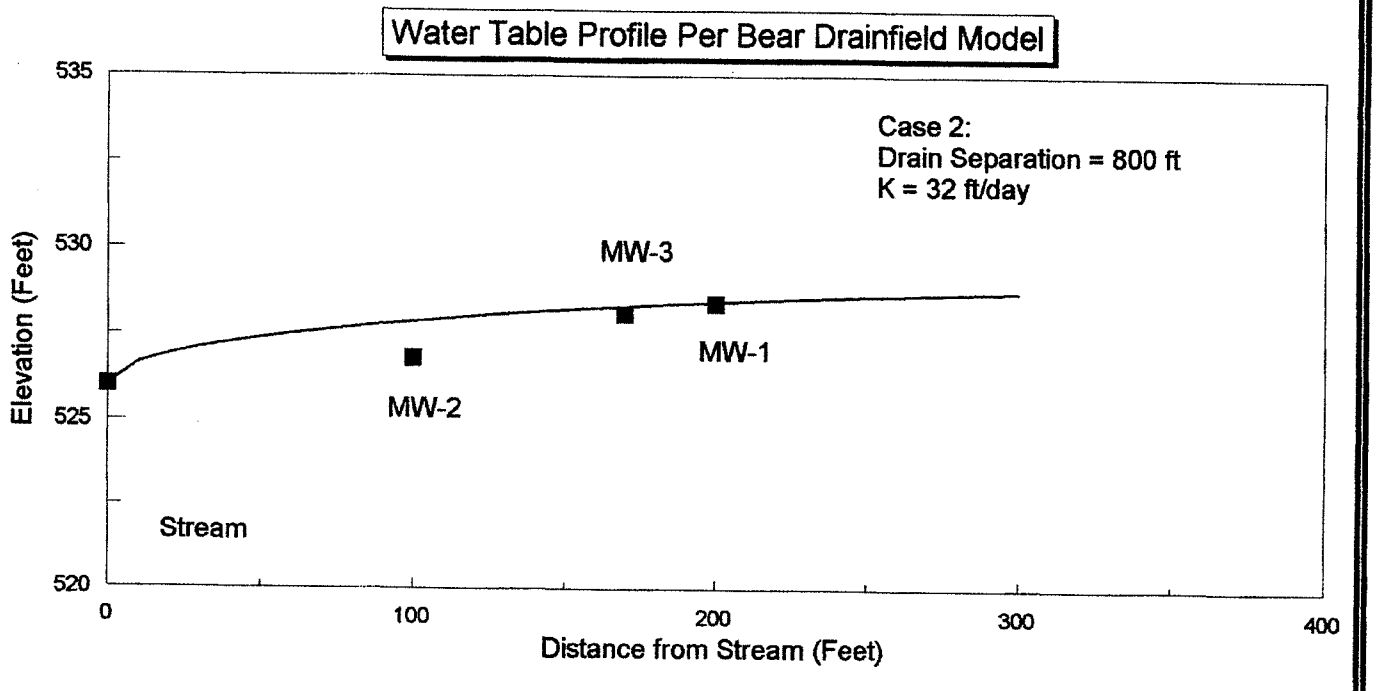
2.9 MATERIAL RELEASED

Gasoline-range hydrocarbons have been confirmed in soil and groundwater samples from the Site. There is no information available concerning the amount of the release or the timing of the release. Since MTBE is present, the release occurred after 1978 when MTBE was first added to gasoline. Inspection of the GC chromatograms indicates that there are no late-eluting compounds that would be suggestive of kerosene or diesel contamination in the samples. Thus, based on these analyses, it appears that the contamination is limited to gasoline.

2.10 CAUSE OF RELEASE

Field observations, including petroleum odors, and laboratory analysis of soil, revealed signs of gasoline contamination associated with the UST basin. Recent pressure testing indicated that the tanks were not leaking, and shallow soil samples did not indicate significant leakage from the supply lines. There may have been older tanks that leaked prior to the current tanks being installed, or overfilling of the tanks that resulted in the contamination.





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Figure 10 - Comparison of Bear Water Table to Observed Water Table

2.11 NUMBER AND SIZE OF TANKS

The Site contained three regulated gasoline USTs and one unregulated abandoned kerosene UST with the characteristics shown in Table 1. The ages of the USTs are unknown. The kerosene UST appears to have a dispenser that is pre-1950's vintage.

2.12 EXTENT OF HYDROCARBON CONTAMINATION

2.12.1 Liquid Phase Hydrocarbons (LPH)

No LPH has been found at the Site in the monitoring wells or soil samples. Typically, where LPH is present, the individual dissolved gasoline components have been found at concentrations greater than 5,000 μg/l, although this is not a consistent indicator. Since the different gasoline components undergo varying rates of biodegradation and loss, samples can produce inconsistent results as to the indication of LPH. Thus, at the Site the BTEX components in MW-2 are well below 2,000 μg/l, but the MTBE component is at 56,400 μg/l. Based on the BTEX, LPH is not expected, but based on the MTBE in groundwater, at least some LPH should be expected, or was present at an earlier time and has since dissipated.

2.12.2 Absorbed or Residual-Phase Contamination

Figure 6 above shows that the adsorbed-phase contamination as TPH-GRO appears to be highest in the vicinity of the gasoline tank basin. However, since the water table is at a depth of 8.5 feet in MW-2, the water table is above the base of the tank basin. Therefore, there is no adsorbed soil contamination per se, since this phase of contamination typically is defined as residing above the water table. The contaminated soil in MW-2 is believed to have undergone anaerobic degradation. The soil had some gray coloring and a strong septic, or anaerobic odor. This fits with the high water table and high contamination levels that caused the low oxygen levels.

2.12.3 Dissolved-Phase Contamination

Dissolved-phase contamination by gasoline components has been identified in MW-2, MW-1, and the water supply well. MW-2, adjacent to the UST tank basin, has the highest contamination levels in groundwater with:

Benzene at 1,480 μg/l
Toluene at 1,420 μg/l
Ethylbenzene at BDL
Total xylenes at 900 μg/l

MTBE at 56,400 μg/l
TPH-GRO at BDL

MW-1 only had 18 μg/l of MTBE detected, and the water well only had 3.3 μg/l of MTBE estimated.

The extent of groundwater contamination is not clearly defined with the current data. The water table contour map in Figure 9 shows that the groundwater flow is toward the southeast, and the concentration contours in Figures 7 and 8 are dashed as uncertain to the southeast of MW-2. Since MW-1 and the water well had MTBE detected, there is a component of groundwater flow toward the water supply well.

2.12.4 Vapor Phase

Some vapor-phase contamination was observed in the soil from MW-2 adjacent to the tank basin. However, the onsite building does not have any reported gasoline vapors and has no basement. There are no buried utilities onsite near the tank basin or dispenser island that could act as conduits for vapor migration.

3.0 RISK ASSESSMENT

The risk assessment evaluates risks to human and environmental receptors posed by the release. In the risk assessment, where appropriate, potential and impacted receptors, including sensitive receptors, are identified; migration rates for the contaminants are estimated; and risks to individual receptors are determined. All potential pathways of exposure are evaluated, including ingestion, inhalation, and dermal contact. If there is determined to be a significant risk posed by the Site, remediation endpoints based upon site-specific risks are proposed. The overall goal of the risk assessment is to determine risks to receptors so that endpoints for corrective action may be defined on a scientific and defensible basis.

3.1 SITE DESCRIPTION

3.1.1 Area Characteristics

Site geology consists of a thin soil less than 15 feet thick of predominantly silt with some clay in the upper region and some cobbles deeper that overlies a gneiss bedrock. The top of the well-

indurated bedrock occurs at between 12 and 15 feet of depth across the Site with the water table at a depth of from 6.5 to 8.5 feet below ground surface. Surface-water runoff and groundwater flow are toward the southeast and south.

The Site has been a market and gasoline station for at least 50 years. Currently, there are three, 3,000-gallon gasoline USTs on the east end of the building and an abandoned kerosene (?) UST that may be 550 gallons on the west end. The market building is a mix of slab-on-grade and crawl space. The immediate area surrounding the Site is sparsely developed as commercial and residential land use interspersed with woodlands. Near the Site, the land use is commercial along Route 250. The residential homes are removed from the Site by several hundred feet and are either in the uplands or across the streams to the south and east.

3.1.2 Nature and Extent of Contamination

The nature and extent of contamination due to the gasoline release at the Site is discussed in Section 2.12 and summarized as follows:

- Soil in the tank basin contains TPH-GRO at a concentration of at least 1,060 mg/kg as determined in MW-2-8.
- Since the water table is shallow and extends into the tank basin, the residual soil contamination appears to be limited to a thin zone between about five and eight feet.
- Groundwater contamination was detected in the onsite water supply well with benzene at 1,480 μg/l and MTBE at 56,400 μg/l in MW-1.
- LPH has not been observed in the borings or in the monitoring wells or the onsite water supply well.

3.1.3 Identifying Contaminants of Concern (COC)

The Site has a gasoline release. Therefore, gasoline range organics are considered the only potential COCs. Of the more than 100 gasoline components, the BTEX compounds are generally of most concern due to their greater health threat, solubility and mobility. Benzene is a known human carcinogen, and the EPA has established a maximum contaminant level (MCL) for benzene of 5.0 μg/l (0.005 mg/l) for drinking water. Table 4 lists the highest concentrations of

contaminants found in soil and compares the highest observed groundwater concentrations to drinking water MCLs and cancer rating. At the Site, only benzene exceeds an MCL, and MTBE exceeds an EPA health advisory. Therefore, risks associated with benzene, toluene, and MTBE will be addressed in this risk assessment.

Table 4. Maximum Contaminant Levels and Cancer Potential for Contaminants Observed in Soil and Groundwater at the Site.

Adsorbed/Dissolved Constituent	Highest Observed Residual Concentration (ug/kg)	Highest Observed Concentration in Groundwater (ug/l)	EPA Drinking Water MCL (ug/l)	Reason for MCL
Benzene	3,920	1,480	5	A
Toluene	73,000	1,420	1,000	D
Ethylbenzene	31,300	BDL	700	D
Xylenes, Total	155,000	900	10,000	D
MTBE	BDL	56,400	40	H
TPH	1,060,000	BDL	NA	NA

NA = Not Analyzed or Not Applicable
BDL = Below Detection Limit
A = Classified as a human carcinogen, sufficient evidence in epidemiologic studies to support causal association between exposure and cancer.
D = Cancer group not classifiable, inadequate or no human and animal evidence of carcinogenicity.
H = EPA health advisory level for odor aesthetics, not cancer.

3.2 ENVIRONMENTAL FATE AND TRANSPORT OF GASOLINE

Degradation. The BTEX compounds have both chemical and biological degradation pathways. The chemical degradation of aromatics by hydrolysis is the reaction of the aromatic molecule with water. Biological degradation involves the active breakdown of the compounds by enzymes excreted by microbes in the subsurface. In the course of normal life processes, bacteria accidentally cause the enzymatic breakdown of the BTEX compounds, reabsorb the broken molecules, and ultimately metabolize the organic carbon chains into the end products of carbon dioxide and water. Organic contaminants biodegrade on the order of 1,000 times faster in the presence of aerobic bacteria, i.e., dissolved oxygen must be present in the groundwater. For example, under aerobic conditions, the half life for benzene may be as short as 60 days.

Volatility. With a vapor pressure of 5 to 15 millimeters of mercury, gasoline components readily volatilize, and transport in the vapor phase is potentially important. Gasoline vapors have a density that is greater than that of air and will tend to collect and diffuse into low areas, such as basements, sewers, and utility trenches. However, the Site does not have any basements or utility trenches that could act as vapor migration pathways.

Attenuation. Gasoline components, having a lighter molecular weight and slight polarity, can be transported in the dissolved state fairly readily. Indicators of the compound' s mobility are its theoretical solubility in water, organic carbon partition coefficient (Koc) and oil/water partition coefficient (Kow). Koc is the ratio of the mass of a compound found adsorbed to the soil versus the mass dissolved in water at equilibrium. A high Koc means that the compound preferentially adheres to the soil solids. Kow is the ratio of the concentration of a compound in oil versus the concentration dissolved in water at equilibrium. A high Kow means that the compound preferentially dissolves into the oil more than the water. Thus, a compound with a high Koc and Kow has a low solubility in water, and as a consequence, is not very mobile in the water environment.

If it is assumed that the adsorbed concentrations in MW-2-8 are at equilibrium with the dissolved concentrations in the MW-2 groundwater sample, then the partition coefficient K_{oc} can be estimated by:

$$K_{oc} = C_s / C_{gw} \qquad \textbf{Equation (2)}$$

where K_{oc} is the organic carbon partition coefficient,

C_s is the concentration adsorbed to solids,

C_{gw} is the concentration dissolved in groundwater.

With the K_{oc} estimated, the retardation coefficient, R_f can be estimated by:

$$R_f = 1 + K_{oc} f_{oc} \rho_s / \eta_w \qquad \textbf{Equation (3)}$$

where R_f is the retardation coefficient, dimensionless,

K_{oc} is the organic carbon partition coefficient, l/kg,

f_{oc} is the fraction organic carbon, dimensionless,

ρ_s is the bulk aquifer density, mg/kg, and

η_w is the water filled porosity.

R_f also is defined as:

$$R_f = v_w / v_c \qquad \textbf{Equation (4)}$$

where v_w is the velocity of groundwater, and

v_c is the velocity of the dissolved contaminant.

Table 5 shows the results of these calculations for the data from MW-2. The R_f values in the last column indicate the velocity of the compound through the aquifer relative to the velocity of groundwater (from Equation 3). Thus, from Equation 4, MTBE moves at the same velocity as groundwater, benzene is indicated to move at 80% the velocity of groundwater, and xylene is estimated to move at just 6% that of groundwater.

Table 5. Environmental Data for Petroleum Compounds at 20C.

Compound	Residual Concentration in MW-2 (ug/kg)	Dissolved Concentration in MW-2 (ug/l)	Calculated Organic Carbon Partition Coef. Koc l/kg	Fuel/Water Partition Coef. Kow	Calculated Retardation Factor f_{oc} = 1%
Benzene	3,920	1,480	2.6	350	1.2
Toluene	73,000	1,420	51	1,250	5.5
Ethyl-benzene	31,300	400	78	4,500	7.8
Xylenes	155,000	900	172	4,110	16
MTBE	500	56,400	0	16	1.0

For example, the travel time for groundwater and MTBE from the tank basin to Little Ivy Creek is estimated to be 200 feet divided by 2.1 feet per day, or 95 days. For benzene, with a retardation factor of 1.2, the travel time is estimated to be 114 days, and toluene, with a retardation factor of 5.5, the travel time would be 523 days.

3.3 EXPOSURE ASSESSMENT

The exposure assessment uses information from the characterization of the site characterization and environmental fate and transport analysis to identify significant completed exposure pathways and to estimate actual or potential exposure point concentrations of identified COC. The results of the exposure assessment are used to determine the potential human health and environmental risks associated with the Site.

3.3.1 Potentially Exposed Human and Environmental Populations

Both onsite and offsite residents can be considered potential receptors of the COCs released at the Site if there is a completed exposure pathway via ingestion of contaminated drinking water, contact with contaminated water or soil, or inhalation of vapors or contaminated dust. The potential exposure of environmental populations, i.e., biota, is via contamination of surface water.

3.3.1.1 Potentially Exposed Human Populations

Both onsite workers and offsite workers and residents can be considered potential receptors of the COC released at the Site if there is a completed exposure pathway via ingestion of contaminated drinking water, contact with contaminated water or soil, or inhalation of vapors or contaminated dust. The results of the site investigation indicate that the groundwater flow direction is toward the southeast and south (see Section 2.8). All workers and residents within one-fourth mile radius are served by private water supply wells. There are no water supply wells in the natural down-gradient direction from the contamination. However, the onsite water well and neighboring monitoring well contain MTBE. There are several up- and side-gradient water supply wells within 500 feet of the Site. Thus, potential exposure to human populations will be evaluated further.

3.3.1.2 Potentially Exposed Environmental Populations

Potential for exposure of environmental populations, i.e., biota, is via contamination of surface water. The nearest perennial stream that would contain biota is either the tributary on the south side of the Site or Little Ivy Creek at the southeast side of the Site. Thus, potential exposure to environmental populations will be evaluated further.

3.3.2 Exposure Pathways and Exposure Point Concentrations

For exposure to occur to a receptor, the contaminant must be able to reach a point where exposure may occur. If the exposure pathway is incomplete, no exposure and no health hazard can take place, and that pathway may be eliminated from further evaluation. The following evaluation considers each of the common exposure pathways typically occurring as a result of a release of petroleum hydrocarbons from a UST.

3.3.2.1 Water Consumption Pathway

Based on available evidence, the onsite water supply well is up gradient of the source under natural conditions (see the water table contours in Figure 9). However, analysis of tap water from the onsite well found an estimated 3.3 μg/l of MTBE. Therefore, it appears that the water well is able to reverse groundwater flow. This completed pathway is retained for further evaluation.

The estimation of the exposure point concentration at the onsite water well is computed by using an analytical equation presented by Jacob Bear[3]. The application of his analytical solution was first applied to modeling contaminant concentrations in a pumping well at a Superfund site.[4] The Lotus 1-2-3 spreadsheet showing the results of the calculation of the Bear model is presented in Appendix C. The Bear model assumes that a circular plume with radius, r, and thickness, h, having an average concentration, c, is drawn into a pumping well. As the contaminated plume is drawn in, it combines with fresh water from the other directions of radial flow to the well. The greatest concentration in the pumped water occurs when the center of mass of the circular plume reaches the well.

For benzene, a plume radius of 25 feet is used based on Figure 7. For MTBE, a plume radius of 50 feet is assumed based on Figure 8. The thickness of each plume is 7.0 feet, and the distance from the center of the plume to the water well is 100 feet. The specific yield of the shallow

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[3] Bear, Jacob, 1979, Groundwater Hydraulics, McGraw-Hill, New York, pp. 290-292)

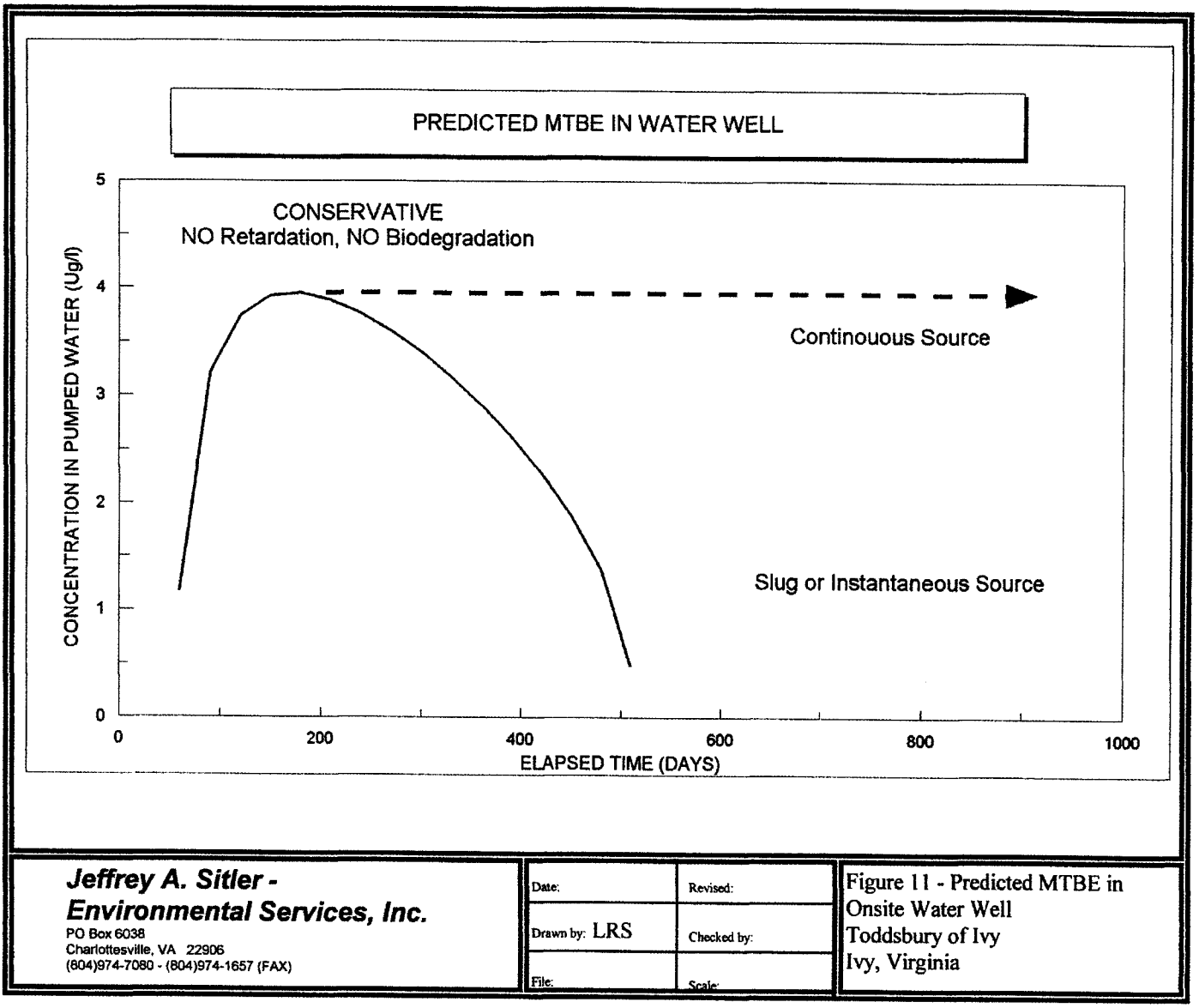
[4] Silka, Lyle R., 1987, Predicting Plume Characteristics from Pumping Well Concentrations Using a One-Dimensional Analytical Solution, Proc. of the Conference on Northwestern Ground Water Issues, National Ground Water Association, Dublin, OH, pp. 329-347.

aquifer is 0.2, and the average pumping rate is estimated to be 1.0 gpm (1,440 gallons per day). The average concentration in the benzene plume is estimated as the log average of the highest concentration to the lowest, i.e., $10^{\{\log(1{,}480\ \mu g/l) + \log(2.0\ \mu g/l)\}/2}$ for benzene, or 55 μg/l. The 2.0 μg/l concentration replaces BDL and is the reported detection limit. For toluene, the log average plume concentration is $10^{\{\log(1{,}420\ \mu g/l) + \log(2.0\ \mu g/l)\}/2}$, or 53 μg/l. For MTBE, the log average plume concentration is $10^{\{\log(56{,}400\ \mu g/l) + \log(4.0\ \mu g/l)\}/2}$, or 475 μg/l.

The results of the Bear pumping well model are presented in Figure 10 for MTBE. The figure shows the solid curve with a peak of 4.0 μg/l at a time of 200 days that represents the approximation of a slug, or instantaneous source. The dashed line represents the case if the source were constant and continuing. The horizontal dashed line implies that a steady state condition exists. Since the predicted peak is reached within less than one year, and the field evidence indicates that the contamination probably was in the subsurface for much longer than one year, than the MTBE concentration in the water well may be at an approximate steady state level. In order to match the observed 3.3 μg/l in the water well, the average concentration in the cylindrical plume had to be reduced from 475 μg/l to 24 μg/l. This reduction in the average plume concentration is equivalent to diluting the plume by a factor of 20 in the water well. This corresponds to the well drawing from a saturated thickness that is 20 times thicker than the 7.0-foot thickness of the shallow aquifer used in the model, i.e., 140 feet.

The model for benzene predicts that, based on dilution alone, benzene will not be detectable in the water well. Since the benzene model has a null result, there is no corresponding figure. Since toluene is at a slightly lower concentration than benzene, it also is predicted to remain undetectable in the water well. A spreadsheet for both the MTBE and benzene models are presented in Appendix C.

As for neighboring water wells, the radial distance to these wells is greater than 100 feet. Therefore, adjustment of the above analysis would result in the prediction of no detectable contaminants in these more distant water supply wells also.



Jeffrey A. Sitler - Environmental Services, Inc. PO Box 6038 Charlottesville, VA 22906 (604)974-7080 - (804)974-1657 (FAX)	Date:	Revised:	Figure 11 - Predicted MTBE in Onsite Water Well Toddsbury of Ivy Ivy, Virginia
	Drawn by: LRS	Checked by:	
	File:	Scale:	

3.3.2.2 Direct Contact Pathway

Direct contact of humans with contaminated water may be via exposure to contaminated surface water such as during swimming or via contact with contaminated groundwater such as during showering. The closest point at which groundwater emerges, i.e., at a perennial stream, is either in the small tributary about 75 feet south of the UST basin or Little Ivy Creek about 200 feet east of the UST basin. A conservative dilution rate for groundwater from the Site entering either the tributary or Little Ivy Creek can be estimated by the ratio of the area of contamination to the area of the upstream drainage basin. The contaminated area of the Site for benzene is estimated to be 0.04 acres (the area within the BDL contour in Figure 7). For MTBE, the contaminated area is

estimated to be 0.08 acres (the area within the BDL contour in Figure 8). The upstream area for the tributary is 430 acres, and the area for Little Ivy Creek is 760 acres. Thus, the dilution rate for the tributary is 430 acres divided by 0.04 acres, or 10,700. For Little Ivy Creek, the dilution rate is 760 acres divided by 0.08 acres, or 9,500.

