WELLHEAD AREA SURVEY
LITTLE ORLEANS CAMPGROUND
ACHD SITE NOS. 72-74, 74D and 74E
Allegany County, Maryland

ALWI Project No. AL7N001

1.0 INTRODUCTION

Advanced Land and Water, Inc. (ALWI) was retained by the Allegany County Health Department (ACHD), to prepare a Wellhead Area Survey for the Little Orleans Campground, located generally on the north side of Oldtown-Orleans Road, approximately 1 mile west of High Germany Road, in southeastern Allegany County, Maryland. ALWI evaluated and sampled five separate though closely spaced well water supplies at the Campground, as follows:

ACHD Site No.	Locally Used Name	Well Tag No.	Disinfection Mode
72	Well A	AL-88-0010	Chlorination
73	Well B	no tag visible	Chlorination
74	Well C	AL-73-1010	None
74D	Well D	AL-73-0941	None
74E	Well E	AL-73-1011	Not in service (yield)

Each well penetrates the local bedrock aquifer as "open hole completion." The wells are not interconnected, through from time to time temporary water lines have been used between buildings and service areas to address short-term needs and deficiencies.

The draft MDE "Transient Water Systems Operations Guidance" manual (herein termed the "Guidance Manual") defines a Non-Transient Non-Community (NTNC) Water System as one that "...serves at least 25 regular consumers over 6 months per year." ALWI obtained limited usage data by interviewing the on-site manager, summarized as follows:

ACHD Site No.	Locally Used Name	Typical No. Days/Year Used	Typical Population During Usage Period
72	Well A	365	30
73	Well B	365	30
74	Well C	200	50
74D	Well D	90	25
74E	Well E	Not in service (yield)	Not in service (yield)

Though not interconnected[1], the wells effectively function as stand-alone and self-contained municipal supplies. Little Orleans Campground has the outward appearance of a weekend and vacation retreat frequented by differing customers on an occasional basis. In actuality, the service areas for Wells B and E largely consist of year-round residents of once portable but now stationary housing. Well C serves a mixture of semi-permanent and transient customers whereas only well D serves truly transient and occasional users.

The population served fluctuates and is not easily estimated. Applying the interview-derived information shown in the above table, it is possible that some of the wells serve a high enough number of customers on a regular basis to be considered public, community water systems as defined in COMAR 26.04.01.01B(19)(a-b). If so, considerable additional laboratory analyses would be required for compliance with COMAR 26.04.01.05-35. Lacking confirmation of service populations, however, ALWI performed its evaluation assuming that on-site personnel over-estimated actual service populations and that Wells A though C and E serve non-transient, non-community systems (NTNCs). Under such a scheme, only Well D should be considered to serve a transient non-community system (TNCs).

1.1 PURPOSE

The Safe Drinking Water Act (SDWA) of 1974 required the U.S. Environmental Protection Agency (EPA) to develop enforceable drinking water quality standards to protect the public health. In 1986, amendments made to the SDWA strengthened provisions for the protection of underground sources of drinking water. These amendments included provisions for establishing Wellhead Protection Programs by individual states under "umbrella" EPA oversight. The EPA approved a statewide Wellhead Protection Program developed by MDE in June 1991.

The MDE program originally applied to community water supplies, only. A newly proposed broadening of the federal Clean Water Act will have the result of expanding the MDE Wellhead Protection Program to encompass non-community supplies both transient and non-transient in nature. ACHD, in cooperation with MDE, established this program to bring existing non-community supplies into compliance with the coming regulations.

1.2 SCOPE

ALWI prepared this Wellhead Area Survey following ACHD requirements, which followed MDE guidelines for transient system operation and wellhead protection.

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[1] Wells A and E serve the same sub-portion of the site. Well E had a low yield and was effectively replaced by Well A. Well E remains available for standby and backup purposes but cannot produce reliable yields for long periods during drought or heavy use periods. It was not functional for more than one minute at the time of ALWI's reconnaissance and sample collection.

1. **Site Reconnaissance, Photographic Documentation and Interviews** – ALWI observed the on-site wellhead, storage, treatment, and distribution infrastructure to the degree exposed without excavation or exposure to personal hazards. ALWI used an ACHD-owned digital camera to photograph conditions surrounding each wellhead at the time of the field reconnaissance. Said photographs are stored on ACHD's computer system. ALWI interviewed the on-site campground co-owner to document information on the use patterns, history and problems associated with the supplies.

2. **Baseline Water Quality Assessment** - ALWI purged the water system and collected samples for analysis in the ACHD laboratory that is affiliated with the Maryland Department of Health and Mental Hygiene (DHMH). ALWI performed this fieldwork in accordance with MDE potable water sampling criteria including in-field measurements of turbidity, chlorine, and pH. ACHD selected the analyte list based on countywide experience with potability concerns and the capabilities of the aforementioned laboratory. The analytes included total and fecal coliform bacteria, nitrates, nitrites, iron, sulfur and manganese (Appendix B).