Without considering degradation and assuming that all contamination went to the tributary, the concentration for benzene in the tributary would be the 55 μg/l log average concentration developed in section 3.3.2.1 divided by 10,700, or BDL, and toluene would be diluted to 53 μg/l divided by 9,500, or BDL. For MTBE, the concentration in the tributary would be the 475 μg/l divided by 10,700, or BDL. For Little Ivy Creek, benzene would be diluted to 55 μg/l divided by 9,500, or BDL, toluene would be diluted to 53 μg/l divided by 9,500, or BDL, while MTBE would be diluted to 475 μg/l divided by 9,500, or BDL. Thus, both streams appear to have sufficient dilution to prevent contamination from becoming detectable even without accounting for degradation.

As for direct contact via a water well, in the preceding section, it was shown that benzene is unlikely to be detected in the onsite well. In addition, it is believed that MTBE is at an approximate steady-state value of about 3.3 μg/l that is well below the 20 μg/l advisory level established for odor. Given these results, the direct contact pathway via contact with surface water or groundwater is insignificant and no potential exposure or health hazard is expected. Therefore, the potential exposure via direct contact with surface- or groundwater is not retained for further evaluation.

DEP: no impact policy.

3.3.2.3 Soil Ingestion Pathway

The soil ingestion pathway is based on the direct ingestion, or exposure to fugitive dust, from contaminated surface soil. Since the contaminated soil is under the surface, potential exposure via direct ingestion of contaminated soil or fugitive dust by onsite workers is considered insignificant. The soil ingestion pathway is incomplete and no exposure or health hazard can occur. Therefore, this potential pathway is eliminated from further evaluation.

3.3.2.4 Inhalation Pathway

The inhalation pathway can occur from exposure to fugitive dusts and from inhalation of volatile COC. Since the contaminated soil is under the surface, potential exposure via inhalation of contaminated soil or fugitive dust by onsite workers is considered insignificant. The inhalation pathway is incomplete for fugitive dust and no exposure or health hazard can occur. The potential inhalation pathway via vapor entering buildings is minimized by the lack of vapor migration pathways. Therefore, the potential inhalation pathway via fugitive dust and vapor is eliminated from further evaluation.

3.3.2.5 Environmental Receptor Pathway

The environmental receptor pathway is via exposure of aquatic biota to contaminated surface water. The environmental receptor pathway is considered potentially complete, but insignificant since the predicted dilution rates in the tributary and Little Ivy Creek would reduce contamination to undetectable concentrations according to the foregoing calculations (section 3.3.2.2). Therefore, based on only dilution, this potential pathway is eliminated from further evaluation.

3.3.2.6 Summary of Potentially Completed Exposure Pathways and Exposure Point Concentrations

The potentially completed exposure pathway and exposure point concentrations are as follows:

> Ingestion of drinking water from the onsite water supply. The **benzene** exposure point concentration at the water well is currently undetectable and is predicted to remain undetectable on the basis of dilution alone. The **MTBE** exposure point concentration is currently estimated at 3.3 μg/l and is predicted to remain at that level based on the assumption that it is at steady state. This MTBE level is well below the 20 μg/l advisory level for aesthetics (odor).

3.4 RISK CHARACTERIZATION

The primary objective of characterizing risk is to integrate information into a complete evaluation of current and future human health risks and nonhuman impacts associated with contaminants detected at the Site. The risk assessment evaluates the nature and degree of risk to

potential receptor populations. The following characterize the potential risks identified for the Site.

- No LPH has been observed at the Site, although MTBE has been detected at 56,400 μg/l, a level usually associated with the presence of LPH.
- The residual soil contamination is minor, since the water table is so shallow.
- There is no significant risk of petroleum vapors migrating to the building.
- Dissolved benzene, toluene, and MTBE are the contaminants of concern present in the groundwater with the highest concentrations observed in MW-2 at 1,480, 1,420, and 56,400 μg/l, respectively.
- The onsite water supply well is contaminated with MTBE at an estimated 3.3 μg/l and is free of all other potential contaminants.
- While dissolved contaminants could migrate to the streams, predicted average dilution rates would render them undetectable.
- MTBE at 3.3 μg/l in the water well is believed to represent an approximate steady-state concentration and is not predicted to increase in the near future.
- No other dissolved contaminants are believed to present any potential threat to the onsite water well.
- There are no risks posed by inhalation, direct contact, or exposure of environmental receptors.
- There are no risks posed to offsite water wells.

4.0 REMEDIATION ASSESSMENT

An assessment of remediation alternatives is conducted if the risk assessment concludes that significant risks are presented by the contamination at the Site. Only MTBE has been detected in the onsite water well, and only MTBE is predicted to be detectable in the well into the future and even then at a similarly low concentration. MTBE does not have an MCL. EPA has established an advisory level for MTBE based solely on odor threshold of 20 to 40 μg/l. Therefore, it is recommended that a remediation assessment not be completed at this time.

If the source characteristics remain constant, the MTBE concentration is predicted to remain at the current level. When the source diminishes or is removed, MTBE is predicted to require less than two years to purge out of the system. If the source increases its intensity, than the MTBE

may begin to increase in the water well within 100 days. However, based on the observed concentration of MTBE of 56,400 μg/l, the current source intensity level is quite high.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The Site had a release of gasoline from the UST system that resulted in groundwater contamination with benzene, toluene, and MTBE. No LPH has been observed at the Site, even though the MTBE level is quite high. Groundwater flow is toward the southeast with discharge into Little Ivy Creek. Some groundwater from the Site also discharges into the small tributary on the south boundary of the Site. However, predicted dilution rates in the surface water would render contaminants undetectable. The potential exposure pathway is via the onsite water supply well. The well currently has 3.3 μg/l MTBE but no other contaminants. The MTBE is predicted not to present any concern in the well into the future unless there is an intensification of the source. The other gasoline contaminants also are predicted not to present any concern for the water well at this time. The neighboring offsite water supply wells have remained uncontaminated and are predicted to remain so in the future.

Since the water table contours indicate that the natural groundwater flow is toward the southeast, there is no down-gradient monitoring well. MW-2 represents a monitoring point for the immediate source area. MW-1 is near the water supply well up gradient of the source. MW-3 also is up gradient of the source and also provides confirmation that the pump island is not a source.

It is recommended that one down-gradient monitoring well (MW-4) be installed to the southeast of MW-2 between MW-2 and Little Ivy Creek and that quarterly monitoring of the water supply well, MW-2, and the new MW-4 be conducted to provide confirmation for the predictive modeling.

APPENDIX A

WELL DATA SPREADSHEET
AND
BORING/WELL LOGS

Toddsbury of Ivy
Monitoring Well Data

01/03/02

	MW-1	MW-2	MW-3	Stream
Installation Date	11/28/01	11/28/01	11/28/01	
Heigth of Scope above TOC, ft				
Height of Scope at Rod, ft	4.23	3.90	3.42	12.66
Total depth of well, ft	15.00	15.00	12.00	
Elevation of TOC Relative Local Datum, ft	535.00	535.33	535.81	526.57
Water Table Depth below TOC, 3/3/00, ft	6.59	8.52	7.70	12.66
Elevation of Water Table, ft	528.41	526.81	528.11	513.91

Boring/Well Log

Project: Toddsbury of Ivy	
Log of Boring: MW-1	Location: Ivy, VA
Date Drilled: 11/28/01	Ground Surface Elevation: 735 ft
Drilling Method: Hollow Stem Auger	Total Depth: 15 ft
Drilling Company: Certified Environmental Drilling	Geologist: Lyle R. Silka, CPG
VA DEQ PC 01-6134	Weather: Cool, Partly Sunny

Depth (ft)	Sample Number			Geologic Description
0-5				red-brown clayey silt, moist to dry, no gas odor
5-10				same, cobble layer, moist, no gas odor
10-15				same, moist to wet, no gas odor
15				total depth
				2" casing set from 0 to 5 feet.
				2" screen set from 5 to 15 feet.

Boring/Well Log				
Project: Toddsbury of Ivy				
Log of Boring: MW-2				Location: Ivy, VA
Date Drilled: 11/28/01				Ground Surface Elevation: 735 ft
Drilling Method: Hollow Stem Auger				Total Depth: 15 ft
Drilling Company: Certified Environmental Drilling				Geologist: Lyle R. Silka, CPG
VA DEQ PC 01-6134				Weather: Cool, Partly Sunny
Depth (ft)	Sample Number			Geologic Description
0-5				red-brown clayey silt, moist to dry, no gas odor
5-10	MW-2-8			same, cobble layer, moist to wet, no gas odor
10-15				same, wet, no gas odor
15				total depth
				2" casing set from 0 to 5 feet.
				2" screen set from 2 to 15 feet.

Boring/Well Log

Project: Toddsbury of Ivy	
Log of Boring: MW-3	Location: Ivy, VA
Date Drilled: 11/28/01	Ground Surface Elevation: 735 ft
Drilling Method: Hollow Stem Auger	Total Depth: 12 ft
Drilling Company: Certified Environmental Drilling	Geologist: Lyle R. Silka, CPG
VA DEQ PC 01-6134	Weather: Cool, Partly Sunny

Depth (ft)	Sample Number			Geologic Description
0-5				red-brown clayey silt, moist to dry, no gas odor
5-10				same, cobble layer, moist to wet, no gas odor
10-12				same, refusal at 12', wet, no gas odor
12				total depth
				2" casing set from 0 to 2 feet.
				2" screen set from 2 to 12 feet.

APPENDIX B

LABORATORY ANALYTICAL REPORTS

MARYLAND SPECTRAL SERVICES, INC.

1500 Caton Center Drive Baltimore, MD 21227

VOLATILE AROMATICS BY EPA METHODS 5030/8021
VOLATILE TPH BY EPA METHODS 5030/8015

CLIENT SAMPLE ID:	MW-2-8 TODDBURY-IVY	BBLK1205E1
LAB SAMPLE ID:	01120402	METHOD BLANK
SAMPLE DATE:	11/28/01	
RECEIVED DATE:	12/04/01	
ANALYSIS DATE:	12/05/01	12/05/01
FILE NAME:	120402D	1205BBLKE1
INSTRUMENT ID:	GC-E	GC-E
% MOISTURE:	24	N/A
MATRIX:	SOIL	SOIL
UNITS:	UG/KG	UG/KG
DILUTION FACTOR:	2.0	1.0

VOLATILE COMPOUNDS	(Results reported on a dry-weight basis.)	
Benzene	3920	250 U
Toluene	73000	250 U
Ethylbenzene	31300	250 U
Xylenes (total)	155000	500 U
Methyl-t-Butyl Ether	1320 U	500 U
Volatile TPH	1060000	12500 U

B - Detected in lab blank. U - Below reported quantitation level. J - Estimated value.
UG/KG = Microgram per kilogram.

MARYLAND SPECTRAL SERVICES, INC.
1500 Caton Center Drive Baltimore, MD 21227

VOLATILE AROMATICS BY EPA METHODS 5030/8021
VOLATILE TPH BY EPA METHODS 5030/8015

CLIENT SAMPLE ID:	STREAM-UP TODDBURY-IVY	STREAM-DOWN TODDBURY-IVY	MW-1 TODDBURY-IVY	MW-2 TODDBURY-IVY	MW-3 TODDBURY-IVY	BBLK1204E1
LAB SAMPLE ID:	01120403	01120404	01120405	01120406	01120407	METHOD BLANK
SAMPLE DATE:	11/29/01	11/29/01	11/29/01	11/29/01	11/29/01	
RECEIVED DATE:	12/04/01	12/04/01	12/04/01	12/04/01	12/04/01	
ANALYSIS DATE:	12/04/01	12/04/01	12/04/01	12/04/01	12/04/01	12/04/01
FILE NAME:	120403	120404	120405	120406D	120407	1204BBLKE1
INSTRUMENT ID:	GC-E	GC-E	GC-E	GC-E	GC-E	GC-E
MATRIX:	WATER	WATER	WATER	WATER	WATER	WATER
UNITS:	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
DILUTION FACTOR:	1.0	1.0	1.0	200	1.0	1.0
VOLATILE COMPOUNDS						
Benzene	2.0 U	2.0 U	2.0 U	1480	2.0 U	2.0 U
Toluene	2.0 U	2.0 U	2.0 U	1420	2.0 U	2.0 U
Ethylbenzene	2.0 U	2.0 U	2.0 U	400 U	2.0 U	2.0 U
Xylenes (total)	4.0 U	4.0 U	4.0 U	900	4.0 U	4.0 U
Methyl-t-Butyl Ether	4.0 U	4.0 U	18	56400	4.0 U	4.0 U
Volatile TPH	100 U	100 U	100 U	20000 U	100 U	100 U

B - Detected in lab blank. U - Below reported quantitation level. J - Estimated value.
UG/L = Microgram per liter.

MARYLAND SPECTRAL SERVICES, INC.
1500 Caton Center Drive Baltimore, MD 21227

VOLATILE ORGANICS BY EPA GC/MS METHOD 8260

CLIENT SAMPLE ID:	WS TODDBURY-IVY	VBLK1205A1
LAB SAMPLE ID:	01120408	METHOD BLANK
SAMPLE DATE:	11/29/01	
RECEIVED DATE:	12/04/01	
ANALYSIS DATE:	12/05/01	12/05/01
FILE NAME:	120408	1205VBLKA1
INSTRUMENT ID:	MSA	MSA
MATRIX:	WATER	WATER
UNITS:	UG/L	UG/L
DILUTION FACTOR:	1.0	1.0

VOLATILE COMPOUNDS		
Acetone	10 U	10 U
t-Amyl Methyl Ether (TAME)	5.0 U	5.0 U
Benzene	5.0 U	5.0 U
Bromobenzene	5.0 U	5.0 U
Bromochloromethane	5.0 U	5.0 U
Bromodichloromethane	5.0 U	5.0 U
Bromoform	5.0 U	5.0 U
Bromomethane	10 U	10 U
tert-Butanol (TBA)	25 U	25 U
2-Butanone	10 U	10 U
tert-Butylbenzene	5.0 U	5.0 U
sec-Butylbenzene	5.0 U	5.0 U
n-Butylbenzene	5.0 U	5.0 U
Carbon Disulfide	5.0 U	5.0 U
Carbon Tetrachloride	5.0 U	5.0 U
Chlorobenzene	5.0 U	5.0 U
Chloroethane	10 U	10 U
Chloroform	5.0 U	5.0 U
Chloromethane	10 U	10 U
2-Chlorotoluene	5.0 U	5.0 U
4-Chlorotoluene	5.0 U	5.0 U
1,2-Dibromo-3-chloropropane	5.0 U	5.0 U
Dibromochloromethane	5.0 U	5.0 U
1,2-Dibromoethane (EDB)	5.0 U	5.0 U
Dibromomethane	5.0 U	5.0 U
1,3-Dichlorobenzene	5.0 U	5.0 U
1,4-Dichlorobenzene	5.0 U	5.0 U
1,2-Dichlorobenzene	5.0 U	5.0 U
Dichlorodifluoromethane	5.0 U	5.0 U
1,2-Dichloroethane	5.0 U	5.0 U
1,1-Dichloroethane	5.0 U	5.0 U
trans-1,2-Dichloroethene	5.0 U	5.0 U
cis-1,2-Dichloroethene	5.0 U	5.0 U
1,1-Dichloroethene	5.0 U	5.0 U
1,3-Dichloropropane	5.0 U	5.0 U
2,2-Dichloropropane	5.0 U	5.0 U

MARYLAND SPECTRAL SERVICES, INC.
1500 Caton Center Drive Baltimore, MD 21227

VOLATILE ORGANICS BY EPA GC/MS METHOD 8260

CLIENT SAMPLE ID:	WS TODDBURY-IVY	VBLK1205A1
LAB SAMPLE ID:	01120408	METHOD BLANK
SAMPLE DATE:	11/29/01	
RECEIVED DATE:	12/04/01	
ANALYSIS DATE:	12/05/01	12/05/01
FILE NAME:	120408	1205VBLKA1
INSTRUMENT ID:	MSA	MSA
MATRIX:	WATER	WATER
UNITS:	UG/L	UG/L
DILUTION FACTOR:	1.0	1.0

VOLATILE COMPOUNDS		
1,2-Dichloropropane	5.0 U	5.0 U
trans-1,3-Dichloropropene	5.0 U	5.0 U
cis-1,3-Dichloropropene	5.0 U	5.0 U
1,1-Dichloropropene	5.0 U	5.0 U
Ethyl-t-Butyl Ether (ETBE)	5.0 U	5.0 U
Ethylbenzene	5.0 U	5.0 U
Hexachlorobutadiene	5.0 U	5.0 U
2-Hexanone	10 U	10 U
Isopropyl Ether (DIPE)	5.0 U	5.0 U
p-Isopropyl toluene	5.0 U	5.0 U
Isopropylbenzene (Cumene)	5.0 U	5.0 U
4-Methyl-2-Pentanone	10 U	10 U
Methyl-t-Butyl Ether (MTBE)	3.3 J	5.0 U
Methylene Chloride	5.0 U	5.0 U
Naphthalene	5.0 U	5.0 U
n-Propylbenzene	5.0 U	5.0 U
Styrene	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	5.0 U	5.0 U
1,1,1,2-Tetrachloroethane	5.0 U	5.0 U
Tetrachloroethene	5.0 U	5.0 U
Toluene	5.0 U	5.0 U
1,2,3-Trichlorobenzene	5.0 U	5.0 U
1,2,4-Trichlorobenzene	5.0 U	5.0 U
1,1,2-Trichloroethane	5.0 U	5.0 U
1,1,1-Trichloroethane	5.0 U	5.0 U
Trichloroethene	5.0 U	5.0 U
Trichlorofluoromethane	5.0 U	5.0 U
1,2,3-Trichloropropane	5.0 U	5.0 U
1,2,4-Trimethylbenzene	5.0 U	5.0 U
1,3,5-Trimethylbenzene	5.0 U	5.0 U
Vinyl Chloride	10 U	10 U
o-Xylene	5.0 U	5.0 U
m+p-Xylenes	5.0 U	5.0 U

B - Detected in Lab Blank. U - Below Reported Quantitation Level. J - Estimated Value.
UG/L = Microgram per liter.

Company Name:	Project Manager:	no.	Parameters						CHAIN-OF CUSTODY RECORD
JAS Environmental Services, Inc. PO Box 6038 Charlottesville, VA 22906	Jeff Sitler tel (804)974-7080 fax (804)974-1657	of container	TPH GRO EPA-5035-8015	TPH DRO EPA-8015	MBTEX EPA-5035-8021	PAH EPA-8270	MBTEX N EPA-5035-8021		Laboratory: Maryland Spectral Services, Inc. 1500 Caton Center Drive, Suite G Baltimore, Maryland 21227 (410) 247-7600
Project Name: Toddbury of Ivy	Project Number:								
Sampler(s): LRS	Task Number:								

	Date	Time	Matrix									
MW-2-8	11/28/01	1530	S	1	X		X				ICE	MSSF 01-12004-02
Stream Up	11/29/01	1630	W	2								03
Stream Down		1640										04
MW-1		1530										05
MW-2		1610										06
MW-3		1550										07
WS		1650							8260		this sample only	08

(printed) Lyle R. Silka	12/03/01 1000	Federal Express	Send report to: Lyle Silka 5709 Cedar Walk #402 Centreville, VA 20121
Relinquished by: (signature)	Date/Time	Received by: (signature)	Fax summary of results to Lyle Silka at (703)631-0726
(printed)	12/4/01 1020	(printed)	Bill: JAS

APPENDIX C

DATA FOR ANALYSIS OF BTEX CONCENTRATIONS IN SOIL
SPREADSHEETS FOR DRAIN FIELD ANALYSIS
SPREADSHEETS FOR PUMPED CONCENTRATION IN WATER WELL

DATA FOR ANALYSIS OF BTEX CONCENTRATIONS IN SOIL

BTEX Concentrations in Soil

PC #		Sample	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE
			ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
99-5067	Equine	MW-1-10	107,000	841,000	260,000	1,310,000	116,000
99-5192	Ashley's	MW-1-15	81,600	1,220,000	261,000	1,740,000	104,000
99-5158	Beaver Dam	Gas-1	15,900	199,000	123,000	527,000	BDL
99-5158	Beaver Dam	Gas-2	42,400	403,000	253,000	1,040,000	17,200
99-5158	Beaver Dam	MW-1-15	45,100	355,000	146,000	668,000	BDL
99-5159	Crozet	MW-1-10	20,200	246,000	99,400	457,000	NA
00-6036	Jones	SB-2-20	23,100	170,000	67,200	314,000	BDL
99-5195	LJ's	SB-1-10	1,370	36,600	26,800	111,000	1,210
99-5030	Midtown	Pump-1	2,080	35,700	21,200	85,100	NA
99-5060	Stackhouse	MW-4-10	2,070	18,300	9,180	46,100	BDL
01-6134	Toddsbury	MW-2-8	3,920	73,000	31,300	155,000	BDL
N			11	11	11	11	4
Average			31,340	327,055	118,007	586,655	59,603
Std			33,515	362,416	95,165	532,286	50,891

Log BTEX Concentrations in Soil to Xylene

PC #		Sample	Est. Age	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE
			yr	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
99-5067	Equine	MW-1-10	0	5.03	5.92	5.41	6.12	5.06
99-5192	Ashley's	MW-1-15	0	4.91	6.09	5.42	6.24	5.02
99-5158	Beaver Dam	Gas-1	0	4.20	5.30	5.09	5.72	BDL
99-5158	Beaver Dam	Gas-2	0	4.63	5.61	5.40	6.02	4.24
99-5158	Beaver Dam	MW-1-15	0	4.65	5.55	5.16	5.82	BDL
99-5159	Crozet	MW-1-10	0	4.31	5.39	5.00	5.66	NA
00-6036	Jones	SB-2-20	0	4.36	5.23	4.83	5.50	BDL
99-5195	LJ's	SB-1-10	0	3.14	4.56	4.43	5.05	3.08
99-5030	Midtown	Pump-1	0	3.32	4.55	4.33	4.93	NA
99-5060	Stackhouse	MW-4-10	0	3.32	4.26	3.96	4.66	BDL
01-6134	Toddsbury	MW-2-8	0	3.59	4.86	4.50	5.19	BDL
N				11	11	11	11	4
N				4.13	5.21	4.87	5.54	4.35
Average				0.65	0.56	0.48	0.49	0.80

DRAIN FIELD ANALYSIS

AFTER BEAR (1979, P. 180)

MODELER: LRS

01/04/01

INPUT		UNITS
RECHARGE (R) ON LEFT SIDE OF DRAIN	0.0016	FT/DAY
ON RIGHT SIDE OF DRAIN	0.0016	FT/DAY
DISTANCE BETWEEN DRAINS (L)	400	FEET
HEIGHT OF DRAIN "0" (H0)	0	FEET
HEIGHT OF DRAIN "1" (H1)	0	FEET
HYDRAULIC CONDUCTIVITY (K)	14	FT/DAY

OUTPUT	OUTPUT	
FLOW RATE TO DRAIN "0"	-0.320	CFD/LINEAL FT
FLOW RATE TO DRAIN "1"	0.320	CFD/LINEAL FT
DISTANCE TO MAXIMUM HEIGHT OF WATER TABLE (HMAX)	200	FEET

	DISTANCE (FT) 10	HEIGHT OF WATER TABLE (FT)	HYDRAULIC GRADIENT	ELEVATION OF WATER TABLE 526	COMMENTS
0	0	0		526.0	526
10	10	1	0.0667	526.7	
20	20	1	0.0264	526.9	
30	30	1	0.0194	527.1	
40	40	1	0.0156	527.3	
50	50	1	0.0131	527.4	
60	60	2	0.0113	527.5	
70	70	2	0.0098	527.6	
80	80	2	0.0086	527.7	
90	90	2	0.0075	527.8	MW-2
100	100	2	0.0066	527.9	526.8 MW-3
110	110	2	0.0058	527.9	
120	120	2	0.0050	528.0	
130	130	2	0.0043	528.0	
140	140	2	0.0037	528.0	
150	150	2	0.0031	528.1	
160	160	2	0.0025	528.1	
170	170	2	0.0019	528.1	528.1 MW-3
180	180	2	0.0013	528.1	
190	190	2	0.0008	528.1	
200	200	2	0.0003	528.1	528.4 MW-1
210	210	2	-0.0003	528.1	
220	220	2	-0.0008	528.1	
230	230	2	-0.0013	528.1	
240	240	2	-0.0019	528.1	
250	250	2	-0.0025	528.1	
260	260	2	-0.0031	528.0	
270	270	2	-0.0037	528.0	
280	280	2	-0.0043	528.0	
290	290	2	-0.0050	527.9	
300	300	2	-0.0058	527.9	

DRAIN FIELD ANALYSIS

AFTER BEAR (1979, P. 180)

MODELER: LRS

INPUT		INPUT	UNITS	01/04/01
RECHARGE (R)	ON LEFT SIDE OF DRAIN	0.0016	FT/DAY	
	ON RIGHT SIDE OF DRAIN	0.0016	FT/DAY	
DISTANCE BETWEEN DRAINS (L)		800	FEET	
HEIGHT OF DRAIN "0" (H0)		0	FEET	
HEIGHT OF DRAIN "1" (H1)		0	FEET	
HYDRAULIC CONDUCTIVITY (K)		32	FT/DAY	
OUTPUT		OUTPUT		
FLOW RATE TO DRAIN "0"		-0.639	CFD/LINEAL FT	
FLOW RATE TO DRAIN "1"		0.639	CFD/LINEAL FT	
DISTANCE TO MAXIMUM HEIGHT OF WATER TABLE (HMAX)		400	FEET	

	DISTANCE (FT)	HEIGHT OF WATER TABLE (FT)	HYDRAULIC GRADIENT	ELEVATION OF WATER TABLE	COMMENTS
	10			526	
0	0	0		526.0	526
10	10	1	0.0628	526.6	
20	20	1	0.0255	526.9	
30	30	1	0.0191	527.1	
40	40	1	0.0158	527.2	
50	50	1	0.0136	527.4	
60	60	1	0.0121	527.5	
70	70	2	0.0108	527.6	
80	80	2	0.0099	527.7	
90	90	2	0.0090	527.8	
100	100	2	0.0083	527.9	526.8 MW-3
110	110	2	0.0077	527.9	
120	120	2	0.0072	528.0	
130	130	2	0.0067	528.1	
140	140	2	0.0063	528.1	
150	150	2	0.0058	528.2	
160	160	2	0.0055	528.3	
170	170	2	0.0051	528.3	528.1 MW-3
180	180	2	0.0048	528.4	
190	190	2	0.0045	528.4	
200	200	2	0.0042	528.4	528.4 MW-1
210	210	2	0.0039	528.5	
220	220	3	0.0037	528.5	
230	230	3	0.0034	528.6	
240	240	3	0.0032	528.6	
250	250	3	0.0030	528.6	
260	260	3	0.0027	528.6	
270	270	3	0.0025	528.7	
280	280	3	0.0023	528.7	
290	290	3	0.0021	528.7	
300	300	3	0.0019	528.7	

CONCENTRATION AT PUMPING WELL (FROM BEAR, 1979, pp. 290-292)

Benzene L.R. SILKA

INPUT DATA:

PLUME RADIUS	25 FEET		
DISTANCE, WELL TO PLUME CENTER	*100 FEET*	*SOURCE CONC.*	3 *ug/l*
AQUIFER THICKNESS	7 FEET	AREA =	1963 SQUARE FEET
SPECIFIC YIELD	0.200	Uo =	43982 CUBIC FEET
AVERAGE PUMPING RATE (gpm)	1.00 GPM	BIODEG HALFLIFE	10000 DAYS
RETARDATION FACTOR	1	BIODEG RATE	0.0001 PER DAY

TIME DAYS	CUMMULATIVE VOLUME PUMPED CF	PARAMETERS FOR BEAR'S EQUATION Up/Uo	Ui/Uo	ϵ (Relative Conc.)	CONSERVATIVE PUMPED CONC. ug/l	Observed Concentration	PUMPED CONC. WITH BIODEGRADATION ug/l
0.00E+00	0.00E+00						
3.00E+01	5.78E+03	1.31E-01	6.25E-02	ERR	ERR		ERR
6.00E+01	1.16E+04	2.63E-01	6.25E-02	ERR	ERR		ERR
9.00E+01	1.73E+04	3.94E-01	6.25E-02	ERR	ERR		ERR
1.20E+02	2.31E+04	5.25E-01	6.25E-02	ERR	ERR		ERR
1.50E+02	2.89E+04	6.57E-01	6.25E-02	5.76E-02	0		0
1.80E+02	3.47E+04	7.88E-01	6.25E-02	7.56E-02	0		0
2.10E+02	4.04E+04	9.19E-01	6.25E-02	8.03E-02	0		0
2.40E+02	4.62E+04	1.05E+00	6.25E-02	7.84E-02	0		0
2.70E+02	5.20E+04	1.18E+00	6.25E-02	7.17E-02	0		0
3.00E+02	5.78E+04	1.31E+00	6.25E-02	6.04E-02	0		0
3.30E+02	6.35E+04	1.44E+00	6.25E-02	4.28E-02	0		0
3.60E+02	6.93E+04	1.58E+00	6.25E-02	ERR	ERR		ERR
3.90E+02	7.51E+04	1.71E+00	6.25E-02	ERR	ERR		ERR
4.20E+02	8.09E+04	1.84E+00	6.25E-02	ERR	ERR		ERR
4.50E+02	8.66E+04	1.97E+00	6.25E-02	ERR	ERR		ERR
4.80E+02	9.24E+04	2.10E+00	6.25E-02	ERR	ERR		ERR
5.10E+02	9.82E+04	2.23E+00	6.25E-02	ERR	ERR		ERR
5.40E+02	1.04E+05	2.36E+00	6.25E-02	ERR	ERR		ERR
5.70E+02	1.10E+05	2.49E+00	6.25E-02	ERR	ERR		ERR
6.00E+02	1.16E+05	2.63E+00	6.25E-02	ERR	ERR		ERR
6.30E+02	1.21E+05	2.76E+00	6.25E-02	ERR	ERR		ERR
6.60E+02	1.27E+05	2.89E+00	6.25E-02	ERR	ERR		ERR
6.90E+02	1.33E+05	3.02E+00	6.25E-02	ERR	ERR		ERR
7.20E+02	1.39E+05	3.15E+00	6.25E-02	ERR	ERR		ERR
7.50E+02	1.44E+05	3.28E+00	6.25E-02	ERR	ERR		ERR
7.80E+02	1.50E+05	3.41E+00	6.25E-02	ERR	ERR		ERR
8.10E+02	1.56E+05	3.55E+00	6.25E-02	ERR	ERR		ERR
8.40E+02	1.62E+05	3.68E+00	6.25E-02	ERR	ERR		ERR
8.70E+02	1.67E+05	3.81E+00	6.25E-02	ERR	ERR		ERR

CONCENTRATION AT PUMPING WELL (FROM BEAR, 1979, pp. 290-292)

MTBE L.R. SILKA

INPUT DATA:

PLUME RADIUS	50 FEET		
DISTANCE, WELL TO PLUME CENTER	100 FEET	SOURCE CONC.	24 ug/l
AQUIFER THICKNESS	7 FEET	AREA =	7850 SQUARE FEET
SPECIFIC YIELD	0.200	Uo =	43982 CUBIC FEET
AVERAGE PUMPING RATE (gpm)	1.00 GPM	BIODEG HALFLIFE	10000 DAYS
RETARDATION FACTOR	1	BIODEG RATE	0.0001 PER DAY

TIME DAYS	CUMMULATIVE VOLUME PUMPED CF	PARAMETERS FOR BEAR'S EQUATION Up/Uo	Ui/Uo	ϵ (Relative Conc.)	CONSERVATIVE PUMPED CONC. ug/l	Observed Concentration	PUMPED CONC. WITH BIODEGRADATION ug/l
0.00E+00	0.00E+00						
3.00E+01	5.78E+03	1.31E-01	2.50E-01	ERR	ERR		ERR
6.00E+01	1.16E+04	2.63E-01	2.50E-01	4.91E-02	1		1
9.00E+01	1.73E+04	3.94E-01	2.50E-01	1.35E-01	3		3
1.20E+02	2.31E+04	5.25E-01	2.50E-01	1.58E-01	4		4
1.50E+02	2.89E+04	6.57E-01	2.50E-01	1.65E-01	4		4
1.80E+02	3.47E+04	7.88E-01	2.50E-01	1.66E-01	4		4
2.10E+02	4.04E+04	9.19E-01	2.50E-01	1.64E-01	4		4
2.40E+02	4.62E+04	1.05E+00	2.50E-01	1.59E-01	4		4
2.70E+02	5.20E+04	1.18E+00	2.50E-01	1.52E-01	4		4
3.00E+02	5.78E+04	1.31E+00	2.50E-01	1.43E-01	3		3
3.30E+02	6.35E+04	1.44E+00	2.50E-01	1.34E-01	3		3
3.60E+02	6.93E+04	1.58E+00	2.50E-01	1.23E-01	3		3
3.90E+02	7.51E+04	1.71E+00	2.50E-01	1.11E-01	3		3
4.20E+02	8.09E+04	1.84E+00	2.50E-01	9.63E-02	2		2
4.50E+02	8.66E+04	1.97E+00	2.50E-01	7.95E-02	2		2
4.80E+02	9.24E+04	2.10E+00	2.50E-01	5.79E-02	1		1
5.10E+02	9.82E+04	2.23E+00	2.50E-01	1.98E-02	0		0
5.40E+02	1.04E+05	2.36E+00	2.50E-01	ERR	ERR		ERR
5.70E+02	1.10E+05	2.49E+00	2.50E-01	ERR	ERR		ERR
6.00E+02	1.16E+05	2.63E+00	2.50E-01	ERR	ERR		ERR
6.30E+02	1.21E+05	2.76E+00	2.50E-01	ERR	ERR		ERR
6.60E+02	1.27E+05	2.89E+00	2.50E-01	ERR	ERR		ERR
6.90E+02	1.33E+05	3.02E+00	2.50E-01	ERR	ERR		ERR
7.20E+02	1.39E+05	3.15E+00	2.50E-01	ERR	ERR		ERR
7.50E+02	1.44E+05	3.28E+00	2.50E-01	ERR	ERR		ERR
7.80E+02	1.50E+05	3.41E+00	2.50E-01	ERR	ERR		ERR
8.10E+02	1.56E+05	3.55E+00	2.50E-01	ERR	ERR		ERR
8.40E+02	1.62E+05	3.68E+00	2.50E-01	ERR	ERR		ERR
8.70E+02	1.67E+05	3.81E+00	2.50E-01	ERR	ERR		ERR

DEQ-VALLEY

APR 2 2 2002

TO:_____

FILE:_____

SITE CHARACTERIZATION REPORT
ADDENDUM

REVIEWED
VRO Petroleum Program
Date: 5/9/02
By:

TODDSBURY OF IV
Albemarle County

PC # 01-6134
FAC ID # _____ *(for DEQ use)*

Submitted to:

Joel P. Maynard
Valley Regional Office
Department of Environmental Quality
PO Box 3000
Harrisonburg, VA 22801-3000
(540)574-7800

Prepared for:

Charlottesville Oil Company
PO Box 6340
Charlottesville, Virginia 22906
(804)293-9107

Prepared by:

Jeffrey A. Sitler Environmental Service, Inc.
PO Box 6038
Charlottesville, Virginia 22906
(804)974-7080 fax (804)974-1657

April 18, 2002

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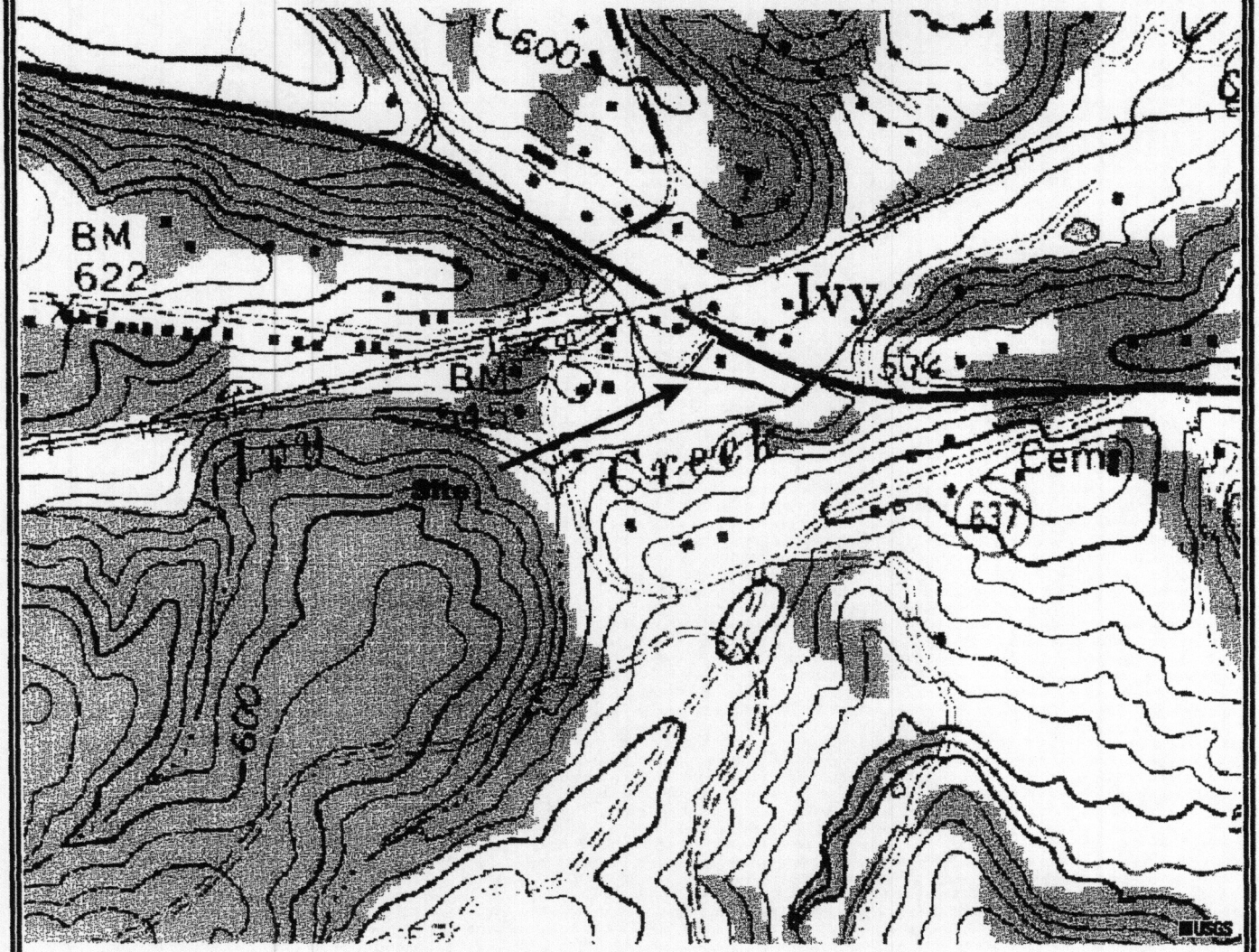
APPENDIX A - Boring/Well Log
APPENDIX B - Laboratory Analytical Reports

1.0 INTRODUCTION

Jeffrey A. Sitler Environmental Services, Inc., (JAS) was contracted by Charlottesville Oil Company, Rt. 250 West, Charlottesville, Virginia to prepare this Site Characterization Report Addendum (SCRA) for the property known as Toddsbury of Ivy Market located on US Route 250 in Ivy, Virginia, in Albemarle County, (the "Site" shown in Figure 1). The objectives of this SCRA were to install a fourth monitoring well to the east of the tank basin in the down-gradient direction, sample the stream in the down-gradient direction under the Rt 250 bridge over Ivy Creek, and reevaluate the extent of contamination per a letter from Joel P. Maynard of the DEQ dated January 28, 2002.

The Site has been operated as a gas station since at least the early 1950's. Charlottesville Oil Company owns the three gasoline underground storage tanks (USTs) that are currently in service as shown in the site plan in Figure 2. As a result of an inconclusive pressure test on the lines, soil sampling along the supply lines indicated potential petroleum releases. The DEQ-required Site Characterization Report (SCR) was submitted January 3, 2002. The SCR found the following:

1. No LPH has been observed at the Site, although MTBE has been detected at 56,400 μg/l, a level usually associated with the presence of LPH.
2. The residual soil contamination is minor, since the water table is so shallow.
3. There is no significant risk of petroleum vapors migrating to the building.
4. Dissolved benzene, toluene, and MTBE are the contaminants of concern present in the groundwater with the highest concentrations observed in MW-2 at 1,480, 1,420, and 56,400 μg/l, respectively.
5. The onsite water supply well is contaminated with MTBE at an estimated 3.3 μg/l and is free of all other potential contaminants.
6. While dissolved contaminants could migrate to the streams, predicted average dilution rates would render them undetectable.
7. MTBE at 3.3 μg/l in the water well is believed to represent an approximate steady-state concentration and is not predicted to increase in the near future.



Scale

0 **500 ft**

Jeffrey A. Sitler - Environmental Services, Inc. PO Box 6038 Charlottesville, VA 22906 (804)974-7080 - (804)974-1657 (FAX)	Date:	Revised:	Figure 1 - Site Location Topographic Map Toddsbury of Ivy
	Drawn by: LRS	Checked by:	
	File:	Scale:	

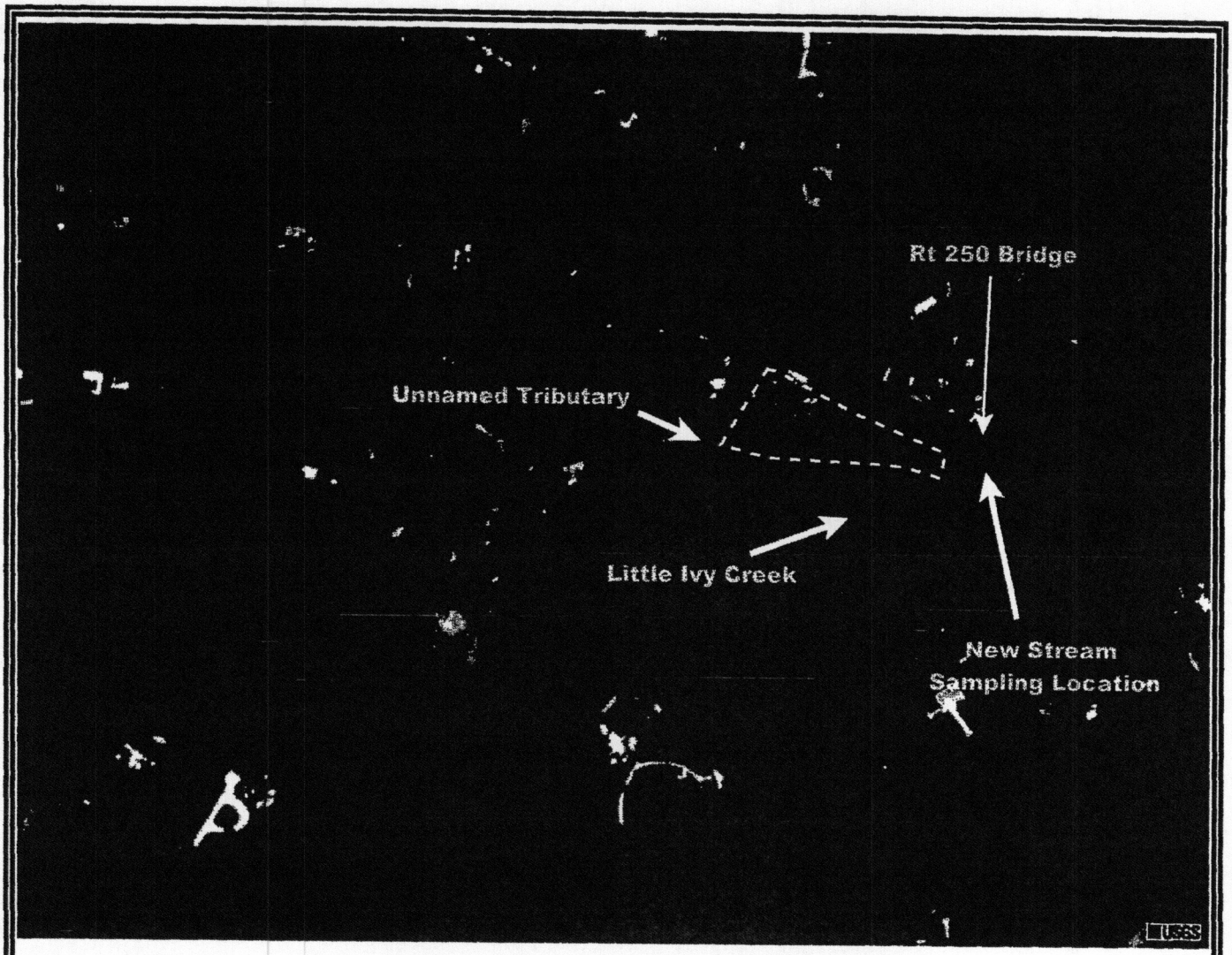
Jeffrey A. Sitler - Environmental Services, Inc. PO Box 6038 Charlottesville, VA 22906 (804)974-7080 - (804)974-1657 (FAX)	Date:	Revised:
	Drawn by: LRS	Checked by:
	File:	Scale:

Figure 2 - Site Plan
Toddsbury of Ivy

8. No other dissolved contaminants are believed to present any potential threat to the onsite water well.
9. There are no risks posed by inhalation, direct contact, or exposure of environmental receptors.
10. There are no risks posed to offsite water wells.

Since the submission of the SCR, it was determined that the onsite water well was not used for drinking water.

The SCR determined that the water table gradient sloped to the east southeast, parallel with Rt 250, while the three monitoring wells were installed assuming the groundwater flow would be to the south. Therefore, as part of this SCRA, a fourth well was installed to the east southeast of the tank basin. In addition, the surface water sample was collected from the small unnamed tributary that flows along the southern boundary of the Site near the down-gradient end of the Site. However, the east southeast groundwater flow indicated that Little Ivy Creek may be the recipient of contaminated groundwater leaving the Site. Therefore, as part of this SCRA, a surface water sample was collected from under the Rt 250 bridge. These relationships are shown on Figure 3.



Scale

0 **200 ft**

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Date:	Revised:
Drawn by: LRS	Checked by:
File:	Scale:

Figure 3 - 1994 USGS Aerial Photograph Showing Streams and Rt 250 Bridge
Toddsbury of Ivy

2.0 MONITORING WELL INSTALLATION

For the SCRA, one monitoring well was installed at the Site in a location that would be down gradient of the tank basin per the water table contours developed in the SCR. JAS and Certified Environmental Drilling, of Earlysville, Virginia, mobilized onsite on February 12, 2002 and installed monitoring well MW-4 by hollow-stem auger drill rig. The drilling was supervised by Lyle R. Silka, Virginia certified professional geologist, and was in accordance with standard health and safety practices. The total boring depth was 20 feet. Geologic samples were inspected at five-foot intervals for characterization of the geology and assessing the presence of hydrocarbon contamination. Decontaminated drill stems were used for the boring.

Each soil sample was logged for lithology, inspected for petroleum odors, examined for visual petroleum staining, and tested for total volatile hydrocarbon vapors. The boring log is presented in Appendix A. Since MW-4 was about 75 feet from the tank basin, no soil sample was collected. In addition, there was no odor or staining in the soil samples until the water table was reached at which depth a slight gasoline odor was encountered.

The soil boring was converted to a monitoring well using flush-threaded, two-inch diameter, schedule 40 PVC casing and 0.01-inch factory-slotted PVC screen with a threaded end cap. The well was installed by assembling and lowering the PVC screen and blank casing into the open borehole to the total depth of the boring. A #2 filter sand was placed around the screen to a height of two feet above the screen, followed by a two-foot bentonite-chip seal that was hydrated in place. From the top of the bentonite seal to the surface, a cement grout mix was placed in the annulus around the casing. The well was completed with a flush-mount, bolt-down, metal well protector set in concrete at the surface. A locking well cap and padlock were placed on each well casing. Monitoring well depths and screened intervals were selected in the field based on the depth at which groundwater was encountered in order to provide ample open screen above the water table to allow for seasonal fluctuations and allow sufficient screen below the water table to allow for groundwater sampling.

The monitoring well was purged of approximately three well volumes of water to develop the well and bring in fresh groundwater from the surrounding aquifer. The well purging was accomplished using a pre-cleaned plastic bailer. The relative elevation of the top of casing

(TOC) for MW-4 was determined by surveying with a rod and transit relative to MW-2. The horizontal position of the wells on the Site was determined relative to the building using a 200-foot fiberglass tape measure. Appendix A provides the elevation survey results.

3.0 GROUNDWATER SAMPLING AND ANALYSIS

Groundwater samples were obtained from monitoring well MW-4 and Little Ivy Creek under the Rt 250 bridge on March 15, 2002. All four monitoring wells were checked for free product and depth to water with an electronic oil-water interface probe. Monitoring well MW-4 was purged of approximately three well volumes of water using a pre-cleaned plastic bailer. The stream sample was obtained by collecting a sample directly from the flowing stream along the west bank. Each water sample was placed into two laboratory-supplied 40-milliliter glass vials with Teflon septa in a manner to exclude all air from the vials. All sample bottles were labeled, placed on ice, and delivered via overnight Federal Express under standard chain-of-custody procedures to MSS. Water samples were analyzed for TPH-GRO, BTEX, and MTBE.