3. **Contamination Hazard Assessment** – ALWI identified existing and potential contaminant hazards within the delineated area based on visual observations and the techniques enumerated above. ALWI ranked these hazards in term of relative risk and provided concrete suggestions for their appropriate address. More generally, herein ALWI provides specific recommendations for source reduction measures, contingency plans, and other methods that may help better protect against occurrences of groundwater contamination.

2.0 HYDROGEOLOGIC FRAMEWORK

ALWI used published information from the United States Geological Survey and the Maryland Geological Survey to identify and describe the characteristics of the local hydrogeologic setting.

2.1 BEDROCK GEOLOGY

The Campground is situated within the Appalachian Valley and Ridge physiographic province and is underlain by sedimentary rocks of late Devonian age. No Geologic Map has been published for the Artemas Quadrangle. However, generally the rocks underlying the site have been intensely folded and faulted, resulting in alternating synclines (concave-upward folds) and anticlines (convex-upward folds).

In three dimensions, the rock formations of such folds dip at right angles to the direction of plunge of the entire fold system. In general, dip directions may help govern groundwater (and contaminant) movement directions in the bedrock but plunge directions have little or no relation. At this location, the bedding planes dip moderately steeply to the west-northwest (Glaser, 1994). Deep groundwater flow directions likely follow, whereas shallow flow directions likely mirror land surface topography.

Local well yields generally range from 5 to 10 gpm. Wells completed within sandstone layers generally have a higher yield because the greater competence of the rock allows the development of longer and wider fractures both along and across bedding planes.

2.2 Saprolite and Soil Mantle

Natural chemical weathering of the shallow portion of the bedrock, due to percolating water, has chemically altered many of the original rock-forming minerals to clays and other secondary minerals. This has resulted in the development of shallow saprolite (weathered bedrock) and the overlying soil mantle. The thickness of the soil and saprolite is generally 2 to 10 feet, but it varies considerably over short distances. In highly fractured zones, enhanced groundwater storage and movement has accelerated the breakdown of the rock-forming minerals and has caused formation of a thicker saprolitic deposit.

2.3 Aquifer Recharge

Precipitation infiltrating through the soil on site and/or in topographically up-gradient areas is the primary source of aquifer recharge to the on-site supply wells. Generally, overlying soil horizons act to absorb and then slowly release infiltrating precipitation. However, in areas where fracture zones have formed, percolating groundwater can reach the water table quickly. A portion of the precipitation percolates downward through the soil mantle and then migrates through narrow, interconnected joints, fractures, faults, and cleavage planes in the bedrock.

2.4 Geology-Controlled Groundwater Flow

Generally, bedding plane partings and cross-bedding fracture zones (where present) function as both downward and lateral water conduits. Consequently, such zones receive and transmit water at a rate higher than would otherwise be achievable and, accordingly, are preferential conduits for groundwater flow and contaminant transport.

Despite the bedrock's overall hardness and resistance to erosion, hydraulic permeabilities in bedding planes and fracture zones within the competent sandstone bedrock layers may be several times greater than in surrounding less-fractured rock. This intrinsic characteristic portends the possibility for the existence of specific zones with higher-than-normal well yields, higher-than-normal groundwater flow velocities and higher-than-normal susceptibility to groundwater contamination.

3.0 WATER QUALITY ASSESSMENT

Slaughter and Darling (1962) reported the regional water quality as slightly irony (0.01 to as much as .12 micrograms per liter (mg/l), moderately soft (58 to 174mg/l), and slightly acidic to

moderately alkaline (pH range of 6.3 to 8.7). ALWI interpreted that the slight reddish colors of the local rock exposures as likely attributable to the trace presence of iron.

At this location, ALWI collected baseline groundwater samples on December 14, 1999, in accordance with the MDE sampling procedures specified in COMAR 26.08.05. For Well B, both pre- and post-treatment samples were collected. A post-chlorination sample was collected from Well A; no port was provided for raw sample collection. Wells C and D are untreated and well E could not be sampled because of the low yield of the well.

ALWI collected, preserved and transported each of the sample suites in accordance with COMAR 26.04.01.14. ACHD's laboratory analyzed the samples for those constituents of countywide concern. These included total coliform bacteria as specified in COMAR 26.04.01.11A-C, alkalinity, color, conductance, hardness, iron, manganese, nitrate-nitrite nitrogen (COMAR 26.04.01.14(4)(a)), nitrite nitrogen (COMAR 26.04.01.14(4)(b)), pH, and total dissolved solids. The results are included as Appendix A, and suggest potability relative to the samples collected.

Other than Well B, the supplies appear at low risk for surface water influence as defined in the MDE guidance document, although ALWI could not verify casing depths. Well B appears at moderate risk because of its proximity to a ravine north of the wellhead. According to the guidance document and assuming that this ravine represents a surface water body, two sets of wet weather samples are required to confirm the absence of surface water pathogens from those supplies at moderate risk.