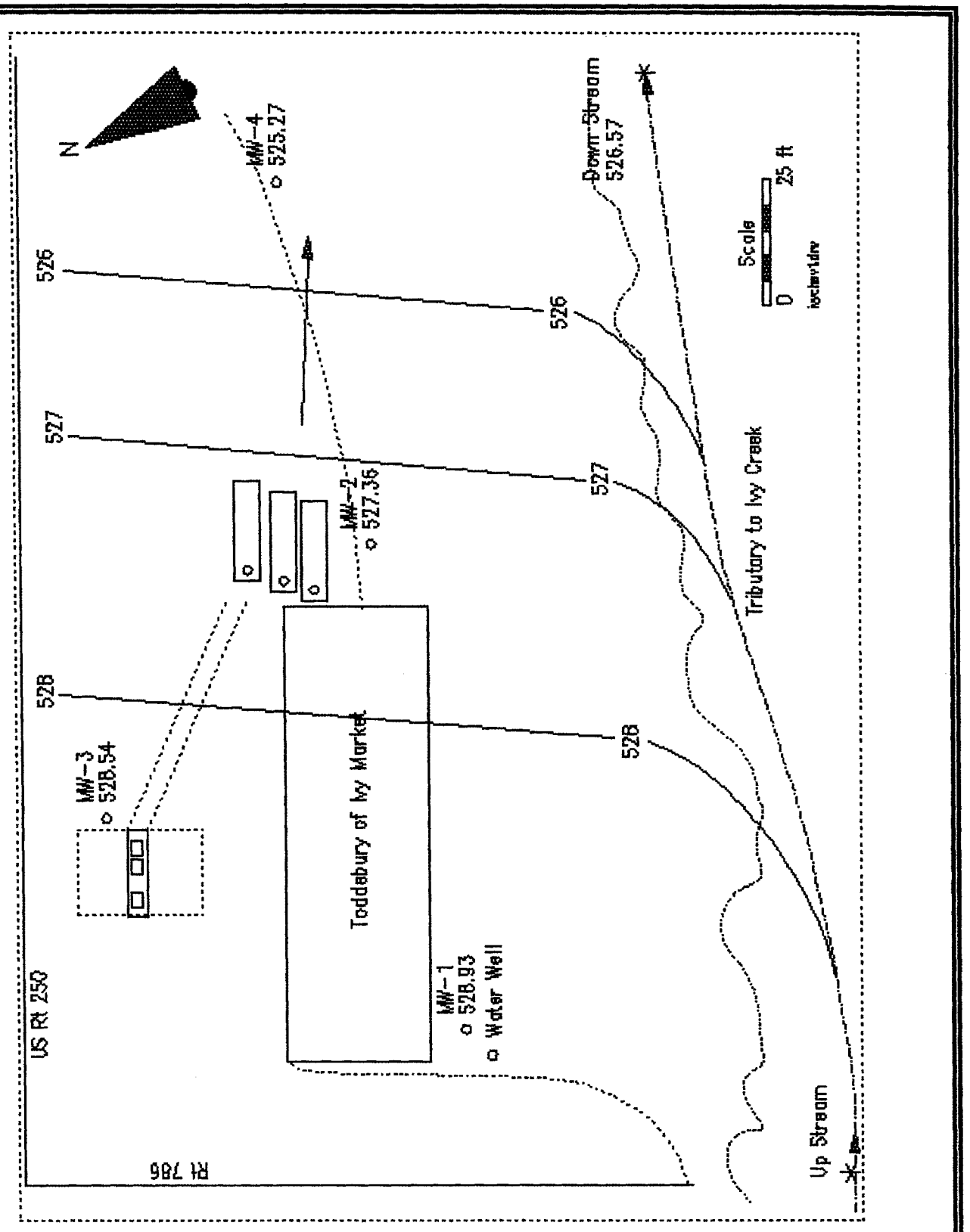
The letter from Joel P. Maynard dated January 28, 2002 called for sampling and analysis of all four monitoring wells and the onsite water supply well. A mistake during field collection erroneously omitted the sampling of MW-1, MW-2, MW-3, and the onsite water well. This SCRA thus combines the data for MW-4 and Little Ivy Creek with the data collected on November 29, 2001.

4.0 GROUNDWATER FLOW DIRECTION

The results of the water table measurements are presented in Figure 4. The data for March 15, 2002 confirm the finding in the SCR that the groundwater flow is toward the east southeast at about the same gradient.

5.0 LABORATORY ANALYTICAL RESULTS

The results of the groundwater analyses are summarized in Table 1 and reported in Appendix B. Figures 5 and 6 show the extent of dissolved benzene and MTBE, respectively. The full laboratory report is presented in Appendix B.



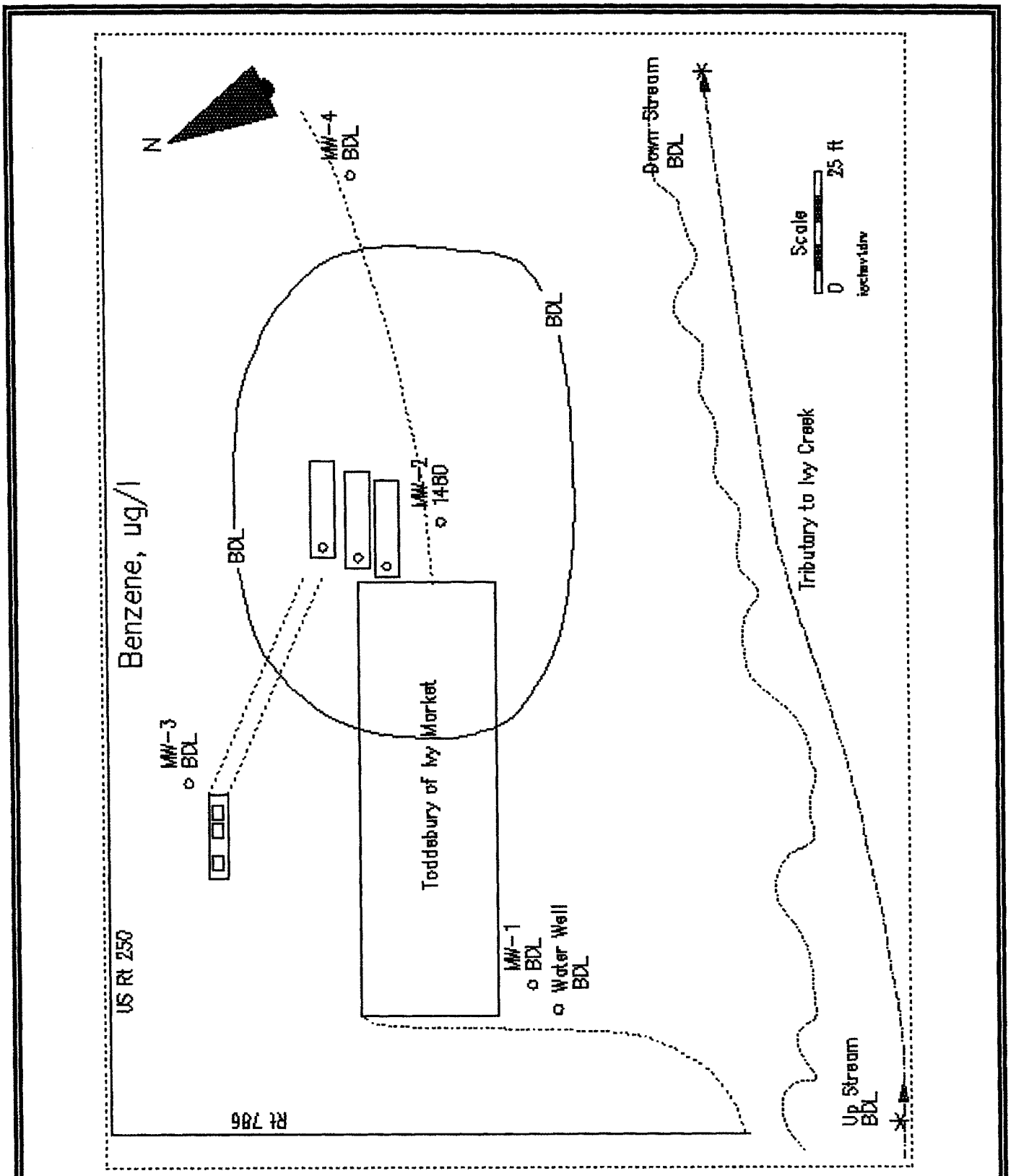
Jeffrey A. Sitler - Environmental Services, Inc. PO Box 6038 Charlottesville, VA 22906 (804)974-7080 - (804)974-1657 (FAX)	Date:	Revised:
	Drawn by: LRS	Checked by:
	File:	Scale:

Figure 4 - Water Table Elevation as of 03/14/02
Toddsbury of Ivy
Ivy, Virginia

Table 1. Groundwater Analytical Results

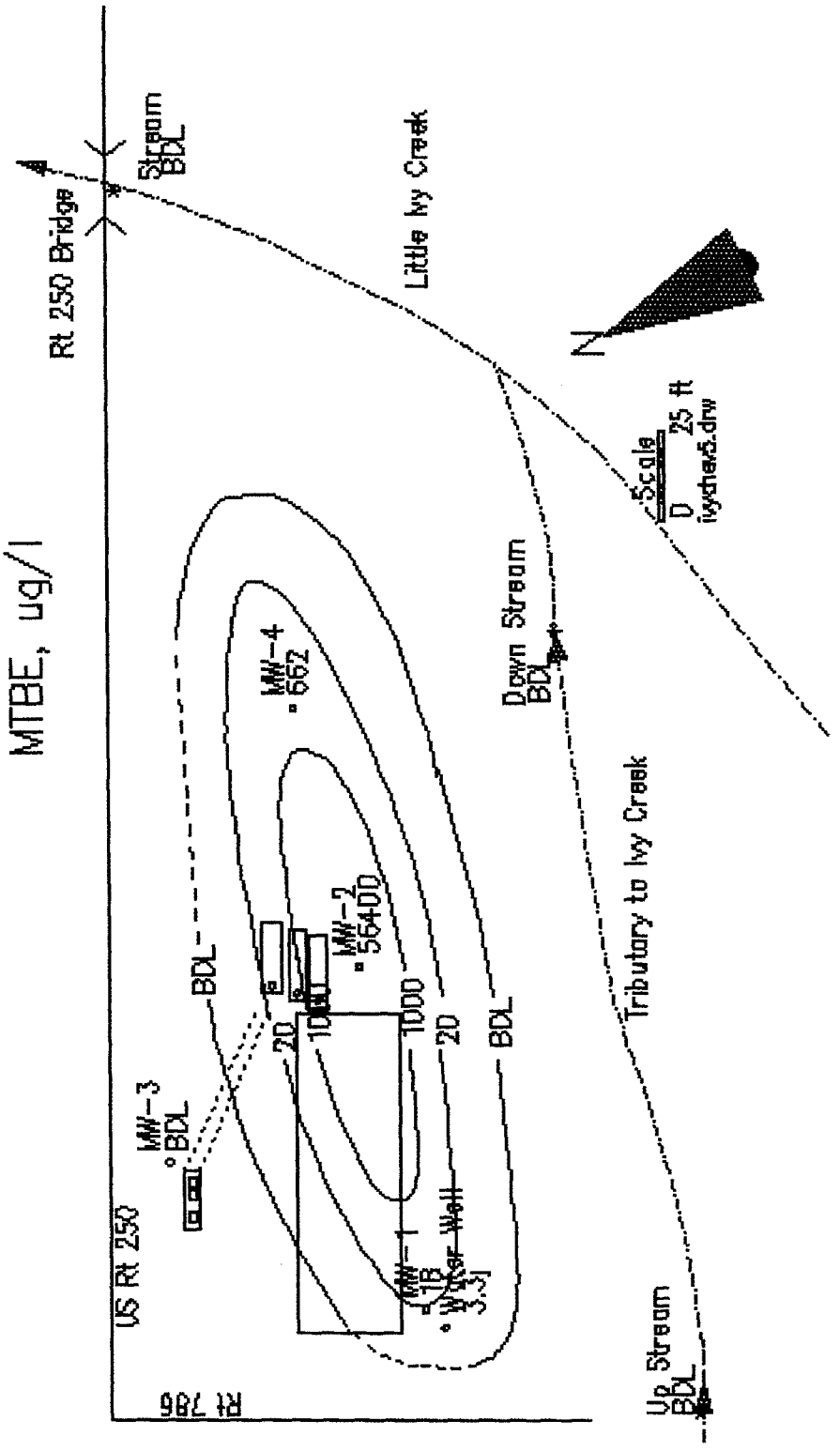
Well No.	Date Sampled	LPH in	TPH-GRO µg/l	Benzene µg/l	Toluene µg/l	Ethyl-Benzene µg/l	Xylenes µg/l	MTBE µg/l
MW-1	11/29/01	0	BDL	BDL	BDL	BDL	BDL	18
MW-2	11/29/01	0	BDL	1480	1420	BDL	900	56400
MW-3	11/29/01	0	BDL	BDL	BDL	BDL	BDL	BDL
MW-4	03/14/02	0	BDL	BDL	BDL	BDL	BDL	662
Onsite Water Well	11/29/01	0	BDL	BDL	BDL	BDL	BDL	3.3j
Up Stream	11/29/01		BDL	BDL	BDL	BDL	BDL	BDL
Down Stream	11/29/01		BDL	BDL	BDL	BDL	BDL	BDL
Rt 250 Bridge	03/14/02		BDL	BDL	BDL	BDL	BDL	BDL

Notes: ND - Not Determined
µg/kg - Micrograms Per Kilogram
BDL - Below Detection Limit
LPH - Liquid Petroleum Hydrocarbon
j - Estimated value
NA - Not applicable



Jeffrey A. Sitler - Environmental Services, Inc. PO Box 6038 Charlottesville, VA 22906 (804)974-7080 - (804)974-1657 (FAX)	Date: / Revised: Drawn by: LRS / Checked by: File: / Scale:

Figure 5 - Benzene in Groundwater, μg/l, 11/29/01 & 03/14/02 Toddsbury of Ivy



Jeffrey A. Sitler - Environmental Services, Inc. PO Box 6038 Charlottesville, VA 22906 (804)974-7080 - (804)974-1657 (FAX)	Date:	Revised:
	Drawn by: LRS	Checked by:
	File:	Scale:

Figure 6 - MTBE in Groundwater, μg/l, 11/29/01 & 03/14/02 Toddsbury of Ivy

Based on Figures 5 and 6, the major dissolved contamination at the Site is limited to the vicinity of the gasoline UST basin. Dissolved benzene was found at 1,480 μg/l and MTBE was at 56,400 μg/l in MW-2. By the time the contamination reaches MW-1 and the onsite water well, benzene becomes undetectable, and MTBE dropped to 18 μg/l and an estimated 3.3 μg/l, respectively.

Toward the east, benzene was not detected in MW-4, although MTBE was detected at 662 μg/l. However, none of the stream samples have any detectable contamination. These new data provide fairly conclusive data concerning the extent of groundwater contamination as depicted in Figures 5 and 6.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The conclusions from the SCR remain unchanged in the SCRA. The Site had a release of gasoline from the UST system that resulted in groundwater contamination with benzene, toluene, and MTBE. No LPH has been observed at the Site, even though the MTBE level is quite high in MW-2. Groundwater flow is toward the southeast with discharge into Little Ivy Creek. Some groundwater from the Site also discharges into the small tributary on the south boundary of the Site. However, as confirmed by the results of sampling, predicted dilution rates in the surface water would render contaminants undetectable. The potential exposure pathway is via the onsite water supply well. However, it has been determined that the well is not used for drinking water. The MTBE is predicted not to present any concern in the well into the future unless there is an intensification of the source. The other gasoline contaminants also are predicted not to present any concern for the water well at this time.

It is recommended that quarterly monitoring be conducted for the four monitoring wells, the onsite water well, and the stream at the Rt 250 bridge to monitor the benzene and MTBE plumes.

APPENDIX A

WELL DATA SPREADSHEET
AND
BORING/WELL LOG FOR MW-4

Toddsbury of Ivy
Monitoring Well Data

	MW-1	MW-2	MW-3	Stream	03/17/02 MW-4
Installation Date	11/28/01	11/28/01	11/28/01		02/12/02
Helgth of Scope above TOC, ft					5.00
Height of Scope at Rod, ft	4.23	3.90	3.42	12.66	5.57
Total depth of well, ft	*15.00*	*15.00*	*12.00*		*20.00*
Elevation of TOC Relative Local Datum, ft	535.00	535.33	535.81	526.57	534.76
Water Table Depth below TOC, 11/29/01, ft	6.59	8.52	7.70	0.00	
Elevation of Water Table, ft	528.41	526.81	528.11	526.57	
Water Table Depth below TOC, 3/14/00, ft	6.07	7.97	7.27		9.49
Elevation of Water Table, ft	528.93	527.36	528.54	526.57	525.27

Boring/Well Log

Project: Toddsbury of Ivy	
Log of Boring: MW-4	Location: Ivy, VA
Date Drilled: 02/12/02	Ground Surface Elevation: 535 ft
Drilling Method: Hollow Stem Auger	Total Depth: 20 ft
Drilling Company: Certified Environmental Drilling	Geologist: Lyle R. Silka, CPG
VA DEQ PC 01-6134	Weather: Warm and Sunny

Depth (ft)	Sample Number			Geologic Description
0-5				red-brown clayey silt, moist to dry, no gas odor
5-10				same, cobble layer, moist, no gas odor
10-15				same, moist to wet, slight gas odor
15-20				same, moist to wet, slight gas odor
20				total depth
				2" casing set from 0 to 5 feet.
				2" screen set from 5 to 15 feet.

APPENDIX B

LABORATORY REPORT

MARYLAND SPECTRAL SERVICES, INC.
1500 Caton Center Drive Baltimore, MD 21227

VOLATILE AROMATICS BY EPA METHODS 5030/8021
VOLATILE TPH BY EPA METHODS 5030/8015

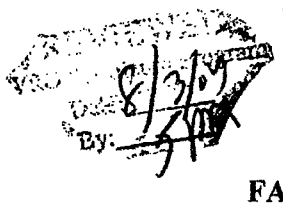
CLIENT SAMPLE ID:	MW-4 TODDSBURY-IVY	STREAM TODDSBURY-IVY	BBLK0321D2
LAB SAMPLE ID:	02032012	02032013	METHOD BLANK
SAMPLE DATE:	03/14/02	03/14/02	
RECEIVED DATE:	03/20/02	03/20/02	
ANALYSIS DATE:	03/21/02	03/21/02	03/21/02
FILE NAME:	032012D	032013	0321BBLKD2
INSTRUMENT ID:	GC-D	GC-D	GC-D
MATRIX:	WATER	WATER	WATER
UNITS:	UG/L	UG/L	UG/L
DILUTION FACTOR:	2.0	1.0	1.0
VOLATILE COMPOUNDS			
Benzene	4.0 U	2.0 U	2.0 U
Toluene	4.0 U	2.0 U	2.0 U
Ethylbenzene	4.0 U	2.0 U	2.0 U
Xylenes (total)	8.0 U	4.0 U	4.0 U
Methyl-t-Butyl Ether	662	4.0 U	4.0 U
Volatile TPH	200 U	100 U	100 U

Toddsbury of Ivy SCR - PC 01-6134

Company Name:	Project Manager:	no.	Parameters						CHAIN-OF CUSTODY RECORD
JAS Environmental Services, Inc. PO Box 6038 Charlottesville, VA 22906	**Jeff Sitler** tel (804)974-7080 fax (804)974-1657	of c o n t a i n e r	TPH GRO EPA-5035-8015	TPH DRO EPA-8015	MBTEX EPA-5035-8021	PAH EPA-8270	MBTEX EPA-5035-8021		Laboratory: **Maryland Spectral Services, Inc.** **1500 Caton Center Drive, Suite G** **Baltimore, Maryland 21227** **(410) 247-7600**
Project Name: Toddsbury of Ivy	Project Number:								
Sampler(s): **LRS**	Task Number:								

	Date	Time	Matrix									
MW-4	3/14/02	1045	W	2	X		X					01-6290-12
Stream at Bridge	3/14/02	1100	W	2	X		X					13

Lyle R. Silka (printed)	3/17/02 1200	**Federal Express** (printed)	**Send report to: Lyle Silka** **PO Box 1283** **Haymarket, VA 20168** **Fax summary of results to Lyle Silka at (703)**
Relinquished by: (signature)	Date/Time 3/20/02 1150	Received by: (signature)	**Bill:** JAS
(printed)		(printed)	



CORRECTIVE ACTION PLAN
TODDSBURY OF IVY
Albemarle County

PC # 01-6134
FAC ID # _____ *(for VDEQ Use)*

Submitted to:

Joel P. Maynard
Valley Regional Office
Department of Environmental Quality
PO Box 3000
Harrisonburg, VA 22801-1129
(540)574-7800

Prepared for:

Charlottesville Oil Company
PO Box 6340
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Prepared by:

Jeffrey A. Sitler Environmental Service, Inc.
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(434)974-7080 fax (434)974-1657

June 8, 2004

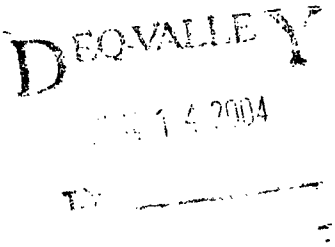


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Appendix A CAP Summary Worksheet
Appendix B Public Notice

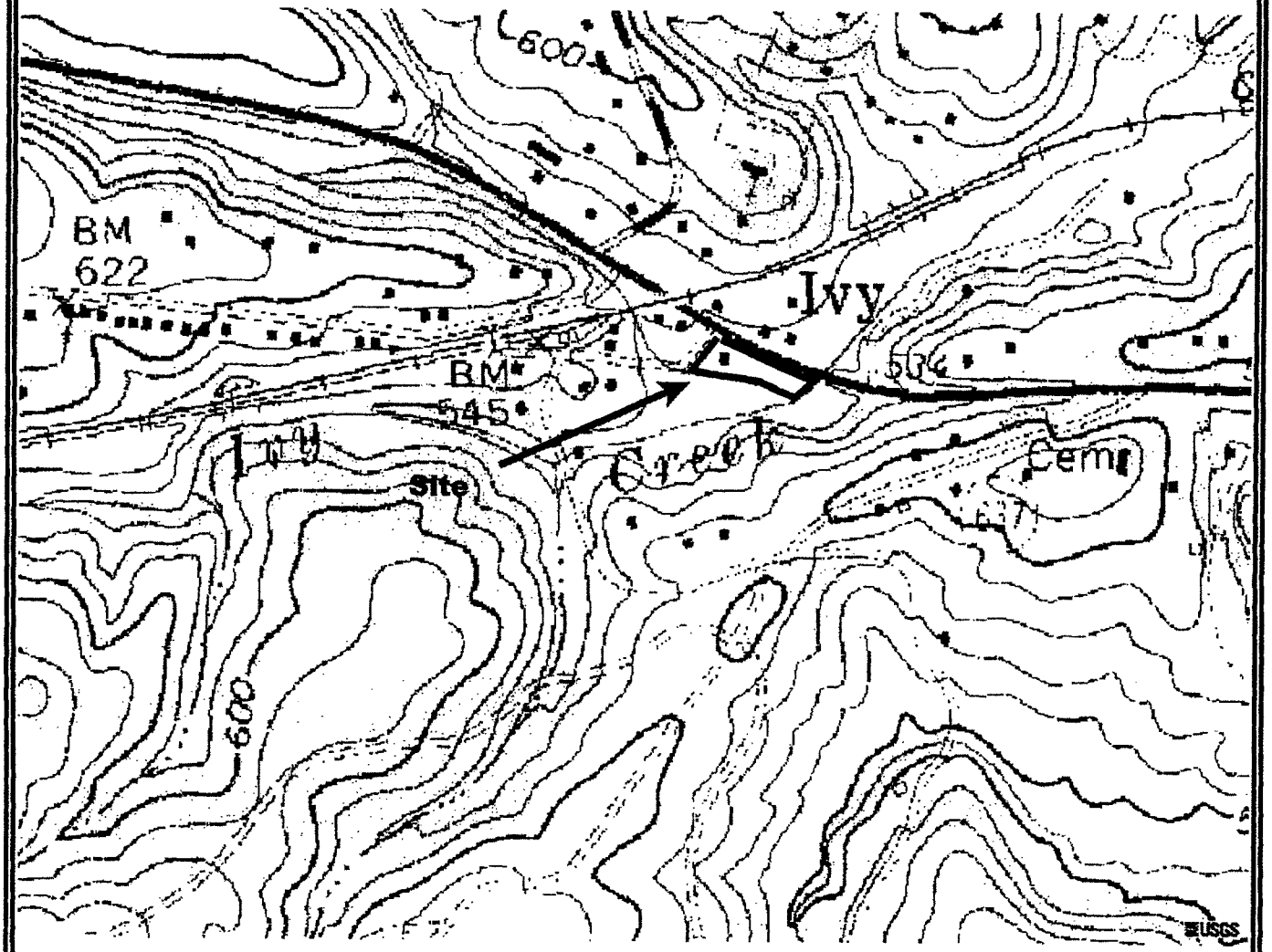
1.0 INTRODUCTION

Jeffrey A. Sitler Environmental Services, Inc., (JAS) was contracted by Charlottesville Oil Company, to prepare a Corrective Action Plan (CAP) for the property known as Toddsbury of Ivy Market located on US Route 250 in Ivy, Virginia, in Albemarle County as shown in Figure 1. Figure 2 is an enlargement of the 1996 USGS aerial photograph for the vicinity of the Site. This CAP has been prepared based on information provided in the Site Characterization Report (SCR) dated January 3, 2002, SCR Addendum (SCRA) dated April 18, 2002, and seven post-SCR monitoring reports. This CAP is designed to address the issues identified in the March 10, 2004 letter addressed to Mr. Mike Jones of Charlottesville Oil Company from Joel P. Maynard, Senior Geologist with the Virginia Department of Environmental Quality's (DEQ) Valley Regional Office in Harrisonburg, Virginia.