4.0 DELINEATION

ALWI delineated a composite surveyed area encompassing all areas within 1,000 feet and topographically upgradient from each well. The 1,000 foot criteria was developed by MDE for non-community supplies, and was then further modified by ALWI (with ACHD consent) based on the site's rugged topographic setting. ALWI excluded downgradient areas more than 100 feet from each wellhead as well as areas unlikely to contribute recharge to the well based on intervening streams and/or drainage divides. Because of the rugged topography, ALWI also excluded steeply-sloping cross-gradient areas.

The resultant delineation is shown on the "Water Plant Information" survey forms (Appendix B) and encompasses approximately 200 acres. Within an assumed 300 gallons per day per acre (gpd/ac) of annualized groundwater recharge (Slaughter and Darling, 1962, Table 3), with a 50% correction factor applied by ALWI for the unusually steep slopes), over 60,000 gallons per day exists within the aquifer beneath this surveyed area. In actuality, the annualized demands of the wellfield (roughly estimated at 10,000 gpd) is less than 20% of the available recharge, lending a high degree of conservatism to this analysis. Considerable seasonal fluctuation in demand is anticipated given the largely transient campground-like use of the facility. The steep slopes in the

area suggest that peak demands are met with aquifer storage rather than by an areal expansion of the cones of depression. Negligible nitrate-nitrogen concentrations were detected in the sample ALWI collected. This obviated the need for a nitrate balance assessment.

5.0 CONTAMINANT THREATS ASSESSMENT

ALWI performed a site reconnaissance on December 14, 1998. During the reconnaissance, local land use conditions were observed with emphasis on the potential use, storage and disposal practices of hazardous materials and petroleum products. Such conditions may have included visual evidence for present or former spills, stained or discolored ground surfaces, stressed vegetation, unusual odors, or visible underground storage tank (UST) facilities. Adjacent and nearby properties were also visually scanned for such evidence from the property and nearby public right-of-ways. Off-site properties were not entered. ALWI relied upon the accuracy of historical interview information provided by the on-site manager to provide context for some of its observations.

5.1 POTENTIAL HAZARDS AT THE WELLHEADS

Design, construction and present condition are important factors in determining a well's susceptibility to contamination. Though four of the five wells had tags, ALWI was not provided completion reports. Accordingly, ALWI could not assess the initial design nor present condition of their casings or grout seals. ALWI observed that the portion of the casings exposed at ground surface appeared intact. Well A merely had an upside-down plastic bucket protecting the well. The other wells were equipped with a conventional pitless-style cap of the type that can sometimes allow insects to enter the well. An upgrade to more modern caps would provide greater protection against microbial contamination.

5.2 OTHER LOCAL CONTAMINATION RISKS

On December 14, 1998, ALWI observed several potential contamination sources in the delineated area. For various reasons, each well seems to runs some potential risk from recirculation septic effluent though the low nitrate concentrations detected seem to suggest that this risk is not presently severe. Other specific contamination risks ALWI noted were as follows:

- **Wells A and E** – ALWI observed gasoline and other fuels stored in unsecured cans within 100 feet of the wellhead. ALWI also understands that Well A has effectively replaced Well E. Any unneeded well is a potential short-circuit pathway for groundwater contamination. If no longer in use, this well should be abandoned and sealed pursuant to COMAR 26.04.04.11D(1 and 2)[2].

[2] These regulations specify well abandonment in cases where (1) the well may "act as a channel for the interchange of waters of undesirable quality with those whose quality is desirable" and/or (2) the well may be a "...potential source of pollution of waters of the State."

- **Well B** – The casing of this well is surrounded and partially covered by mulch that can harbor bacteria and other organic and microbial contaminants. ALWI recommends that mulch be removed from the well casing.

- **Well C** – ALWI observed a manually operated domestic wastewater dumping station within 100 feet of the well and in a topographically upgradient direction. The plumbing and associated infrastructure of the dumping station was of unknown design and integrity and its outfall could not be determined. ALWI also observed that the position of the well placed at risk of vehicular damage. ALWI recommends frequent bacteriologic sampling and/or a pro-active retrofit with disinfection equipment (chlorine or UV). ALWI also recommends that barriers be erected and maintained around the wellhead so as to better protect it against vehicular damage.

- **Well D** – The roadside location of this well places it at risk from deicing and from vehicular damage (see recommendations for Well C, above). Baseline and periodic sampling for sodium and chlorides should be considered. Additionally, the Campground's wastewater disposal lagoons are within approximately 750 feet of this well in a cross-gradient direction. ALWI recommends frequent bacteriologic sampling and/or a pro-active retrofit with disinfection equipment (chlorine or UV). Alternately and given the seasonal use of this well, Campground customers within its service area could be cautioned to boil water before use as a potable supply.

ALWI also observed a cemetery with approximately 100 to 200 grave sites located within 100 feet and upgradient of Well D and within 500 feet and slightly downgradient of Well B. Grave sites may be sources of microbial and/or hydrocarbon contamination of groundwater (e.g., aldehydes and ketones sometimes used in embalming practices). ALWI recommends baseline sampling of wells B and D for those compounds considered likely to be in use as preservatives. Assuming the cemetery is active, sampling of Well D should continue bi-annually.

5.0 CONCLUSION AND RECOMMENDATIONS

ALWI did not find acute conditions suggesting non-potability of a type warranting immediate reporting, resampling, or other emergency corrective action. ALWI developed the recommendations herein following MDE guidelines but also in light of site-specific practicalities. ALWI recommends the following key contaminant source reduction measures:

- Cap Well A, Abandon Well E and Relocate the Fuel Storage Area;

- Remove the Mulch from the Casing of Well B;

- Relocate the Wastewater Dumping Station or Retrofit Well C for Disinfection;

- Discontinue Use of Well D for Potable Purposes or Regularly Test for Aldehydes, Ketones and Surface Water Influence and Retrofit as Necessary.

- Test Well B for Aldehydes, Ketones and Surface Water Influence and Upgrade Treatment as Necessary.

Property ownership interests may wish to consider the long-term benefit of subsurface system interconnections. These could be used for emergency purposes (e.g., fire fighting; temporary supply shortfalls; pump failures; etc.) and to help meet peak demands during high summertime and hunting season use periods.

6.0 SELECTED REFERENCES

MDE Public Drinking Water Program, 1998, Transient Water System Operations Guidance; Guidance For Counties With Delegated Responsibilities (Draft), 45p.

Slaughter, Turbit H. and John M. Darling, 1963, The Water Resources of Allegany and Washington Counties: Maryland Department of Geology, Mines, and Water Resources, Bulletin 24, p. 408.

NONCOMMUNITY WATER SUPPLY SANITARY SURVEY

1. System Name: Little Orleans Campground – Well A & E

2. WAS: 72 & 74E

3. System Information:

Address: 31661 Green Forest Drive, S.E.
Little Orleans, Maryland

Phone No.: (301) 478-2325

4. ADC Map/Grid: N/A

5. Tax Map/Plat: N/A

6. Population:

Transient 30
Regular 4
Total 34

7. Property Information:

Owner's Name Mr. Dale B. Sipes

Address: 31661 Green Forest Drive, S.E.
Little Orleans, Maryland

Phone No. (301) 478-2325 (301) 478-2429

8. No. Service Connections:

9. Type of Facility:

Food Service _____
Church _____
Campground x
Daycare _____
Other (specify) _____

10. Contact Person:

Name: Mr. Dale B. Sipes

Phone No. (301) 478-2429

11. Operator:

Name: _____

Cert. No. _____

12. Sample History (Has the system had any violations?):

Bacteria: None apparent or reported

Nitrate: None apparent or reported

SURVEY RESULTS

13. Comments on System, Recommendations:

ALWI did not find acute conditions suggesting non-potability of a type warranting immediate reporting, resampling, or other emergency corrective action. ALWI developed the recommendations herein following MDE guidelines but also in light of site-specific practicalities. ALWI recommends the following key contaminant source reduction measures:

- ☐ Cap Well A, Abandon Well E, and Relocate the Fuel Storage Area

Wells A and E – ALWI observed gasoline and other fuels stored in unsecured cans within 100 feet of the wellhead. ALWI also understands that Well A has effectively replaced Well E. Any unneeded well is a potential short-circuit pathway for groundwater contamination. If no longer in use, this well should be abandoned and sealed pursuant to COMAR 26.04.04.11D(1 and 2).

Property ownership interests may wish to consider the long-term benefit of subsurface system interconnections. These could be used for emergency purposes (e.g., fire fighting; temporary supply shortfalls; pump failures; etc.) and to help meet peak demands during high summertime and hunting season use periods.

14. Inspected by:

Mark W. Eisner

15. Date inspected:

12/14/98

16. System Vulnerability

Protected x Vulnerable _____

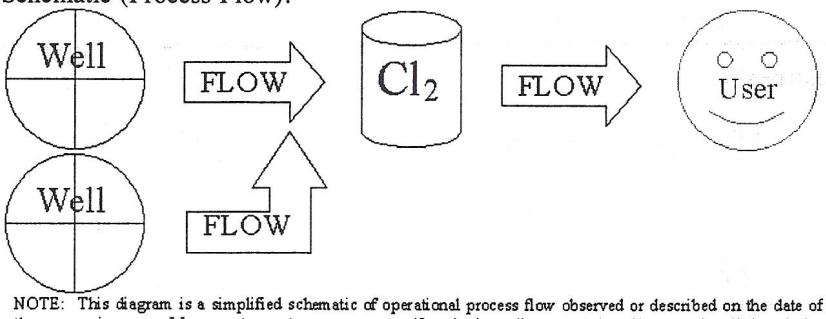
WATER PLANT INFORMATION

17. Type of Treatment:
(Check all that apply)

Disinfection
- Gas Chlorine: _____
- Sodium Hypochlorite: x
- Ultraviolet Radiation: _____