1.1 Previous Investigations

The following is a summary of the findings for the Site:

1. High concentrations of MBTEX are present in the shallow groundwater, emanating from the region of the gasoline tank basin and migrating eastward and discharging into Little Ivy Creek. For the latest monitoring event, benzene was 4,400 μg/l, and MTBE was 3,980 μg/l.
2. Free product has been observed near the source in the form of sheen and drops in MW-2. Based on those observations and the high dissolved concentrations, it is hypothesized that there is a lens of free product located near the tank basin or just down gradient.
3. The onsite water supply well has remained contaminated with a low concentration of MTBE that has hovered around 4.0 μg/l.
4. In 3.5 years of monitoring, the dissolved concentrations in the source area have not diminished appreciably and concentrations have increased down gradient.



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Date:	Revised:
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Figure 1 - Site location on topographic map Toddsbury of Ivy

Maryland spectral Services

Analytical Chemistry Services

Analytical Results

1500 Caton Center Dr Suite G
Baltimore MD 21227
410-247-7600
www.mdspectral.com
VELAP ID 460040

Project: Toddsbury of Ivy

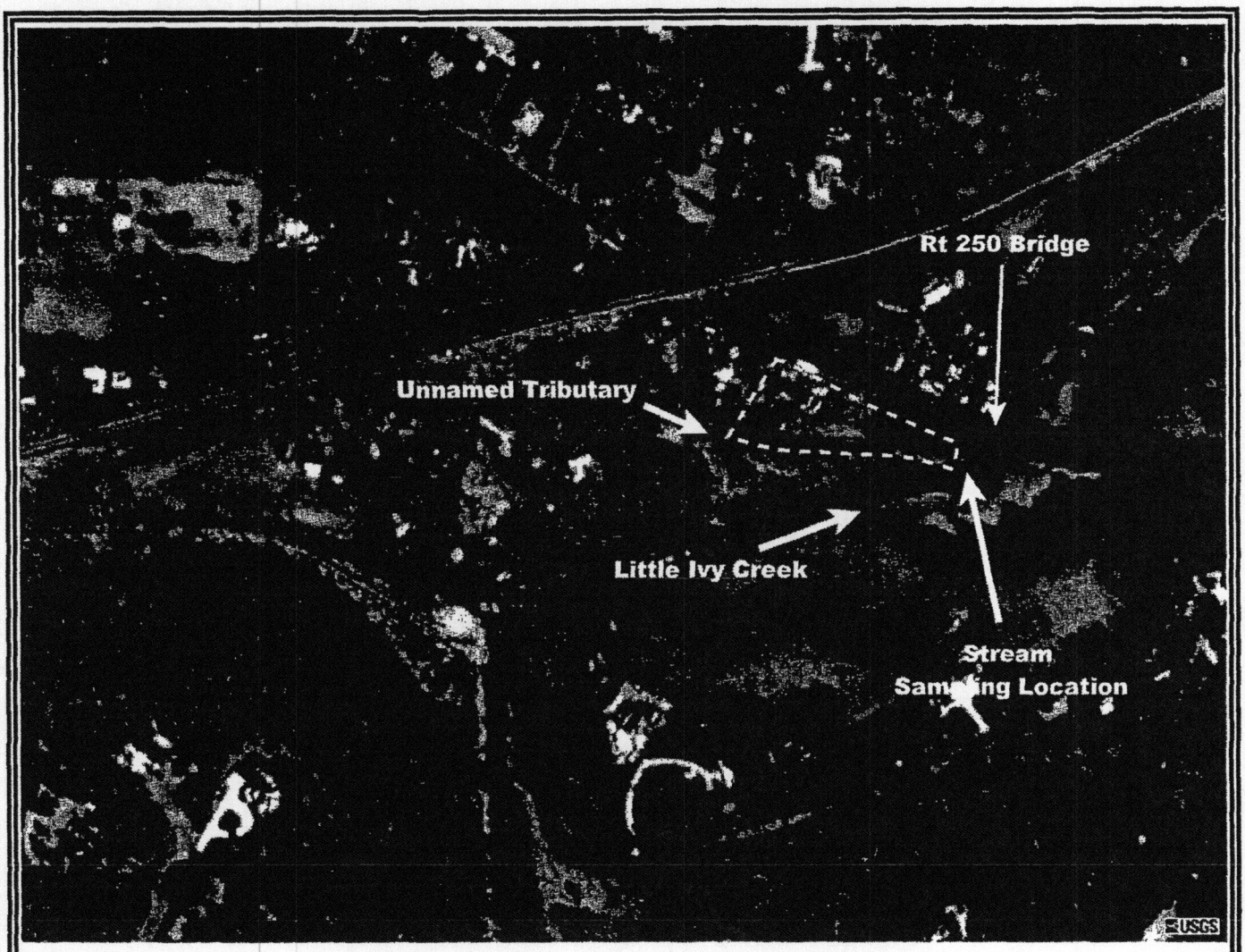
Project Number: N/A

Project Manager: Jeff Sitler

Report Issued: 02/26/13 18:11

JAS Environmental Services
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Charlottesville VA, 22906

CLIENT SAMPLE ID:		MW-2	MW-4	MW-6	WW
LAB SAMPLE ID:		3022102-01	3022102-02	3022102-03	3022102-04
SAMPLE DATE:		02/19/13	02/19/13	02/19/13	02/19/13
RECEIVED DATE:		02/21/13	02/21/13	02/21/13	02/21/13
MATRIX	Units	Nonpotable Water	Nonpotable Water	Nonpotable Water	Potable Water
VOLATILE ORGANICS BY EPA METHOD 8021B (Water)					
Benzene	ug/L	<2.0	<2.0	<2.0	
Toluene	ug/L	<2.0	<2.0	<2.0	
Ethylbenzene	ug/L	<2.0	<2.0	<2.0	
Xylenes, Total	ug/L	<4.0	<4.0	<4.0	
Methyl tert-butyl ether (MTBE)	ug/L	<2.0	2.0	4.9	



Scale

0 200 ft

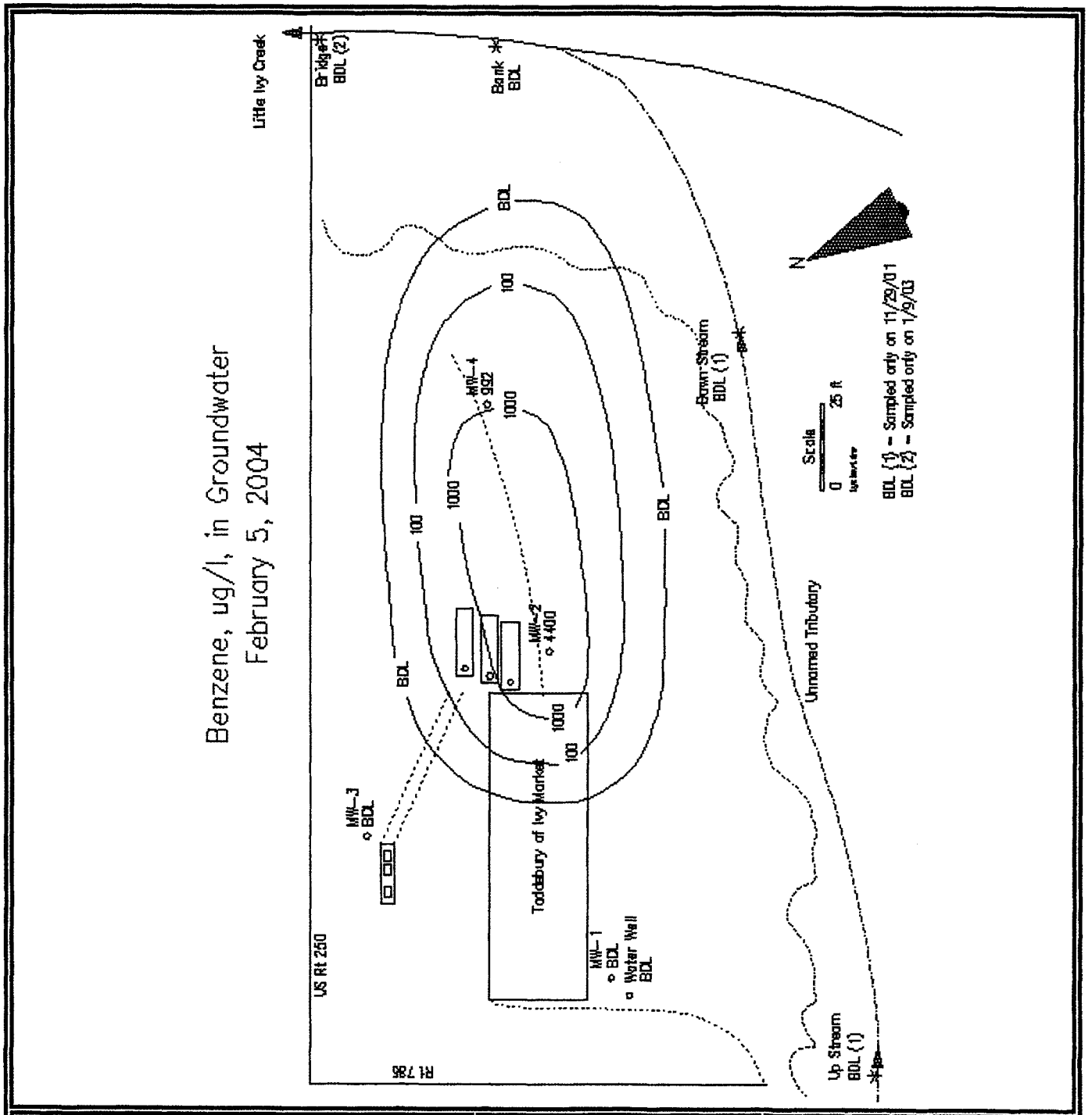
Jeffrey A. Sitler - Environmental Services, Inc. PO Box 6038 Charlottesville, VA 22906 (804)974-7080 - (804)974-1657 (FAX)	Date:	Revised:	Figure 2 - 1994 USGS Aerial Photograph Showing Streams and Rt 250 Bridge Toddsbury of Ivy
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1.2 Estimated Quantities of Contaminant in Each Phase

Liquid Phase. There is a hypothesized layer of liquid, or free-phase gasoline floating on the water table. The layer of gasoline may be less than one-fourth inch thick, but probably is thicker than a sheen. The area with free-phase gasoline probably is less than 20 to 30 feet across. In order to create the observed plume of dissolved gasoline, it is estimated that the liquid phase originally contained on the order of 50 gallons of gasoline. This estimate is based on the fact that the release has been losing an estimated 2.0 gallons of gasoline per year (see "Dissolved Phase" section below). Thus, if the release is 20 years old, the source would have involved at least 40 gallons. In the SCR, it was concluded that if the source disappeared, it would take two years for MTBE to flush out of the shallow aquifer. The SCR was published more than two years ago and MTBE is still at a relatively high concentration. However, with the continuous flushing of contamination out of the aquifer, the current liquid phase probably contains on the order of five or ten gallons of gasoline.

Adsorbed Phase. There is a thin unsaturated zone that is about seven feet thick that may have gasoline adsorbed and suspended within the pore space. This adsorbed contamination is limited to the immediate vicinity of the tank basin and to the area of the liquid-phase gasoline. It is estimated that the adsorbed phase contains on the order of five gallons of gasoline.

Dissolved Phase. There is a plume of contaminated groundwater with an approximate width of 75 feet and a length of 125 feet. The highest TPH-GRO concentration was reported in April of 2003 at 64.2 mg/l (64,200 μg/l). Figure 3 shows the extent of the dissolved plume in the groundwater as dissolved benzene concentration contours. Figure 4 shows the worksheet used to estimate the log average concentration, volume of the plume, and volume of gasoline dissolved in the plume. The gasoline dissolved in the plume is estimated to be 1.3 gallons. An estimate of the volume of gasoline moving through the groundwater each year is estimated using the Darcy groundwater flow equation ($q=KAi$), where K is the average hydraulic conductivity of 23 feet per day, A is the aquifer cross-sectional area to groundwater flow in the plume of 75 feet wide by 10 feet thick, and i is the average hydraulic gradient of 0.2.



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Figure 3 - Benzene in groundwater
Toddsbury of Ivy

Estimation of the Volume of Dissolved Fuel in Plume

Parameter		Value	Unit
Maximum Concentration	TPH-GRO	64.2	mg/l
Log Max Conc		1.81	
Minimum Concentration		0.1	mg/l
Log Min Conc		-1.00	
Log Average Conc		2.5	mg/l
Area of Plume		9375	feet
Thickness of Plume		30	feet
Volume of Aquifer		281,250	cubic feet
Porosity		0.25	
Volume of Plume		525,938	gallon
Volume of Contaminant in Plume		1.33	gallon

Area of Plume	9,375	square feet
Recharge	0.58	feet per year
Volume of Recharge	5,469	cubic feet
	40,906	gallons
Contaminated Water to Recharge	13	
hydraulic gradient	0.02	
hydraulic conductivity	23	feet per day
vertical cross section to flow	750	sq feet
groundwater flow volume	345	cfd
	125,925	cfy
	941,919	gallons
gas removed by groundwater flow	2	gallons per year

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Figure 4 - Estimation of Gasoline in Groundwater

At the bottom of Figure 4, these values produce an estimate of two gallons of gasoline moving through the shallow aquifer each year. Thus, there is a source of gasoline that adds two gallons of gasoline per year to the shallow aquifer.

The gasoline contamination has been estimated to be distributed amongst the three phases as summarized in the following table. Based on this analysis, it is apparent that the primary source of contamination has been the free-phase gasoline.

Table 1. Distribution of Gasoline Amongst Three Phases.

Phase	Original Volume in Gallons	Current Volume in Gallons	Original Percent of Total
Free Phase	50	5	81
Adsorbed Phase	10	5	16
Dissolved Phase	2	2	3
Total	62	12	100

1.3 Previous Remedial Efforts

No remediation activities have been conducted at the Site.

1.4 CAP Objectives

This CAP is designed to address the dissolved-phase plume, any free-phase gasoline floating on the water table, and, as a spinoff, the adsorbed-phase gasoline associated with the free-phase gasoline. The following objectives are proposed for the CAP.

1. Develop a zone of capture that will encompass contaminated groundwater in the area of MW-2 and MW-4 to accelerate the removal of free-phase gasoline.

2. Reduce the concentration of MTBE in the onsite water well to below the detection limit.

The CAP has been prepared in accordance with VR680-13-02 and guidance documents published by the DEQ. Section 2.0 discusses the hydrogeology and remedial design. Section 3.0 details the selected remedial design for the Site. Schedules for operations and monitoring, numerical end points, waste disposal, and reporting requirements are described in Section 4.0. The CAP Summary Worksheet is presented in Appendix A, and a copy of the Public Notice is included in Appendix B.

2.0 REMEDIAL DESIGN

The remedial design is for a total fluids pumping system installed in MW-2 and MW-4 that pumps 120 gallons per day.

2.1 Aquifer Characteristics

The Site is underlain by 12 to 15 feet of red-brown clayey silt to silt soil with cobbles in the lower depths. It is not known whether the soil represents a saprolite or a reworked floodplain sediment. Underlying the soil is indurated bedrock. At MW-2, the depth to the water table has remained close to 7.0 feet below the surface. During drilling of MW-2, hard bedrock was encountered at 15 feet. Thus, the shallow aquifer is eight feet thick in the vicinity of MW-2. The SCR estimate for hydraulic conductivity was between 14 and 32 feet per day. The result of the pumping test on MW-2 indicated a hydraulic conductivity of 1.0 feet per day. Pumping of MW-2 was able to achieve 60 gallons per day.

The natural groundwater flow direction is eastward with discharge in Little Ivy Creek. Under natural conditions, the contamination remains in the shallow groundwater, since the area is in the discharge zone with upward flowing groundwater. However, the onsite water well that is completed in the fractured bedrock creates downward flow lines when it is pumping. Even so, there is relatively little contamination in the fractured bedrock due to the fact that the bedrock contains so little pore space, on the order of a few percent. Since the free-phase gasoline floats on the water table, no free-phase gasoline will occur in the deeper fractured aquifer.

2.2 Zone of Capture

The zone of capture for pumping the two-inch diameter monitoring wells will have the estimated values over time shown in Table 2. These estimates use an aquifer porosity of 20% and a pumping rate of 60 gallons per day.

Table 2. Estimated Radius of Capture per Two-Inch Well

Time, days	Radius, feet	Volume pumped, gallons
60	10	3600
180	18	10800
365	26	21900
730	36	43800

2.3 Water Quality Characteristics for Recovered Groundwater

Since there is a significant plume of dissolved gasoline near MW-2, it is predicted that MW-2 will produce water having maximum dissolved concentrations that approach those shown in Table 2. These concentrations were observed during the pump test on MW-2 completed in mid-2003. MW-4 produces groundwater with somewhat less concentration than MW-2 as shown in Table 2.

Table 3. Highest Observed Concentrations at Proposed Recovery Wells and Predicted Discharge and Treated Discharge Concentrations

Well No.	TPH-GRO µg/l	Benzene µg/l	Toluene µg/l	Ethyl-Benzene µg/l	Xylenes µg/l	MTBE µg/l
MW-2	95,300	4,500	1,950	470	2,780	89,500
MW-4	3,120	992	42	275	552	6,700

The estimation of concentrations in the discharge from the groundwater recovery system has been evaluated by using an analytical solution developed by Jacob Bear.[1] [2] The Bear model, as modified by Silka, assumes that the well is pumping from an isotropic homogeneous aquifer and draws in a cylindrical plume of a specified radius and thickness with its center initially at a certain distance from the pumping well. The Bear model also assumes that the source is not continuous. The cylindrical plume can be assigned a thickness of uniform concentration, and the well can draw groundwater from a different aquifer thickness. The Lotus 1-2-3 spreadsheet showing the results of the calculation of the Bear model is presented in the appendix. The input parameters for the Bear model are:

1. Plume uniform concentration of each constituent is estimated as the following log average: $10^{[\{\log(\text{highest concentration})+\log(\text{detection limit})\}/2]}$

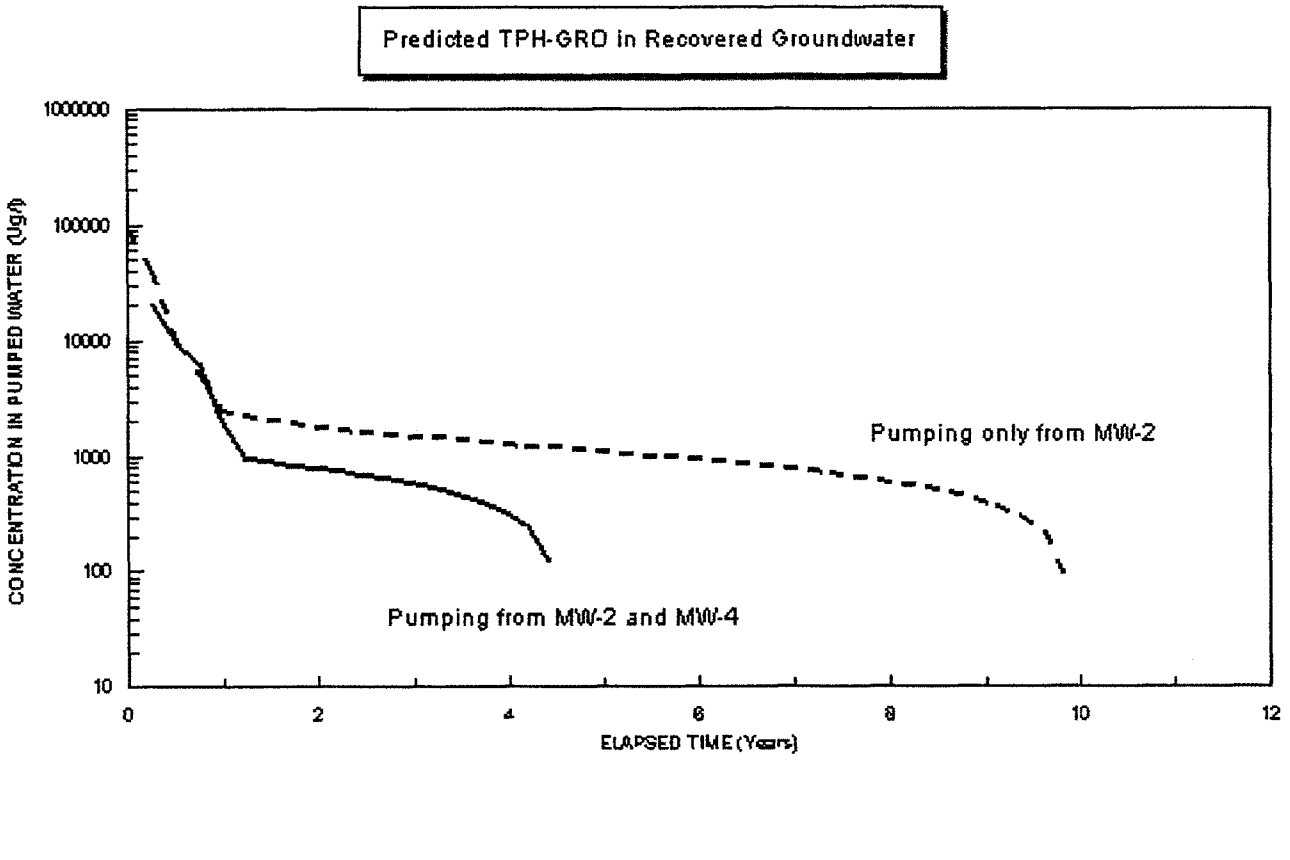
   The highest concentration of TPH-GRO in MW-2 is 90,000 μg/l. The lowest concentration is the detection limit of 100 μg/l for TPH-GRO.
2. Plume radius is 50 feet when only MW-2 is pumping and 25 feet when both MW-2 and MW-4 are pumping.
3. Plume thickness is 7.0 feet.
4. Distance from the center of the plume to the onsite well is 25 feet.
5. Aquifer thickness (the saturated length of the water well) is assumed to be 7.0 feet.
6. Specific yield is 0.2.
7. Average pumping rate is 60 gpd per well.
5. Retardation factor is 1.2. This is conservative since 90% of the TPH-GRO is attributable to MTBE and the weighted average retardation factor is 1.1.
6. No biodegradation.

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1 Bear, Jacob, 1979, Groundwater Hydraulics, McGraw-Hill, New York, pp. 290-292)

2 Silka, Lyle R., 1987, Predicting Plume Characteristics from Pumping Well Concentrations Using a One-Dimensional Analytical Solution, Proc. of the Conference on Northwestern Groundwater Issues, National Ground Water Association, Dublin, OH, pp. 329-347.

Figure 5 shows the results of the model prediction for the concentrations in MW-2 when either MW-2 is the only pumped well or when both MW-2 and MW-4 are pumped together. It is predicted that pumping from both wells accelerates the cleanup of the aquifer by more than a factor of two. This figure assumes that the free-phase gasoline ceases to be a source quickly.



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Figure 5 - Estimated TPH-GRO Concentration in MW-2 Discharge for Two Cases

3.0 REMEDIATION SYSTEM DESIGN

3.1 Remediation System Design

The remediation system has the following objectives.