Iron Removal: _____
Nitrate Removal: _____
PH Neutralizer: _____
Other: _____
Unknown: _____

18. System Schematic (Process Flow):



NOTE: This diagram is a simplified schematic of operational process flow observed or described on the date of the reconnaissance. Many water systems possess malfunctioning, disconnected and/or occasionally/regularly-bypassed equipment. Actual treatment processes may differ, therefore, from those shown herein.

19. System Storage:

Ground Storage: _____
Elevated Storage: _____
Hydropneumatic Tank: _____
Other: _____

20. Storage Capacity:

Typical Domestic

21. Untreated water sampling tap?

Yes _____ No x

WELL INFORMATION

22. Well Information:

Tag Number: AL-88-0010
AL-73-1010 (unavailable)
Year Drilled: 1990

Casing Depth: 40

Well Depth: 320

Well Yield: 15

Casing Height: 1

Grout Depth: 40

Pitless Adapter? _____

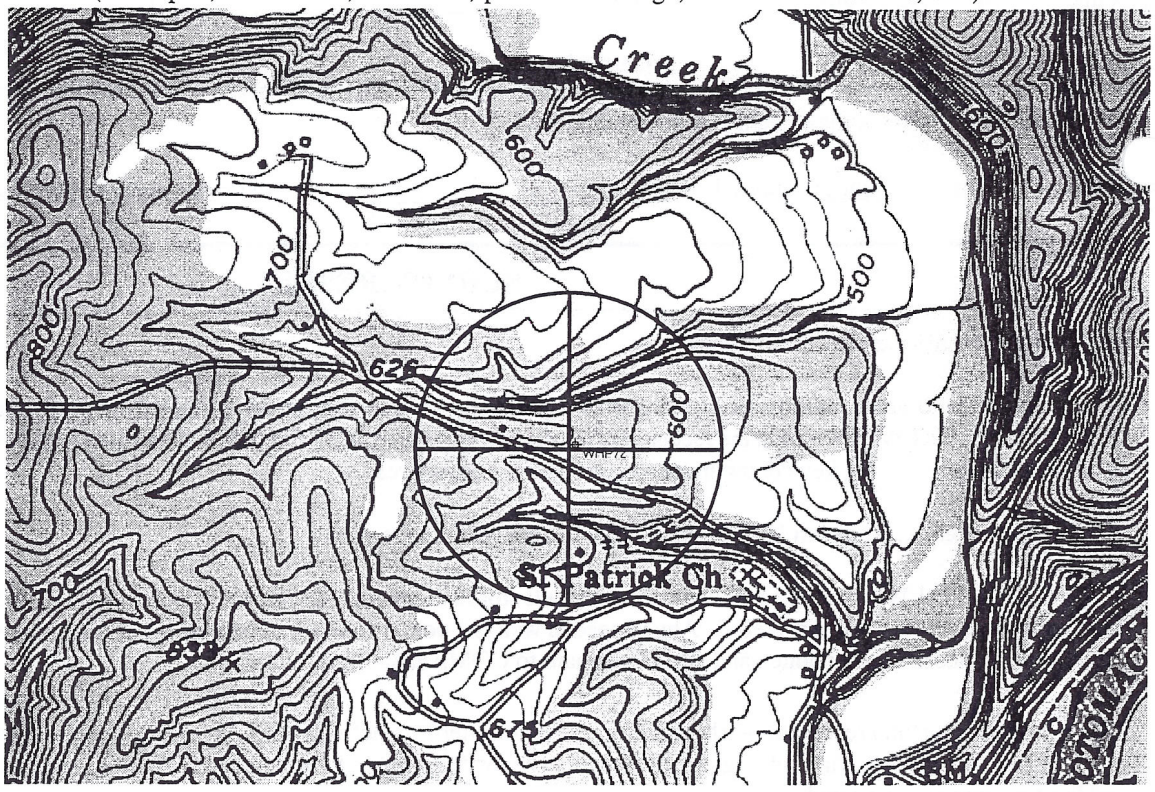
Wiring OK? unknown

Pump OK? unknown

23. Well Type:

Drilled: x
Driven: _____
Dug: _____

24. Well Location Diagram (1 in. = 1250 ft.) with Approximate Distances from Potential Contaminant Sources (i.e. septic, sewer lines, structures, petroleum storage, surface water bodies, etc.):



25. Aquifer:

Name: Foreknobs
Hampshire
GAP #: _____
Confined: _____
Unconfined: x
Semi-confined: _____

26. Quantity Used:

Daily Avg (gpd): 600
Pumping Rate (gpm): 5 - 10
Hours run per day: _____

27. Well Cap:

Type? _____
Seal Tight? O.K.
Vented? O.K.
Screened? No
Conduit OK? O.K.

28. Casing Diameter:

2": _____
4": _____
6": x
Other: _____

29. Casing Type:

PVC: _____
Metal: x
Concrete: _____

NONCOMMUNITY WATER SUPPLY SANITARY SURVEY

1. System Name: Little Orleans Campground – Well B

2. WAS: 73

System Information:

Address: 31661 Green Forest Dr. SE

Little Orleans, Maryland

Phone No.: (301) 478-2325

4. ADC Map/Grid: N/A

5. Tax Map/Plat: N/A

6. Population:

Transient 30
Regular
Total 30

7. Property Information:

Owner's Name Mr. Dale B. Sipes

Address: 31661 Green Forest Dr. SE

Little Orleans, Maryland

Phone No. (301) 478-2325 (301) 478-2429

8. No. Service Connections:

9. Type of Facility:

Food Service
Church
Campground x
Daycare
Other (specify)

10. Contact Person:

Name: Mr. Dale B. Sipes

Phone No. (301) 478-2429

11. Operator:

Name:

Cert. No.

12. Sample History (Has the system had any violations?):

Bacteria: None apparent or reported

Nitrate: None apparent or reported

SURVEY RESULTS

13. Comments on System, Recommendations:

Well B – The casing of this well is surrounded and partially covered by mulch that can harbor bacteria and other organic and microbial contaminants. ALWI recommends that mulch be removed from the well casing.

- ☐ Remove the Mulch from the Casing of Well B
- ☐ Test Well B for Aldehydes, Ketones, and Surface Water Influence and Upgrade Treatment as Necessary.

Property ownership interests may wish to consider the long-term benefit of subsurface system interconnections. These could be used for emergency purposes (e.g., fire fighting; temporary supply shortfalls; pump failures; etc.) and to help meet peak demands during high summertime and hunting season use periods.

14. Inspected by:

Mark W. Eisner

15. Date inspected:

12/14/98

16. System Vulnerability

Protected x Vulnerable

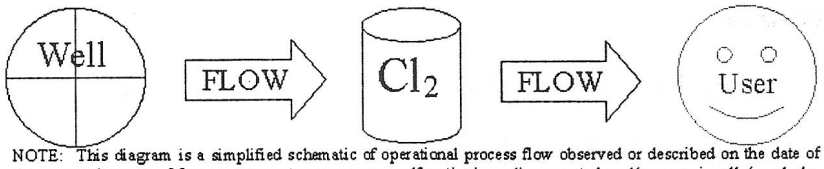
WATER PLANT INFORMATION

17. Type of Treatment:
(Check all that apply)

Disinfection
- Gas Chlorine: _____
- Sodium Hypochlorite: x
- Ultraviolet Radiation: _____

Iron Removal: _____
Nitrate Removal: _____
PH Neutralizer: _____
Other: _____
Unknown: _____

18. System Schematic (Process Flow):



NOTE: This diagram is a simplified schematic of operational process flow observed or described on the date of the reconnaissance. Many water systems possess malfunctioning, disconnected and/or occasionally/regularly-bypassed equipment. Actual treatment processes may differ, therefore, from those shown herein.

19. System Storage:

Ground Storage: _____
Elevated Storage: _____
Hydropneumatic Tank: _____
Other: _____