I. Recover free-phase gasoline from the water table.

II. Prevent further migration of contaminated groundwater.

III. Recover dissolved-phase gasoline from groundwater.

IV. Reduce dissolved contamination in the onsite water well to below detection limits.

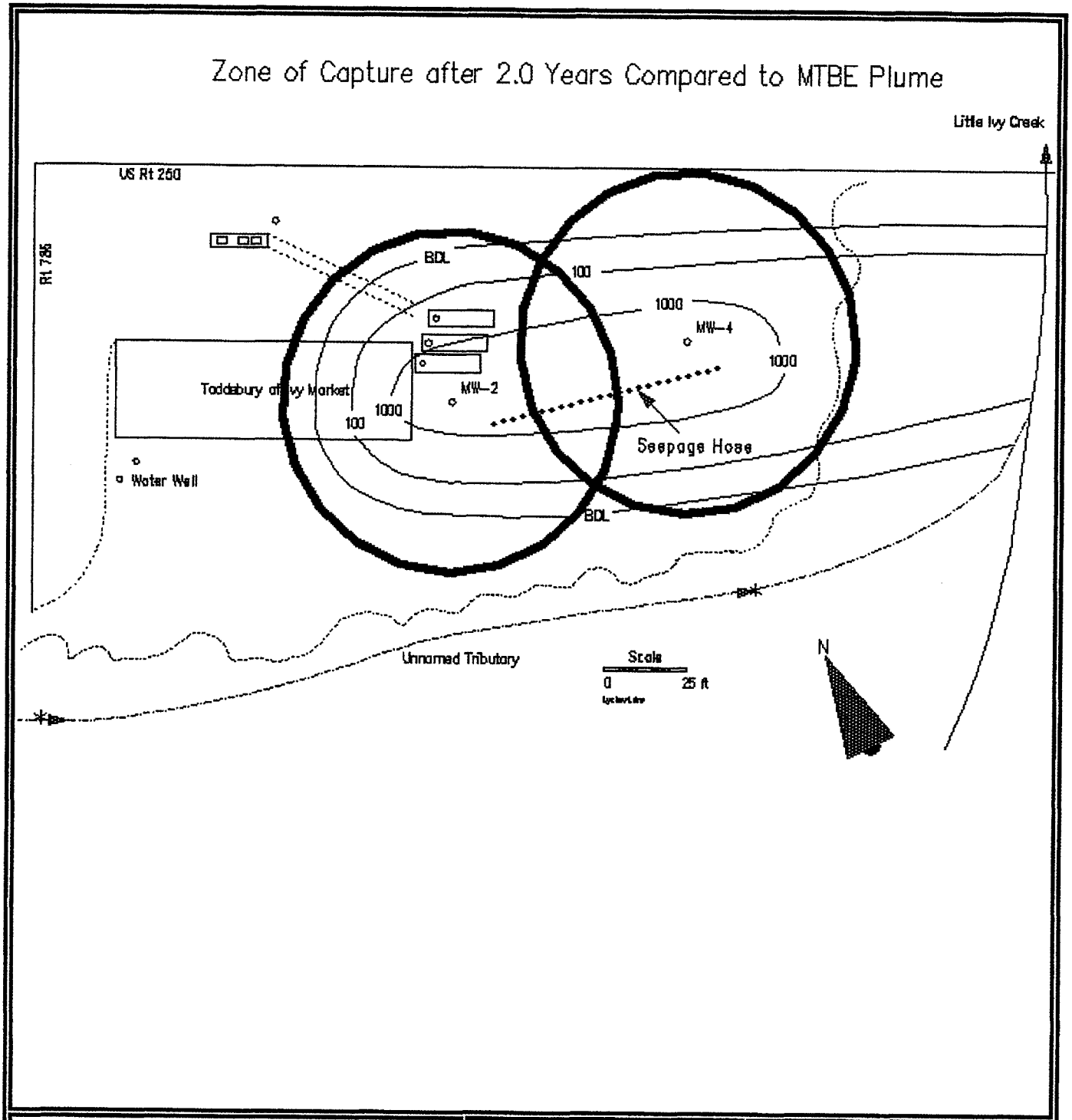
3.2 Water Treatment System

Discharge from the recovery system will be pumped to a 300-gallon polytank. The tank will be fitted with a 110-volt aerator that puts out about 7.0 cfm through a large air diffuser. With a pumping rate of 120 gallons per day, the residence time in the holding tank will be approximately 24 hours. This system has been found to attain up to 90% removal of volatile organics.

The tank will be fitted with a passive drain that will allow water from the bottom of the tank to drain out to a seepage hose. The drain will have an anti-syphon device. As water is pumped into the tank, when the water level in the tank reaches the outflow level of the drain, the water from the bottom of the tank will flow out the tank. In this manner, any free-phase gasoline that is collected in the tank will be trapped within the tank and cannot be discharged. The discharge of the water on the ground will allow natural biodegradation and evaporation to further treat the water. The seepage hose will be moved around to prevent water logging and also to prevent the infiltration of the water to reduce the effective growth of the zone of capture.

3.3 Treated Groundwater Discharge

Groundwater from the aerated holding tank will be passively drained to an infiltration hose that will overly the plume of contaminated groundwater. The discharge will be through a 50-foot-long, three-fourth-inch diameter seepage hose. Figure 6 shows the location of the seepage hose along the fence line next to MW-2 and MW-4.



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Date:	Revised:
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Figure 6 - Zone of Capture after Two Years and Seepage Hose Location.

3.4 Pumping Equipment

The monitoring wells will be pumped using Weldon air-diaphragm pumps capable of pumping between 1.0 and 10 gpm. The air-diaphragm pumps are driven by compressed air from a small electric air compressor. The air-diaphragm pumps are equipped with Viton diaphragms designed for pumping gasoline. The holding tank, pumps, and air compressor will be mounted on a small trailer behind the fence next to the MW-2 and MW-4. The pumps will have an intake hose run out to each well where a fitting will attach the hose to the two-inch PVC well casing. A riser will be inserted into each well to pump in groundwater from near the bottom of each well to maximize drawdown. The two pumps will be installed inside a weatherproof box on the trailer. Electrical service will be obtained from the existing service in the market by running a contractor-grade 12-AWG UL extension cord from the market to the trailer.

4.0 SYSTEM OPERATION AND MONITORING

4.1 Operation Schedule

The operation schedule has been developed to ensure continuous system operation, verify compliance with applicable discharge requirements, and track system efficiency and effectiveness. Table 4 summarizes the operation schedule for the system components to be implemented at the Site.

Table 4. Operation Schedule

Component	Estimated Operation	Comments
Free-phase gasoline and groundwater recovery	4.5 years	Monitor production for significant decline and determine necessary operation change.
Groundwater Treatment	4.5 years	Monitor operation, replace air compressors as needed.

The monitoring schedule is shown in Table 5. Routine monitoring of system performance and compliance with requirements will ensure that the system is operating at optimum effectiveness.

Table 5. Monitoring Schedule		
Component	Estimated Operation	Comments
Free-phase gasoline recovery	Semi-monthly check	Record accumulated volume
Groundwater recovery	Semi-monthly check	Confirm flow rates, record total volume pumped
	Quarterly sampling of effluent.	Effluent water analysis to include BTEX + MTBE (8020) and TPH-GRO (8015).
Groundwater Treatment	Semi-monthly check	Check aeration tank for iron or biofouling. Clean out sediment as needed. Check anti-syphon passive drain for proper functioning
	Quarterly sampling of monitoring wells and water supply wells	Water analysis to include BTEX + MTBE (8020) and TPH-GRO (8015).

4.2 Numerical Remedial End Points

The groundwater remediation program is designed to remediate the Site and decrease contaminant concentrations over time. The longer the remediation is conducted, the greater the decrease of contaminants in groundwater. While the MCL for benzene is 5.0 ug/l, the Commonwealth of Virginia has a zero-tolerance policy for gasoline contaminants, especially benzene, in drinking water. However, it is questionable whether zero concentration is achievable within a reasonable time frame and cost. In addition, it is often the case that a remediation system will reach a point of diminishing return when the concentrations will reach a plateau where there are no further decreases in concentration (asymptotic concentration). This plateau occurs when the amount of contaminants being added to the groundwater equals the amount of contaminants being removed by the recovery wells. The sources of the contaminants being added to the groundwater include contaminants adsorbed to the soil particles that are gradually released to the groundwater, and contaminated groundwater caught in less permeable soil or aquifer zones that slowly is released to the groundwater flowing through the higher permeability fractures (this is referred to as "dual porosity"). In addition, concentrations in pumped water may

approach asymptotes, but upon resting, the concentrations may recover again. Thus, the achievable end point for the remediation system is difficult to determine in advance. However, the goal of the remediation system is to achieve the MCLs.

4.3 Groundwater Discharge

A total of 120 gpd of treated groundwater will be discharged from the system. The discharge of treated groundwater will be made to the seepage hose located over the groundwater plume. Therefore, no direct discharge to surface water will occur from the treatment system, and no discharge permit is required.

4.4 Schedule -Post-Operational

After the proposed numerical end points have been achieved for six consecutive months, the remediation system will be shut down and taken off-line. Groundwater monitoring will be continued on a quarterly basis for one year following the remediation system shut-down. Groundwater samples from all monitoring wells and previously contaminated water supply wells will be analyzed for BTEX plus MTBE. The remediation system will be reactivated if the numerical end points are exceeded at any time during the post-operational phase. The remediation system will be dismantled after the numerical end points have been achieved for four consecutive quarters.

4.5 Implementation Schedule

The main elements of CAP implementation are: mobilization of the system to the site, system start-up and break-in period, monitoring and maintenance, and post-operational monitoring. It is expected that the remediation system can be in operation within 90 days of DEQ authorization. The break-in period is expected to last approximately four weeks. The remediation system is expected to operate for up to 4.5 years.

4.6 Reporting Requirements

Quarterly monitoring reports will be submitted to the DEQ that will include treatment system sampling analysis results, system flow rates and efficiency, and cumulative recovery data for free-phase gasoline and total groundwater pumped.

The fourth quarterly report of each year will also be the annual report that will include an evaluation of CAP effectiveness and its progress in achieving the numerical end points.

4.7 Waste Disposal

No wastes are anticipated to be developed during CAP construction. During operation, if free-phase gasoline is collected, the RECO Biotechnology vacuum truck will be scheduled as required to remove the gasoline for recycling.

4.8 Public Notification

The adjacent landowners will be made aware of the CAP by being provided with a public notice statement. The public notice will not be published in the local paper. A copy of the statement is included in Appendix B.

4.9 Contingency Plan

In the event that proposed numerical end points cannot be achieved using the chosen technology, a contingency plan will be activated. The plan will be based on site-specific conditions and may include actions such as installing additional recovery points or changing recovery rates through flow and pumping schedule adjustments. The remediation system components including pump and air stripping system have been oversized to provide at least a 100 percent increase in designed flow requirements. This expansion capability should enable the system to comply with the contingency requirements.

APPENDIX A

CAP Summary Worksheet

CAP Summary Worksheet

Phase of Contamination	Proposed Cleanup Endpoints	Proposed Monitoring to Achieve Endpoints					System Shutdown	Proposed Post Oper. Monitoring		Close Site or Reactivate System
		Sampling Location	Sampling Frequency & Type	Method of Analysis	Schedule to Achieve Endpoints	Schedule to Maintain Endpoints		Sampling Frequency & Type	Post Oper. Monitoring Schedule	
Free Product - Gasoline	0.01 ft for 6 months if encountered	MW-2 MW-4	Quarterly, probe and bailer	NA	NA	NA		Quarterly, grab	12 months	
Dissolved Product in GW - BTEX & MTBE TPH-GRO	Asymptotic Endpoints	MW-1 MW-2 MW-3 MW-4 Stream WS	Quarterly, grab	BTEX/MTBE by EPA 8020 TPH-GRO by EPA 8015	4.5 years	6 months		Quarterly, grab	12 months	

For VDEQ Use: Comments:

Reviewed by: Date:

APPENDIX B

Public Notice

PUBLIC NOTICE

PROPOSAL TO CLEANUP
AN UNDERGROUND STORAGE TANK (UST) SITE

Released June 10, 2004

There has been a release of petroleum from an underground storage tank system at:

Toddsbury of Ivy Market
Rt 250 West
Ivy, VA
Albemarle County

The Department of Environmental Quality (DEQ) is requiring Charlottesville Oil Company, the owner of the underground storage tanks that were involved in the release, to develop a Corrective Action Plan to address cleanup of gasoline contamination at the Site. The corrective action will consist of the pumping and treatment of contaminated groundwater. If you have any questions regarding the cleanup, please contact:

Lyle R. Silka
Jeffrey A. Sitler Environmental Services Inc.
PO Box 6038
Charlottesville, VA 22906
(703)216-2490

The Corrective Action Plan was submitted to the Valley Regional Office of the DEQ on June 10, 2004. If you would like to review or discuss the proposed Corrective Action Plan with the staff of the DEQ, please feel free to contact Mr. Joel P. Maynard (540)574-7800.

The DEQ Valley Regional Office will consider written comments regarding the proposed Corrective Action Plan until **July 31, 2004** and may decide to hold a public meeting if there is significant public interest. Written comments should be sent to the DEQ at the address listed below. The DEQ requests that all written comments reference the tracking number for this case; PC# 01-6134.

Joel P. Maynard
Storage Tank Program
Department of Environmental Quality
PO Box 3000
Harrisonburg, VA 22801

CAPI Monitoring Report CAPI Subphase No. 24
Toddsbury of Ivy
4297 Ivy Road
Ivy, Virginia 22945
Albemarle County

PC 2001-6134
FAC ID # _____ *(for DEQ use)*

Submitted to:

David A. Fitt
Valley Regional Office
Department of Environmental Quality
PO Box 3000
Harrisonburg, VA 22801
(540)574-7800

Prepared for:

Charlottesville Oil Company
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February 28, 2013

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February 28, 2013

David A. Fitt
Department of Environmental Quality
PO Box 3000
Harrisonburg, VA 22801

RE: Toddsbury of Ivy CAPI Subphase No. 24
Quarterly Groundwater Monitoring Report
PC 01-6134

Dear David:

This report is for the latest quarterly monitoring event completed at the subject Site and covers the O&M period from December 16, 2012 to February 28, 2013. Figure 1 shows the topographic map with the Site location indicated.

Groundwater Monitoring. On February 19, 2013, Brian Silka went to the Site to complete quarterly sampling. Monitoring wells MW-1 through MW-4 were opened and the depth to water measured. The water-table elevation worksheet is included in Appendix A. For this event, only MW-2, 4, 6 were sampled. The groundwater samples were analyzed for benzene, toluene, ethylbenzene, xylenes, naphthalene, and MTBE by EPA Method 8021B. Usually, the analysis has been limited to MBTEX, but naphthalene was inadvertently left on the chain of custody form. The water well was sampled and analyzed for volatile organics by EPA Method 8260B.

Table 1, at the end of this report, presents a summary of all groundwater analyses to date. The lab report for this quarterly sampling event is presented in Appendix B.

Figure 2 shows the water-table contours for this event. Overall, the interpreted groundwater flow direction has not changed significantly since the beginning of investigations at the Site in 2001.

Last fall, only the recovery well MW-6 had any MBTEX contamination with BEXM. For this quarter, MW-6 had only MTBE at 4.9 µg/l. For this quarter, MW-4 had 2.0 µg/l MTBE. MW-2 was free of detectable MBTEX. Only a figure for the extent of dissolved MTBE is presented (Figure 3).

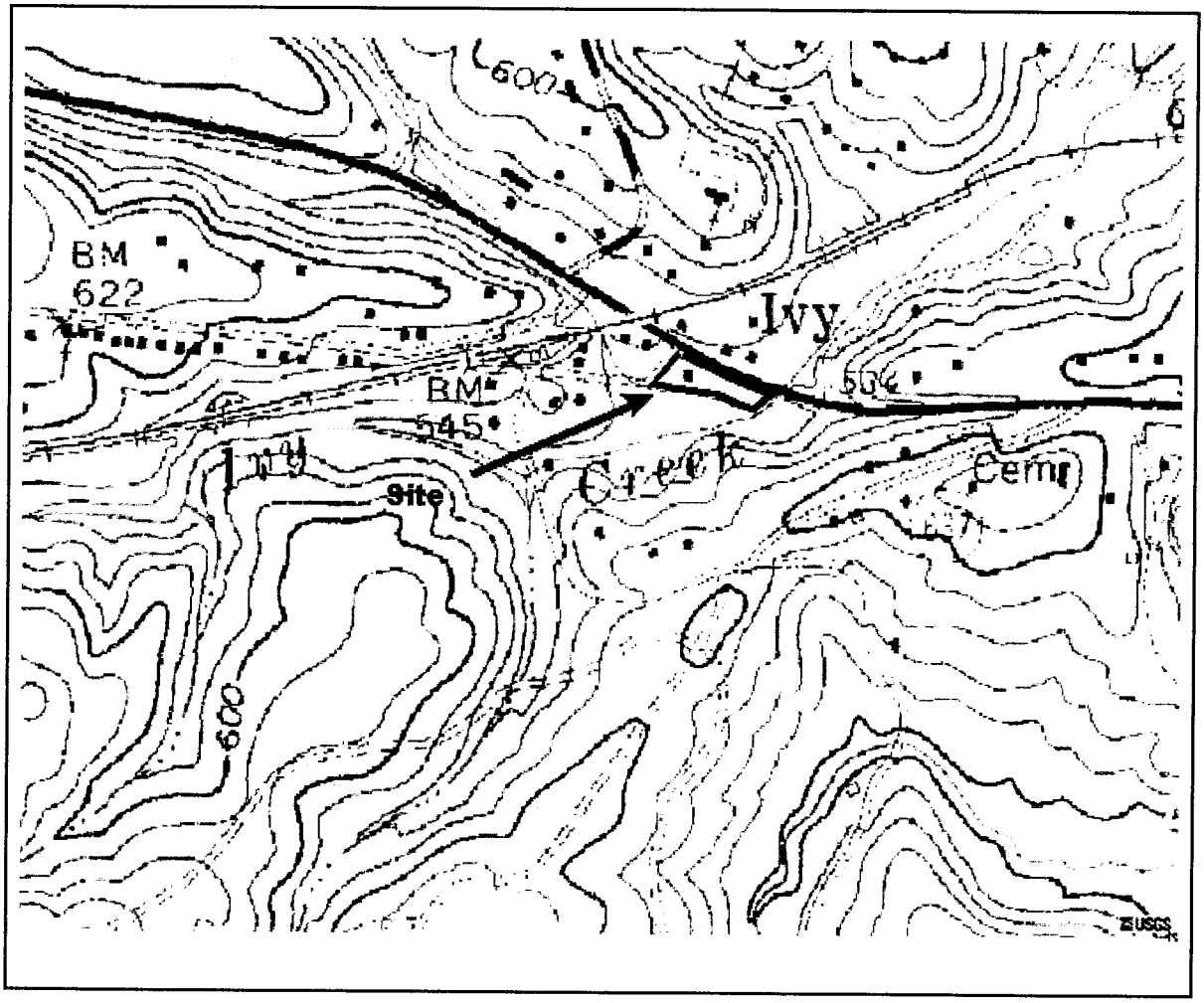


Figure 1. Site location on topographic map, Toddsbury of Ivy.

Source Area Recovery

The four-inch diameter MW-6 is an 80-foot deep recovery well located about 10 feet east of MW-2. MW-6 pumps from the depth interval 10 to 80 feet. Thus, it pumps from both the shallow zone above the bedrock surface (at 13 feet of depth at MW-6) and the deeper fractured bedrock zone. MW-6 began pumping on June 1, 2009.

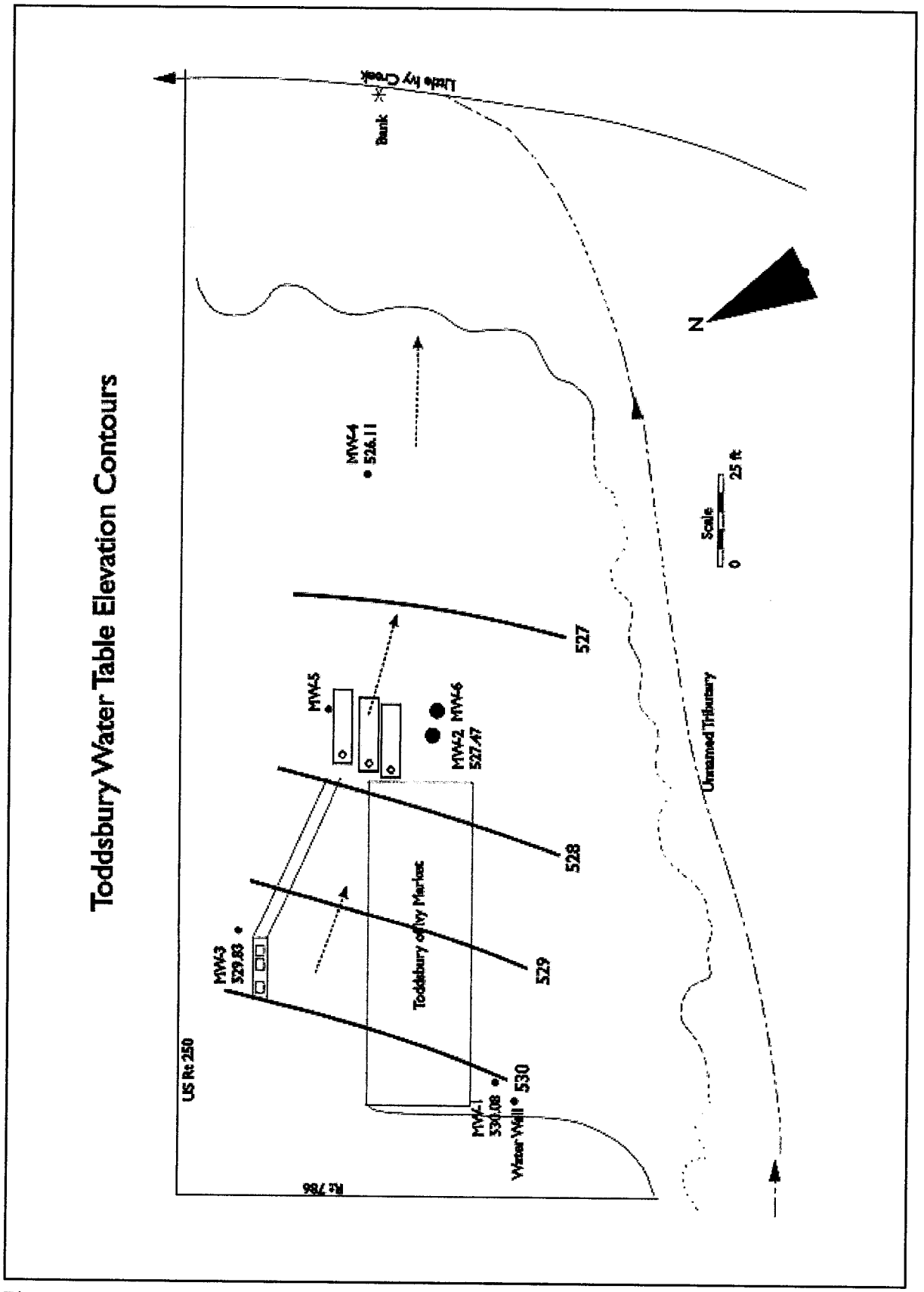


Figure 2. Water-table elevations for this event at Toddsbury of Ivy.

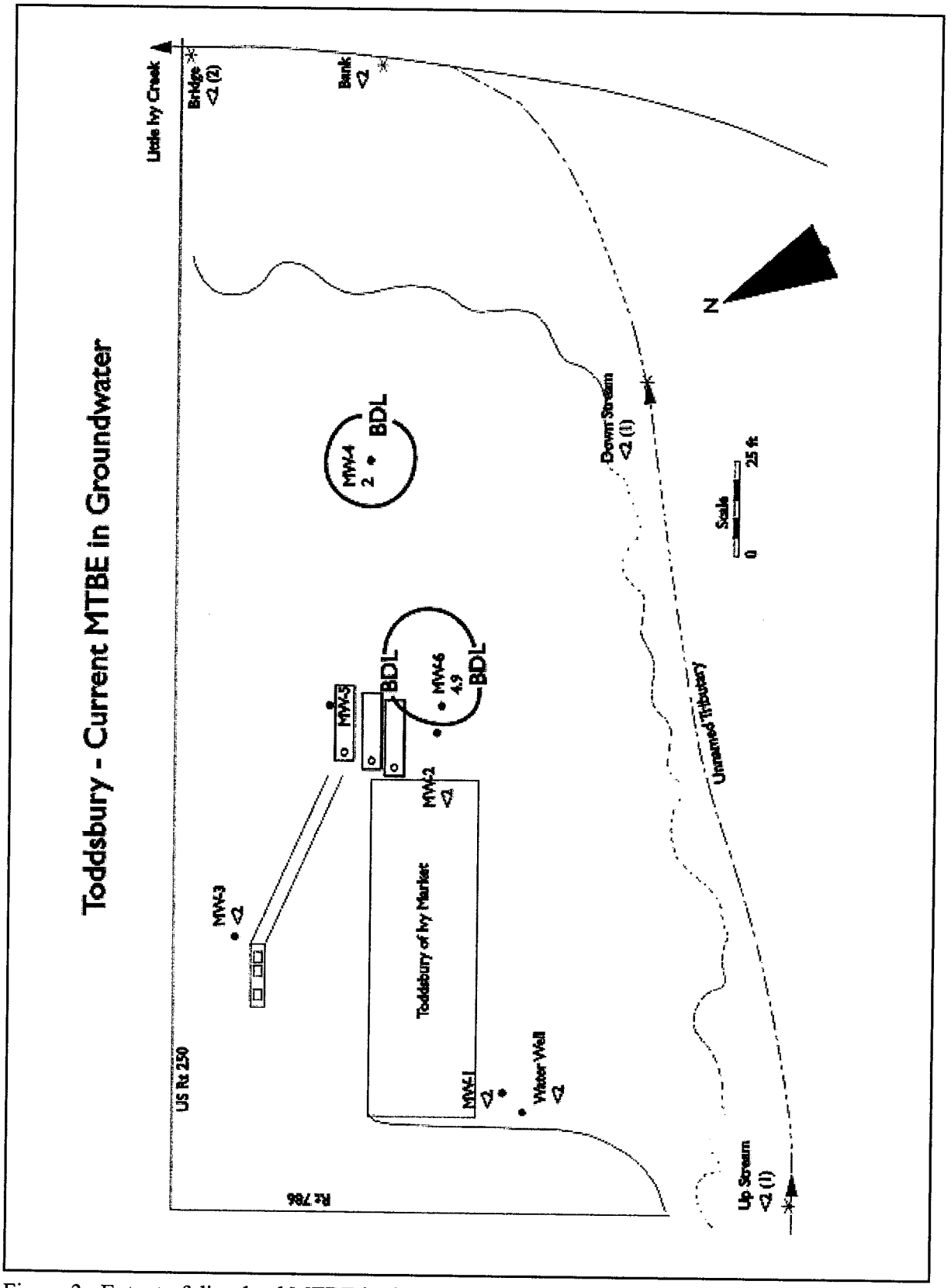


Figure 3. Extent of dissolved MTBE in the groundwater for this event.

Concentration Trends

MW-2/MW-5. The shallow groundwater from MW-2 had the highest concentrations historically, with MTBE at 56,400 µg/l and benzene at 11,500 µg/l in 2001 and 2002. Even with the historically high concentrations in MW-2, measurable free product has not been observed, and a sheen was seen only once in 2005. After a period of two years with MTBE at between 10 and 20 µg/l, MTBE has not been detected for the last two quarters.

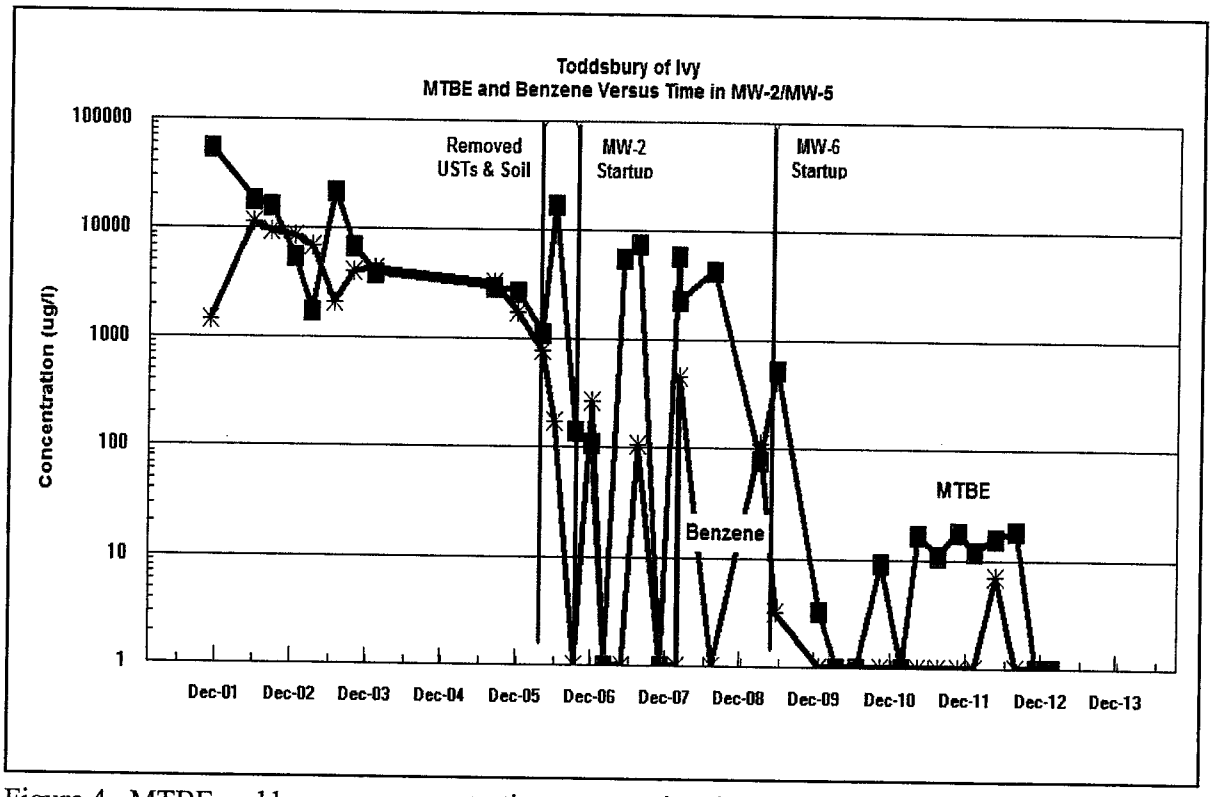


Figure 4. MTBE and benzene concentrations versus time in MW-2/MW-5.

Down gradient (MW-4). Down gradient of the source area at MW-4, MTBE has been following an overall decreasing trend since 2003, even before remediation began, as shown in the graph in Figure 5. This may be related to groundwater migrating eastward through MW-4. However, since MW-6 began pumping, MTBE in MW-4 increased for a short period, then began a steep downward trend. MTBE was not detected for the summer and fall events, but was 2.0 µg/l for this event. The BTEX compounds have been virtually absent from MW-4 since early 2010.

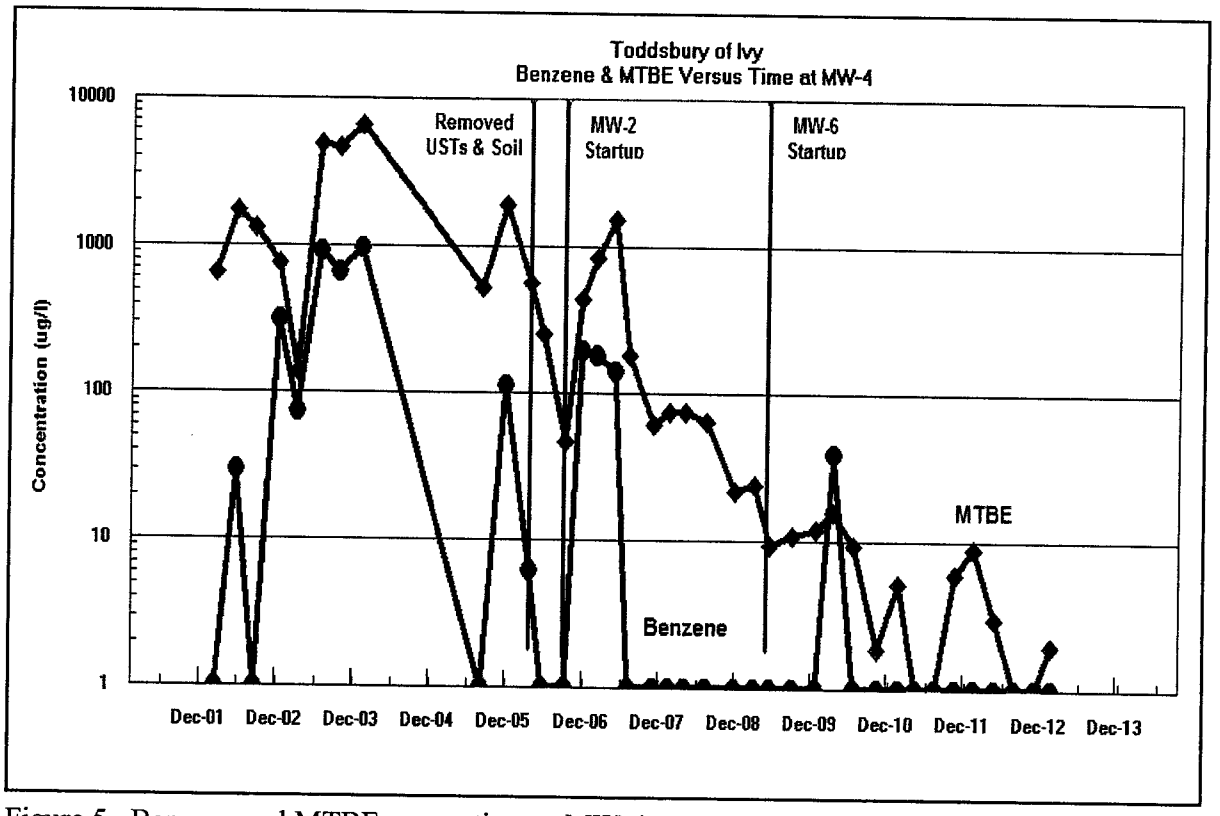


Figure 5. Benzene and MTBE versus time at MW-4.

Stream Bank. The groundwater quality at the stream bank was below detection from August 2008 through November of 2010 (the last sample analyzed). Figure 6 shows the change in MTBE concentration in the stream bank sample over time. The stream bank groundwater, and, by association, the stream, are no longer at risk from contaminated groundwater.

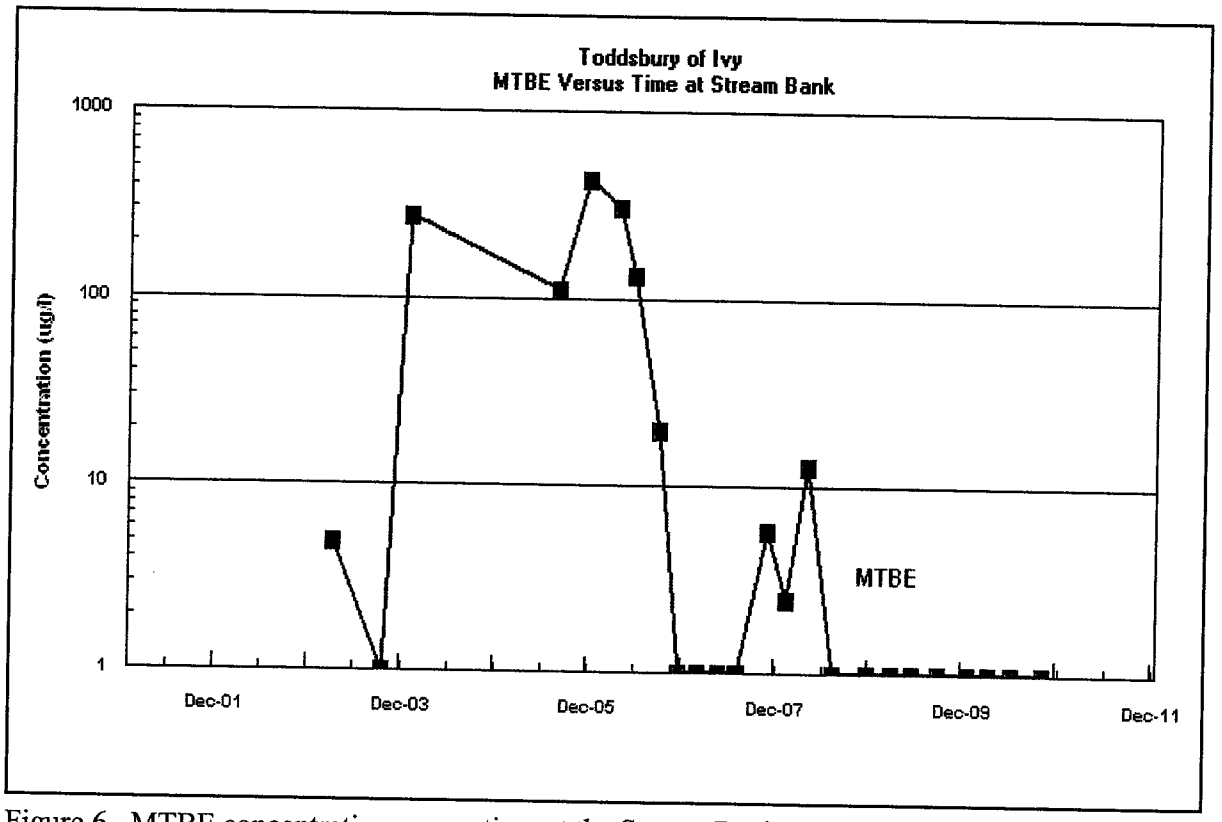


Figure 6. MTBE concentration versus time at the Stream Bank.

MW-6. The trends for MTBE and benzene in the recovery well, MW-6, are shown in Figure 7. MTBE showed a relatively consistent decrease over time from the startup of MW-6.

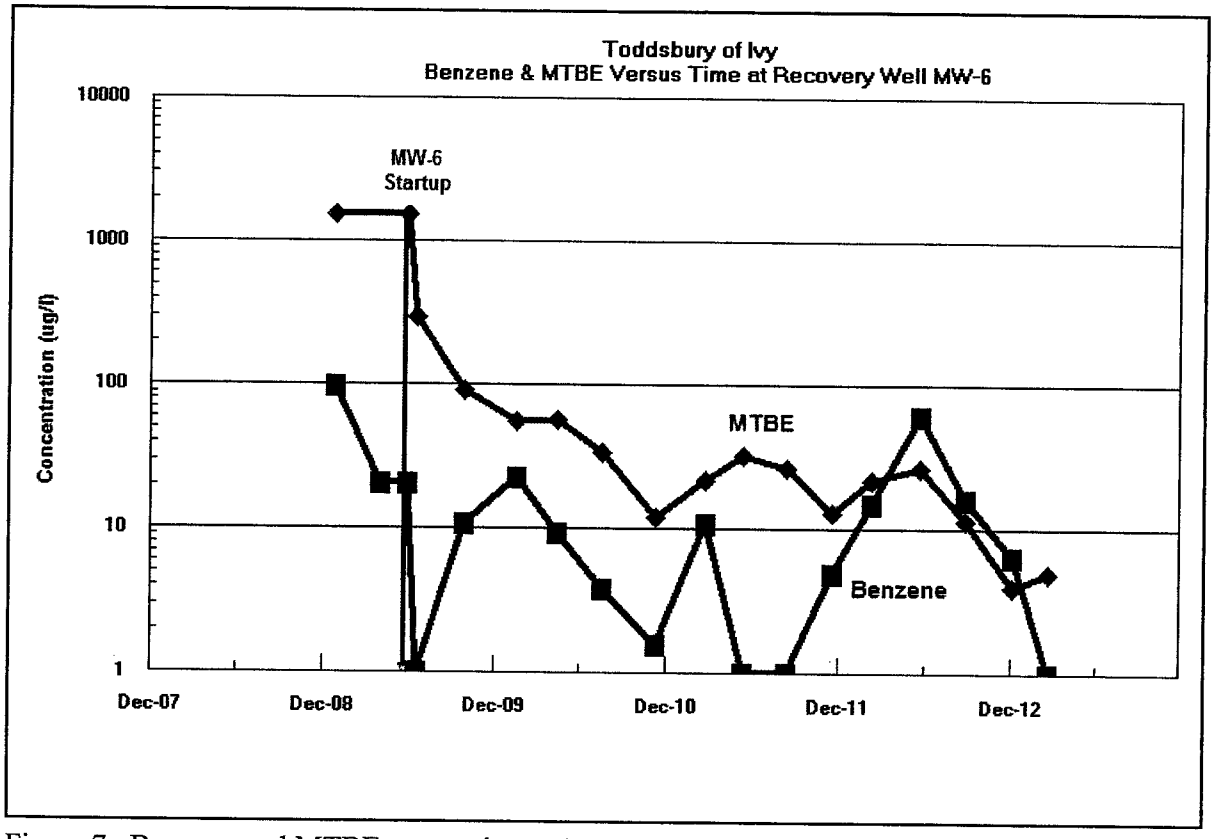


Figure 7. Benzene and MTBE versus time at MW-6.

MTBE and benzene have had three peaks since startup of MW-6 pumping. All three peaks have occurred in the January 2010, February 2011, and May 2012 for benzene, while the peaks for MTBE have been in April 2010, and May of 2011 and 2012. These peaks coincide with the normal groundwater recharge season. Since one of the gasoline USTs was left in the ground, because it was under the building, the annual recharge events may be causing residual gasoline from in and around that remaining gasoline UST to be flushed into the groundwater.

Onsite Water Well. The well water samples had been less than 2.0 µg/l from November of 2009, and less than 1.0 µg/l for eight out of the nine quarters and the last six straight leading to May of 2012. As with the spikes in MTBE witnessed in MW-2, 4 and 6, the well water had a small spike in August of 3.7 µg/l. MTBE was not detected in the water well for the last two events.

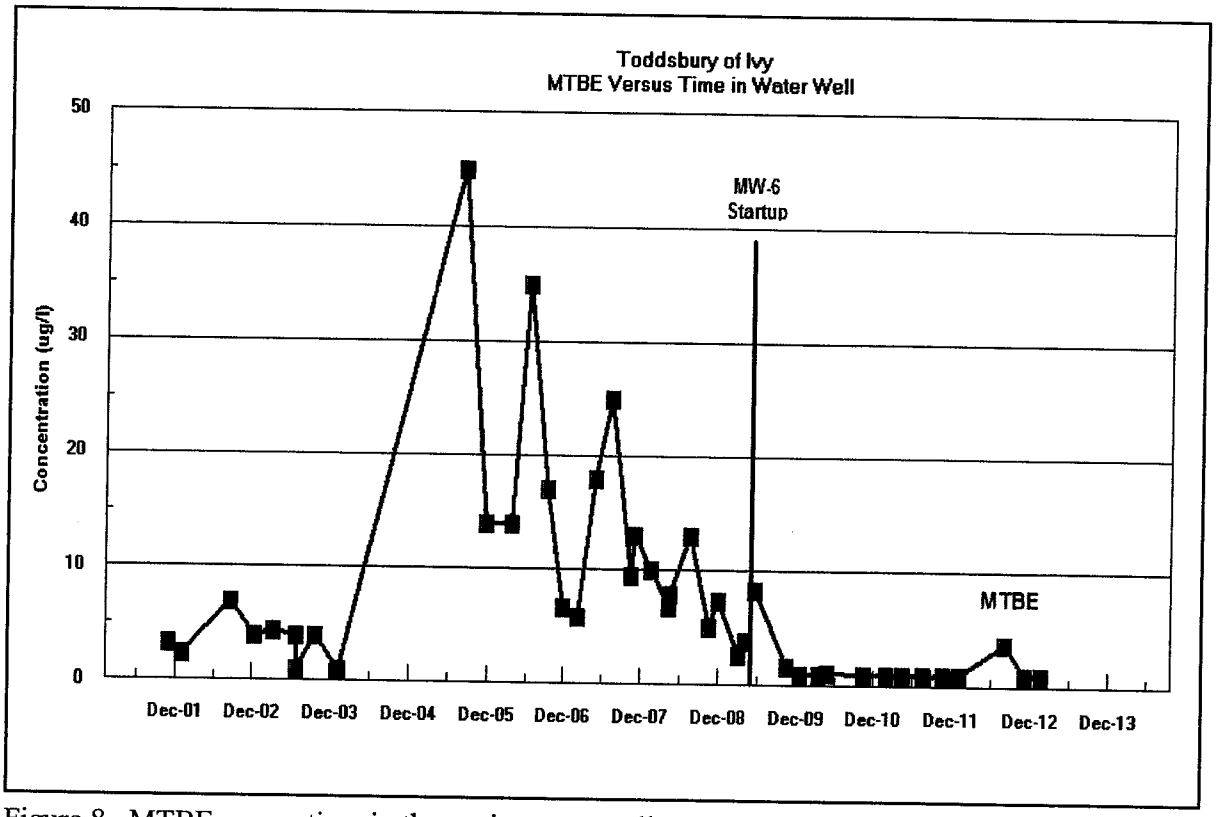


Figure 8. MTBE versus time in the onsite water well. MTBE cleanup is predicted to be much quicker after MW-6 startup than before.

CAPI Performance. The well water was virtually clean from January of 2010 through February of 2012. Now that the spike of 2012 appears to have passed through, the well water is expected to remain clean. .

Figure 9 shows the comparison of the current plume interpretation to the historical "highest" MTBE plume. With MTBE detected only in MW-6, the MTBE plume is reduced to the immediate area around MW-6.

Conclusions and Recommendations. The pumping of MW-6 has reduced the MTBE to a low concentration and may have reduced BTEX to undetectable levels. The next sampling event in May may confirm whether another spike in MTBE or other contaminant occurs as a result of the seasonal groundwater recharge.

Please do not hesitate to contact me if I can be of further service in this matter.

Sincerely,

Lyle R. Silka, CPG

enclosures

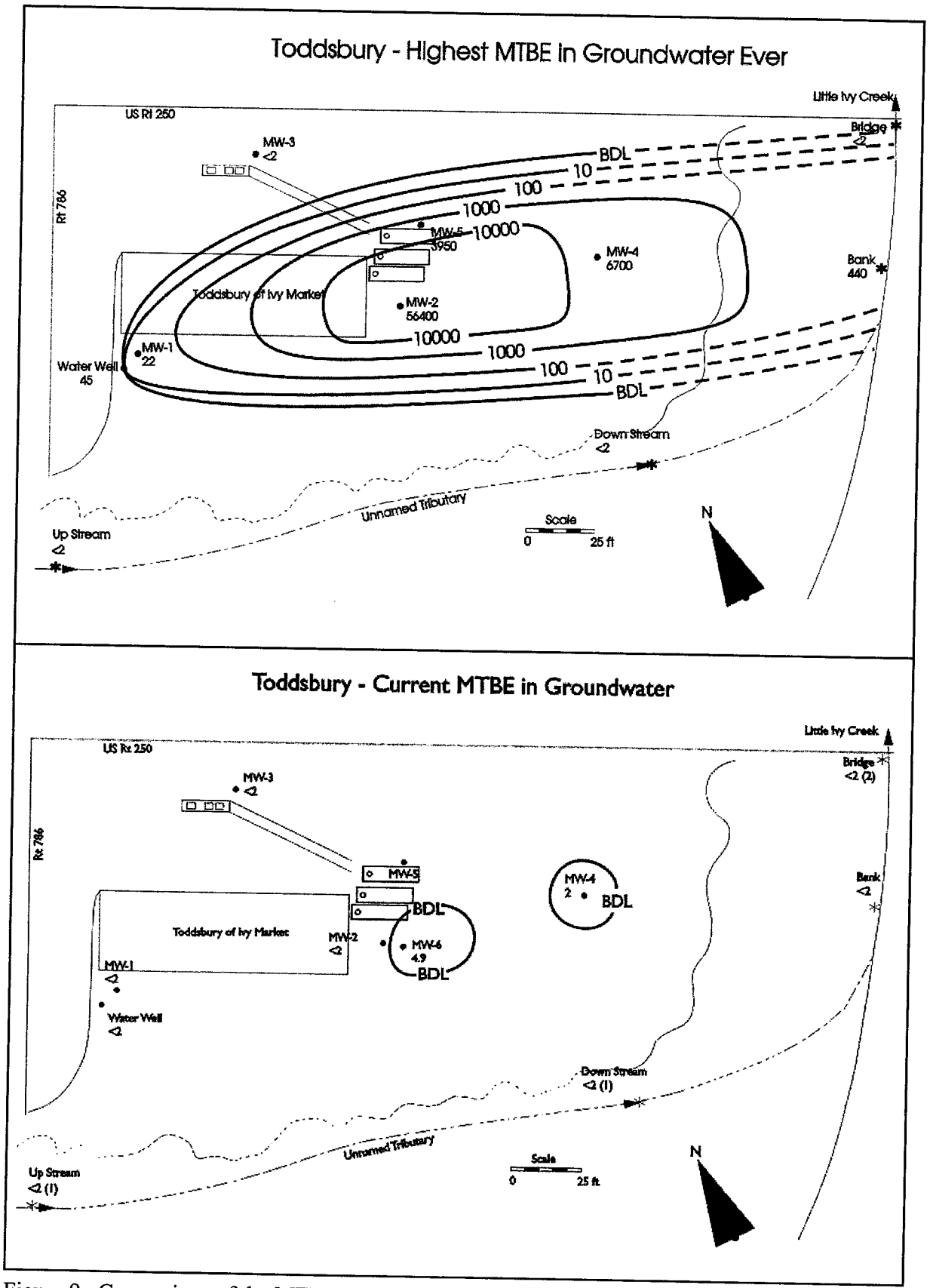


Figure 9. Comparison of the MTBE plume based on the highest concentrations ever observed (top) to the current MTBE plume (bottom).