20. Storage Capacity:

Typical Domestic

21. Untreated water sampling tap?

Yes __x__ No _____

WELL INFORMATION

22. Well Information:

Tag Number: not visible

Year Drilled: _____

Casing Depth: _____

Well Depth: _____

Well Yield: _____

Casing Height: _____

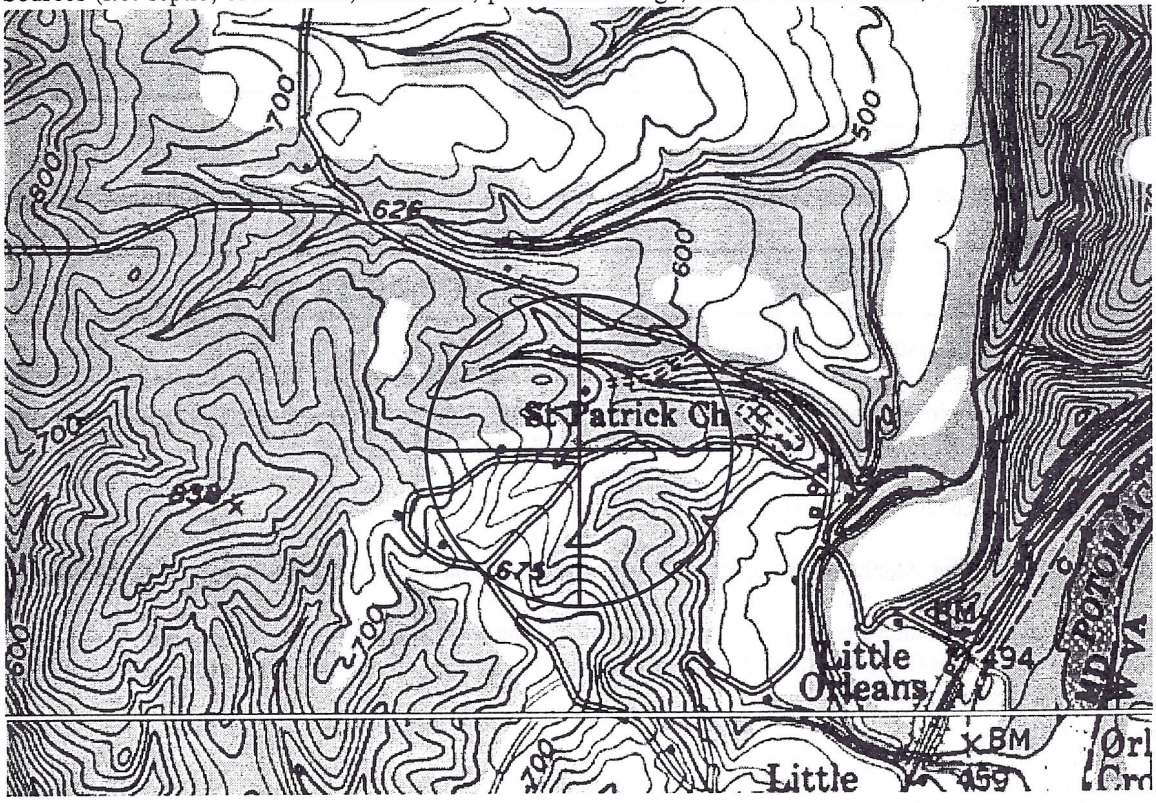
Grout Depth: _____

Pitless Adapter? _____

Wiring OK? unknown

Pump OK? unknown

24. Well Location Diagram (1 in. = 1250 ft.) with Approximate Distances from Potential Contaminant Sources (i.e. septic, sewer lines, structures, petroleum storage, surface water bodies, etc.):



23. Well Type:

Drilled: x
Driven: _____
Dug: _____

25. Aquifer:

Name: Foreknobs
Hampshire
GAP #: _____
Confined: _____
Unconfined: x
Semi-confined: _____

26. Quantity Used:

Daily Avg (gpd): 600
Pumping Rate (gpm): 5 - 10
Hours run per day: _____

27. Well Cap:

Type? _____
Seal Tight? O.K.
Vented? O.K.
Screened? No
Conduit OK? O.K.

28. Casing Diameter:

2": _____
4": _____
6": x
Other: _____

29. Casing Type:

PVC: _____
Metal: x
Concrete: _____

NONCOMMUNITY WATER SUPPLY SANITARY SURVEY

1. System Name: Little Orleans Campground – Well C

2. WAS: 74

System Information:

Address: 31661 Green Forest Drive, SE

Little Orleans, Maryland

Phone No.: (301) 478-2325

4. ADC Map/Grid: N/A

5. Tax Map/Plat: N/A

6. Population:

Transient 50
Regular
Total 50+/-

7. Property Information:

Owner's Name Mr. Dale B. Sipes

Address: 31661 Green Forest Drive, SE

Little Orleans, Maryland

Phone No. (301) 478-2325 (301) 478-2429

8. No. Service Connections:

9. Type of Facility:

Food Service
Church
Campground x
Daycare
Other (specify)

10. Contact Person:

Name: Mr. Dale B. Sipes

Phone No. (301) 478-2429

11. Operator:

Name:

Cert. No.

12. Sample History (Has the system had any violations?):

Bacteria: None apparent or reported

Nitrate: None apparent or reported

SURVEY RESULTS

13. Comments on System, Recommendations:

ALWI did not find acute conditions suggesting non-potability of a type warranting immediate reporting, resampling, or other emergency corrective action. ALWI developed the recommendations herein following MDE guidelines but also in light of site-specific practicalities. ALWI recommends the following key contaminant source reduction measures:

- ❑ Relocate the Wastewater Dumping Station or Retrofit Well C for Disinfection

Well C – ALWI observed a manually operated domestic wastewater dumping station within 100 feet of the well and in a topographically upgradient direction. The plumbing and associated infrastructure of the dumping station was of unknown design and integrity and its outfall could not be determined. ALWI also observed that the position of the well placed at risk of vehicular damage. ALWI recommends frequent bacteriologic sampling and/or a pro-active retrofit with disinfection equipment (chlorine or UV). ALWI also recommends that barriers be erected and maintained around the wellhead so as to better protect it against vehicular damage.