APPENDIX A
WATER TABLE DATA WORKSHEET
LABORATORY REPORT

WATER TABLE DATA WORKSHEET

Toddsbury of Ivy - Monitoring Well Data

	MW-1	MW-2	MW-3	Stream	MW-4	MW-5	MW-6
Installation Date	11/28/2001	11/28/2001	11/28/2001		02/12/2002	09/06/2005	12/29/2008
Heigth of Scope above TOC, ft					5.00		
Height of Scope at Rod, ft	4.23	3.90	3.42	12.66	5.57		
Total depth of well, ft	15.00	15.00	12.00		20.00	16.00	80.00
Elevation of TOC Relative Local Datum, ft	535.00	535.33	535.81	526.57	534.76		
Elevation of Water Table, ft	531.04	528.42	531.41	526.57	527.77		
Water Table Depth below TOC, 11/11/10, ft	5.83	6.10	6.97		9.52		8.21
Elevation of Water Table, ft	529.17	528.62	528.84	526.57	525.24		
Water Table Depth below TOC, 2/24/11, ft	5.68	6.33	6.82		9.17		Pumping
Elevation of Water Table, ft	529.32	528.39	528.99	526.57	525.59		
Water Table Depth below TOC, 5/16/11, ft	4.44	7.81	5.49		7.98		Pumping
Elevation of Water Table, ft	530.56	526.91	530.32	526.57	526.78		
Water Table Depth below TOC, 8/17/11, ft	4.01	5.96	5.20		9.68		Pumping
Elevation of Water Table, ft	530.99	528.76	530.61	526.57	525.08		
Water Table Depth below TOC, 11/21/11, ft	4.11	5.66	5.00		9.41		Pumping
Elevation of Water Table, ft	530.89	529.06	530.81	526.57	525.35		
Water Table Depth below TOC, 2/13/12, ft	4.78	5.22	5.79		8.12		Pumping
Elevation of Water Table, ft	530.22	529.50	530.02	526.57	526.64		
Water Table Depth below TOC, 5/23/12, ft	5.53	8.20	6.56		8.93		Pumping
Elevation of Water Table, ft	529.47	526.52	529.25	526.57	525.83		
Water Table Depth below TOC, 8/27/12, ft	6.25	8.90	7.21		9.59		Pumping
Elevation of Water Table, ft	528.75	525.82	528.60	526.57	525.17		
Water Table Depth below TOC, 12/4/12, ft	5.83	8.49	6.85		9.14		Pumping
Elevation of Water Table, ft	529.17	526.23	528.96	526.57	525.62		
Water Table Depth below TOC, 2/19/13, ft	4.92	7.25	5.98		8.65		Pumping
Elevation of Water Table, ft	530.08	527.47	529.83	526.57	526.11		

Maryland spectral Services

Analytical Chemistry Services

1500 Caton Center Dr Suite G
Baltimore MD 21227
410-247-7600
www.mdspectral.com
VELAP ID 460040

Analytical Results

Project: Toddsbury of Ivy
Project Number: N/A
Project Manager: Jeff Sitler
Report Issued: 02/26/13 18:11

JAS Environmental Services
P.O. Box 6038
Charlottesville VA, 22906

CLIENT SAMPLE ID:		MW-2	MW-4	MW-6	WW
LAB SAMPLE ID:		3022102-01	3022102-02	3022102-03	3022102-04
SAMPLE DATE:		02/19/13	02/19/13	02/19/13	02/19/13
RECEIVED DATE:		02/21/13	02/21/13	02/21/13	02/21/13
MATRIX	Units	Nonpotable Water	Nonpotable Water	Nonpotable Water	Potable Water
VOLATILE ORGANICS BY EPA METHOD 8260B (GC/MS) (Water)					
Acetone	ug/L				<10.0
tert-Amyl alcohol (TAA)	ug/L				<20.0
tert-Amyl methyl ether (TAME)	ug/L				<5.0
Benzene	ug/L				<5.0
Bromobenzene	ug/L				<5.0
Bromochloromethane	ug/L				<5.0
Bromodichloromethane	ug/L				<5.0
Bromoform	ug/L				<5.0
Bromomethane	ug/L				<5.0
tert-Butanol (TBA)	ug/L				<15.0
2-Butanone (MEK)	ug/L				<10.0
n-Butylbenzene	ug/L				<5.0
sec-Butylbenzene	ug/L				<5.0
tert-Butylbenzene	ug/L				<5.0
Carbon disulfide	ug/L				<5.0
Carbon tetrachloride	ug/L				<5.0
Chlorobenzene	ug/L				<5.0
Chloroethane	ug/L				<5.0
Chloroform	ug/L				<5.0
Chloromethane	ug/L				<5.0
2-Chlorotoluene	ug/L				<5.0
4-Chlorotoluene	ug/L				<5.0
Dibromochloromethane	ug/L				<5.0
1,2-Dibromo-3-chloropropane	ug/L				<5.0
1,2-Dibromoethane (EDB)	ug/L				<5.0
Dibromomethane	ug/L				<5.0
1,2-Dichlorobenzene	ug/L				<5.0
1,3-Dichlorobenzene	ug/L				<5.0
1,4-Dichlorobenzene	ug/L				<5.0
Dichlorodifluoromethane	ug/L				<5.0
1,1-Dichloroethane	ug/L				<5.0
1,2-Dichloroethane	ug/L				<5.0
1,1-Dichloroethene	ug/L				<5.0
cis-1,2-Dichloroethene	ug/L				<5.0
trans-1,2-Dichloroethene	ug/L				<5.0
Dichlorofluoromethane	ug/L				<5.0

Maryland spectral Services

Analytical Chemistry Services

1600 Caton Center Dr Suite G
Baltimore MD 21227
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VELAP ID 460040

Analytical Results

Project: **Toddsbury of Ivy**

Project Number: N/A

Project Manager: Jeff Sitler

Report Issued: 02/26/13 18:11

JAS Environmental Services
P.O. Box 6038
Charlottesville VA. 22906

CLIENT SAMPLE ID:		MW-2	MW-4	MW-6	WW
LAB SAMPLE ID:		3022102-01	3022102-02	3022102-03	3022102-04
SAMPLE DATE:		02/19/13	02/19/13	02/19/13	02/19/13
RECEIVED DATE:		02/21/13	02/21/13	02/21/13	02/21/13
MATRIX	Units	Nonpotable Water	Nonpotable Water	Nonpotable Water	Potable Water

VOLATILE ORGANICS BY EPA METHOD 8260B (GC/MS) (continued)

1,2-Dichloropropane	ug/L				<5.0
1,3-Dichloropropane	ug/L				<5.0
2,2-Dichloropropane	ug/L				<5.0
1,1-Dichloropropene	ug/L				<5.0
cis-1,3-Dichloropropene	ug/L				<5.0
trans-1,3-Dichloropropene	ug/L				<5.0
Diisopropyl ether (DIPE)	ug/L				<5.0
Ethyl tert-butyl ether (ETBE)	ug/L				<5.0
Ethylbenzene	ug/L				<5.0
Hexachlorobutadiene	ug/L				<5.0
2-Hexanone	ug/L				<10.0
Isopropylbenzene (Cumene)	ug/L				<5.0
4-Isopropyltoluene	ug/L				<5.0
Methyl tert-butyl ether (MTBE)	ug/L				<5.0
4-Methyl-2-pentanone	ug/L				<10.0
Methylene chloride	ug/L				<10.0
Naphthalene	ug/L				<5.0
n-Propylbenzene	ug/L				<5.0
Styrene	ug/L				<5.0
1,1,1,2-Tetrachloroethane	ug/L				<5.0
1,1,2,2-Tetrachloroethane	ug/L				<5.0
Tetrachloroethene	ug/L				<5.0
Toluene	ug/L				<5.0
1,2,3-Trichlorobenzene	ug/L				<5.0
1,2,4-Trichlorobenzene	ug/L				<5.0
1,1,1-Trichloroethane	ug/L				<5.0
1,1,2-Trichloroethane	ug/L				<5.0
Trichloroethene	ug/L				<5.0
Trichlorofluoromethane (Freon 11)	ug/L				<5.0
1,2,3-Trichloropropane	ug/L				<5.0
1,2,4-Trimethylbenzene	ug/L				<5.0
1,3,5-Trimethylbenzene	ug/L				<5.0
Vinyl chloride	ug/L				<5.0
o-Xylene	ug/L				<5.0
m- & p-Xylenes	ug/L				<5.0

CHAIN-OF-CUSTODY RECORD

Company Name:
JAS Environmental Services, Inc.
PO Box 6038
Charlottesville, VA 22906

Project Name:
Toddsbury of Ivy

Sampler(s):
LRS / BNS

Project Manager:
Jeff Sitler
tel (434)974-7080
fax (434)974-1657

Location:
Ivy, VA

Task Number:

Laboratory:
Maryland Spectral Services, Inc.
1500 Caton Center Drive, Suite G
Baltimore, Maryland 21227
(410) 247-7600
(410) 247-7602 fax
FX 1353-7342-7
UPS 3X6699 for MSS

Sample	Date	Time	Matrix	No. Container	TPH GRO EPA-8015	TPH DRO EPA-8015	MBTEX EPA-8021	VOA EPA-8260	PAH EPA-8270	Preservation	
										Ice	
MW-2	02/19/2013	1230	W	2			X			Ice	3022102-01
MW-4	02/19/2013	100	W	2			X			Ice	-02
MW-6	02/19/2013	130	W	2			X			Ice	-03
WW	02/19/2013	1200	W	2				X		Ice	-04
										Ice	
										Ice	
										Ice	
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										Ice	

Shipped by: (signature) LR Silka
(printed) Lyle R. Silka
Date/Time: 02/19/2013 1500
UPS
(printed)
Date/Time

Email report to lsilka@crols.com

Relinquished by: (signature)
(printed)
Date/Time: 2/21/13 9:40
Received by: (signature) [signature]
(printed) Ron Michael
Date/Time

Bill:
JAS

14.6°C

APPENDIX B
ANALYTICAL DATA SUMMARY

Groundwater Analytical Results

Well No.	Date Sampled	TPH-GRO µg/l	Benzene µg/l	Toluene µg/l	Ethyl-Benzene µg/l	Xylenes µg/l	MTBE µg/l
MW-1	11/29/01	BDL	BDL	BDL	BDL	BDL	18
	06/26/02	BDL	BDL	BDL	BDL	BDL	BDL
	09/19/02	BDL	BDL	BDL	BDL	BDL	22
	01/09/03	BDL	BDL	BDL	BDL	BDL	BDL
	04/09/03	BDL	BDL	BDL	BDL	BDL	BDL
	07/24/03	BDL	BDL	BDL	BDL	BDL	BDL
	10/23/03	BDL	BDL	BDL	BDL	BDL	BDL
	02/05/04	BDL	BDL	BDL	BDL	BDL	BDL
	09/06/05	BDL	BDL	BDL	BDL	BDL	BDL
	12/27/05	BDL	BDL	BDL	BDL	BDL	BDL
	04/26/06	BDL	BDL	BDL	BDL	BDL	BDL
	06/27/06	BDL	BDL	BDL	BDL	BDL	BDL
	10/09/06	ND	BDL	BDL	BDL	BDL	BDL
	12/27/06	ND	BDL	BDL	BDL	BDL	BDL
	03/07/07	ND	BDL	BDL	BDL	BDL	BDL
	05/29/07	ND	BDL	BDL	BDL	BDL	BDL
	08/09/07	ND	BDL	BDL	BDL	BDL	BDL
	12/04/07	ND	BDL	BDL	BDL	BDL	BDL
	02/18/08	ND	BDL	BDL	BDL	BDL	BDL
	05/07/08	ND	BDL	BDL	BDL	BDL	BDL
	08/15/08	ND	BDL	BDL	BDL	BDL	BDL
	12/29/08	ND	BDL	BDL	BDL	BDL	BDL
	04/04/09	ND	BDL	BDL	BDL	BDL	BDL
	06/19/09	ND	BDL	BDL	BDL	BDL	BDL
	09/29/09	ND	BDL	BDL	BDL	BDL	BDL
	01/20/10	ND	BDL	BDL	BDL	BDL	BDL
	04/15/10	ND	BDL	BDL	BDL	BDL	BDL
	07/21/10	ND	BDL	BDL	BDL	BDL	BDL
	11/11/10	ND	BDL	BDL	BDL	BDL	BDL

Well No.	Date Sampled	TPH-GRO µg/l	Benzene µg/l	Toluene µg/l	Ethyl-Benzene µg/l	Xylenes µg/l	MTBE µg/l
MW-2	11/29/01	BDL	1,480	1,420	BDL	900	56,400
	06/26/02	57,100	11,500	18,200	2,580	10,700	18,900
	09/19/02	38,500	9,600	8,000	2,130	9,120	16,600
	01/09/03	56,500	8,800	17,000	3,040	14,000	5,600
	04/09/03	64,200	7,140	19,000	3,070	15,300	1,790
	07/16/03	9,950	2,170	1,950	470	1,750	22,400
	10/23/03	32,300	4,080	11,200	1,660	7,480	7,000
	02/05/04	31,600	4,400	8,560	2,020	7,560	3,980
	09/06/05	40,200	3,300	5,280	3,210	14,600	723
	12/27/05	16,800	1,770	1,710	1,250	5,430	497
	04/26/06	5,750	775	850	415	2,060	305
	06/27/06	ND	175	BDL	BDL	BDL	17,800
	10/09/06	ND	BDL	BDL	BDL	BDL	144
	12/27/06	ND	267	508	288	1,090	112
	03/07/07	ND	BDL	BDL	BDL	BDL	BDL
	05/29/07	ND	BDL	BDL	BDL	BDL	5,630
	08/09/07	ND	110	BDL	60	168	7,760
	12/04/07	ND	BDL	BDL	BDL	BDL	BDL
	02/18/08	ND	BDL	BDL	BDL	BDL	5,980
	02/24/08	ND	458	118	261	725	2,320
	05/07/08	ND	ND	ND	ND	ND	ND
	08/15/08	ND	BDL	BDL	BDL	BDL	4,470
	04/04/09	ND	112	26	90	222	79
	06/19/09	ND	3.2	7.2	5.2	26	543
	01/20/10	ND	BDL	BDL	BDL	BDL	3.3
	04/15/10	ND	BDL	3.8	3.6	14	BDL
	07/21/10	ND	BDL	BDL	BDL	BDL	BDL
	11/11/10	ND	BDL	BDL	BDL	BDL	9.3
	02/24/11	ND	BDL	BDL	BDL	BDL	BDL
	05/16/11	ND	BDL	BDL	BDL	BDL	17
	08/17/11	ND	BDL	BDL	BDL	BDL	11
	11/21/11	ND	BDL	BDL	BDL	BDL	18
	02/13/12	ND	BDL	BDL	BDL	BDL	12
	05/23/12	ND	6.7	7.9	BDL	5.7	16.4
	08/27/12	ND	BDL	BDL	10	BDL	18.5
	12/04/12	ND	BDL	BDL	BDL	BDL	BDL
	02/19/13	ND	BDL	BDL	BDL	BDL	BDL

Well No.	Date Sampled	TPH-GRO µg/l	Benzene µg/l	Toluene µg/l	Ethyl-Benzene µg/l	Xylenes µg/l	MTBE µg/l
MW-3	11/29/01	BDL	BDL	BDL	BDL	BDL	18
	06/26/02	BDL	BDL	BDL	BDL	BDL	BDL
	09/19/02	BDL	BDL	BDL	BDL	BDL	BDL
	01/09/03	BDL	BDL	BDL	BDL	BDL	BDL
	04/09/03	BDL	BDL	BDL	BDL	BDL	BDL
	07/24/03	103	BDL	BDL	BDL	6.3	BDL
	10/23/03	BDL	BDL	BDL	BDL	BDL	BDL
	02/05/04	BDL	BDL	BDL	BDL	BDL	BDL
	09/06/05	BDL	BDL	BDL	BDL	BDL	BDL
	12/27/05	BDL	BDL	BDL	BDL	BDL	BDL
	04/26/06	BDL	BDL	BDL	BDL	BDL	BDL
	06/27/06	ND	BDL	BDL	BDL	BDL	BDL
	10/09/06	ND	BDL	BDL	BDL	BDL	BDL
	12/27/06	ND	BDL	BDL	BDL	4.4	BDL
	03/07/07	ND	BDL	BDL	BDL	BDL	BDL
	05/29/07	ND	BDL	BDL	BDL	BDL	BDL
	08/09/07	ND	BDL	BDL	BDL	BDL	BDL
	12/04/07	ND	BDL	BDL	BDL	BDL	BDL
	02/18/08	ND	BDL	BDL	BDL	BDL	BDL
	05/07/08	ND	BDL	BDL	BDL	BDL	BDL
	08/15/08	ND	BDL	BDL	BDL	BDL	BDL
	12/29/08	ND	BDL	BDL	BDL	BDL	BDL
	04/04/09	ND	BDL	BDL	BDL	BDL	BDL
	06/19/09	ND	BDL	BDL	BDL	BDL	BDL
	09/29/09	ND	BDL	BDL	BDL	BDL	BDL
	01/20/10	ND	BDL	BDL	BDL	BDL	BDL
	04/15/10	ND	BDL	BDL	BDL	BDL	BDL
	07/21/10	ND	BDL	BDL	BDL	BDL	BDL
	11/11/10	ND	BDL	BDL	BDL	BDL	BDL

Well No.	Date Sampled	TPH-GRO µg/l	Benzene µg/l	Toluene µg/l	Ethyl-Benzene µg/l	Xylenes µg/l	MTBE µg/l
MW-4	03/14/02	BDL	BDL	BDL	BDL	BDL	662
	06/26/02	BDL	30	BDL	BDL	BDL	1,730
	09/19/02	BDL	BDL	BDL	BDL	BDL	1,330
	01/09/03	1,120	320	20	42	98	758
	04/09/03	2,280	76	6.2	7.6	21	142
	07/24/03	3,120	929	42	275	552	4,950
	10/23/03	BDL	675	BDL	167	122	4,670
	02/05/04	2,200	992	BDL	124	BDL	6,700
	09/06/05	282	BDL	BDL	BDL	BDL	534
	12/27/05	2,110	116	46	41	315	1,940
	04/26/06	466	6.4	4	4	21	562
	06/27/06	ND	BDL	BDL	BDL	BDL	260
	10/09/06	ND	BDL	BDL	BDL	BDL	47
	12/27/06	ND	199	313	139	449	439
	03/07/07	ND	187	34	81	336	848
	05/29/07	ND	146	BDL	BDL	55	1,520
	08/09/07	ND	BDL	BDL	2.9	BDL	185
	12/04/07	ND	BDL	BDL	BDL	14	63
	02/18/08	ND	BDL	BDL	BDL	BDL	76
	05/07/08	ND	BDL	BDL	BDL	BDL	77
	08/15/08	ND	BDL	BDL	BDL	BDL	66
	12/29/08	ND	BDL	BDL	2.6	BDL	22
	04/04/09	ND	BDL	BDL	2.5	BDL	24
	06/19/09	ND	BDL	BDL	BDL	BDL	9.4
	09/29/09	ND	BDL	BDL	BDL	BDL	11
	01/20/10	ND	1.0	BDL	BDL	5.7	12
	04/15/10	ND	40	26	229	337	16
	07/21/10	ND	BDL	BDL	BDL	BDL	9.5
	11/11/10	ND	BDL	BDL	BDL	BDL	1.9
	02/24/11	ND	BDL	BDL	BDL	BDL	5.2
	05/16/11	ND	BDL	BDL	BDL	BDL	BDL
	08/17/11	ND	BDL	BDL	BDL	BDL	BDL
	11/21/11	ND	BDL	BDL	BDL	BDL	6
	02/13/12	ND	BDL	BDL	15	6	9
	05/23/12	ND	BDL	BDL	BDL	BDL	3.4
	08/27/12	ND	BDL	BDL	BDL	BDL	BDL
	12/04/12	ND	BDL	BDL	BDL	BDL	BDL
	02/19/13	ND	BDL	BDL	BDL	BDL	2.0

Well No.	Date Sampled	TPH-GRO µg/l	Benzene µg/l	Toluene µg/l	Ethyl-Benzene µg/l	Xylenes µg/l	MTBE µg/l
MW-5	09/06/05	32,800	1,150	8,680	1,610	11,600	2,990
	12/27/05	24,700	1,470	8,520	1,180	6,870	2,730
	04/26/06	6,560	366	1,770	362	2,250	1,130
	02/18/08	BDL	BDL	BDL	BDL	BDL	3,950
MW-6	12/29/08	ND	99	1,420	1,880	6,080	1,530
	04/04/09	ND	21	356	723	2,410	BDL
	06/19/09	ND	BDL	14	5.4	82	298
	09/29/09	ND	11	26	79	189	92
	01/20/10	ND	23	27	73	206	56
	04/15/10	ND	9.4	9.1	44	101	58
	07/21/10	ND	3.9	4.6	55	91	34
	11/11/10	ND	1.6	2.2	24	36	12
	02/24/11	ND	11	4	20	37	22
	05/16/11	ND	BDL	BDL	BDL	18	33
	08/17/11	ND	11	BDL	19	24	27
	11/21/11	ND	5	BDL	13	32	13
	02/13/12	ND	15	BDL	17	23	22
	05/23/12	ND	63	7.3	74	89	27
	08/27/12	ND	16.3	BDL	31.3	30.5	11.4
	12/04/12	ND	4	BDL	BDL	BDL	6.5
	02/19/13	ND	BDL	BDL	BDL	BDL	4.9
Discharge to Trench	06/19/09	ND	BDL	3.1	BDL	5.4	3.2
	09/29/09	ND	BDL	BDL	BDL	BDL	12
	01/20/10	ND	3.4	2.9	BDL	15	18
	04/15/10	ND	BDL	BDL	2.1	5.1	15
	07/21/10	ND	BDL	BDL	BDL	BDL	7.8
	11/11/10	ND	1.2	BDL	11	29	15

Well No.	Date Sampled	TPH-g µg	Benzene µg/l	Toluene µg/l	Ethyl-Benzene µg/l	Xylenes µg/l	MTBE µg/l
Onsite Water Well	11/29/01		BDL	BDL	BDL	BDL	3.3j
	01/31/02		BDL	BDL	BDL	BDL	2.3j
	09/20/02		BDL	BDL	BDL	BDL	6.9
	01/09/03		BDL	BDL	BDL	BDL	4.0
	04/09/03		BDL	BDL	BDL	BDL	4.4
	07/24/03c		BDL	BDL	BDL	BDL	4.0
	10/23/03		BDL	BDL	BDL	BDL	4.0
	02/05/04		BDL	BDL	BDL	BDL	BDL
	09/06/05		BDL	BDL	BDL	BDL	45.0
	12/27/05		BDL	BDL	BDL	BDL	14.0
	04/26/06		BDL	BDL	BDL	BDL	14.0
	06/27/06		BDL	BDL	BDL	BDL	35
	10/09/06		BDL	BDL	BDL	BDL	17.0
	12/27/06		BDL	BDL	BDL	BDL	6.7
	03/07/07		BDL	BDL	BDL	BDL	5.9
	05/29/07		BDL	BDL	BDL	BDL	18.0
	08/09/07		BDL	BDL	BDL	BDL	25.0
	11/15/07c		BDL	BDL	BDL	BDL	9.5
	12/04/07		BDL	BDL	BDL	BDL	13
	02/18/08		BDL	BDL	BDL	BDL	10
	05/07/08		BDL	BDL	BDL	BDL	6.8
	05/15/08c		BDL	BDL	BDL	BDL	7.9
	08/15/08		BDL	BDL	BDL	BDL	13
	11/15/08		BDL	BDL	BDL	BDL	5.0
	12/29/08		BDL	BDL	BDL	BDL	7.3
	04/04/09		BDL	BDL	5	16	2.6
	05/04/09c		BDL	BDL	BDL	BDL	3.9
	06/19/09		BDL	BDL	BDL	BDL	8.3
	11/18/09c		BDL	BDL	BDL	BDL	1.7
	01/20/10		BDL	BDL	BDL	BDL	BDL
	04/15/10		BDL	BDL	BDL	BDL	BDL
	05/25/10c		BDL	BDL	BDL	BDL	1.2
	11/11/10		BDL	BDL	BDL	BDL	BDL
	02/24/11		BDL	BDL	BDL	BDL	BDL
	05/16/11		BDL	BDL	BDL	BDL	BDL
	05/24/11		BDL	BDL	BDL	BDL	BDL
	08/17/11		BDL	BDL	BDL	BDL	BDL
	08/23/11		BDL	BDL	BDL	BDL	0.9
	11/21/11		BDL	BDL	BDL	BDL	BDL
	02/03/12		BDL	BDL	BDL	BDL	BDL
	08/27/12		4.9	BDL	1.7	BDL	3.4
	08/27/12		3.3	BDL	1.0	BDL	3.7
	12/04/12		BDL	BDL	BDL	BDL	BDL
	02/19/13		BDL	BDL	BDL	BDL	BDL

Well No.	Date Sampled	TPH-GRO µg/l	Benzene µg/l	Toluene µg/l	Ethyl-Benzene µg/l	Xylenes µg/l	MTBE µg/l
Up Stream	11/29/01	BDL	BDL	BDL	BDL	BDL	BDL
Down Stream	11/29/01	BDL	BDL	BDL	BDL	BDL	BDL
Bank	04/09/03	BDL	BDL	BDL	BDL	BDL	5.0
	10/23/03	BDL	BDL	BDL	BDL	BDL	BDL
	02/05/04	BDL	BDL	BDL	BDL	BDL	278
	09/06/05	100	BDL	BDL	BDL	BDL	112
	12/27/05	BDL	BDL	BDL	BDL	BDL	440
	04/26/06	BDL	BDL	BDL	BDL	BDL	313
	06/27/06	ND	BDL	BDL	BDL	BDL	134
	10/09/06	ND	BDL	BDL	BDL	BDL	20
	12/27/06	ND	BDL	BDL	BDL	BDL	BDL
	03/07/07	ND	BDL	BDL	BDL	BDL	BDL
	05/29/07	ND	BDL	BDL	BDL	BDL	BDL
	08/09/07	ND	BDL	BDL	BDL	BDL	BDL
	12/04/07	ND	BDL	BDL	BDL	BDL	5.8
	02/18/08	ND	BDL	BDL	BDL	5.8	2.5
	05/07/08	ND	BDL	BDL	BDL	BDL	13
	08/15/08	ND	BDL	BDL	BDL	BDL	BDL
	12/29/08	ND	BDL	BDL	BDL	BDL	BDL
	04/04/09	ND	BDL	BDL	BDL	BDL	BDL
	06/19/09	ND	BDL	BDL	BDL	BDL	BDL
	09/29/09	ND	BDL	BDL	BDL	BDL	BDL
	01/20/10	ND	BDL	BDL	BDL	BDL	BDL
	04/15/10	ND	BDL	BDL	BDL	BDL	BDL
	07/21/10	ND	BDL	BDL	BDL	BDL	BDL
	11/11/10	ND	BDL	BDL	BDL	BDL	BDL
Rt 250 Bridge	03/14/02	BDL	BDL	BDL	BDL	BDL	BDL
	06/26/02	BDL	BDL	BDL	BDL	BDL	BDL
	09/19/02	BDL	BDL	BDL	BDL	BDL	BDL
	01/09/03	BDL	BDL	BDL	BDL	BDL	BDL

Notes: ND- Not Determined BDL- Below Detection Limit j- Estimated value
µg/l- Micrograms per liter LPH- Liquid Petroleum Hydrocarbon
NA- Not applicable c- Culligan raw, untreated drinking water

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