Property ownership interests may wish to consider the long-term benefit of subsurface system interconnections. These could be used for emergency purposes (e.g., fire fighting; temporary supply shortfalls; pump failures; etc.) and to help meet peak demands during high summertime and hunting season use periods.

14. Inspected by: Mark W. Eisner

15. Date inspected: 12/14/99

16. System Vulnerability

Protected Vulnerable yes (see report)

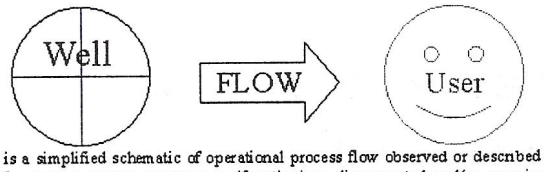
WATER PLANT INFORMATION

17. Type of Treatment:
(Check all that apply)

Disinfection
- Gas Chlorine: _____
- Sodium Hypochlorite _____
- Ultraviolet Radiation _____

Iron Removal _____
Nitrate Removal _____
PH Neutralizer _____
Other _____
Unknown _____

18. System Schematic (Process Flow):



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19. System Storage:

Ground Storage _____
Elevated Storage _____
Hydropneumatic Tank _____
Other _____

20. Storage Capacity:

Typical Domestic

21. Untreated water sampling tap?

Yes __x__ No _____

WELL INFORMATION

22. Well Information:

Tag Number: AL-73-1010
(report unavailable)
Year Drilled: _____

Casing Depth: _____

Well Depth: _____

Well Yield: _____

Casing Height: _____

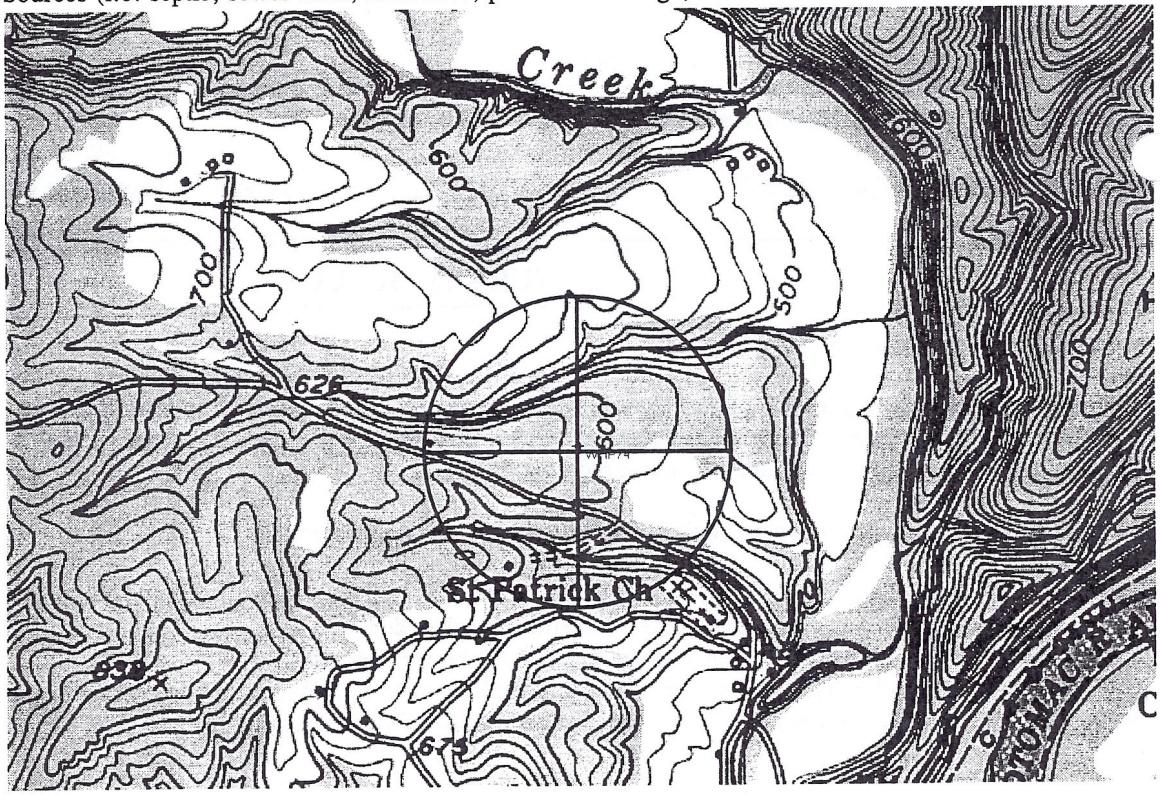
Grout Depth: _____

Pitless Adapter? _____

Wiring OK? unknown

Pump OK? unknown

24. Well Location Diagram (1 in. = 1250 ft.) with Approximate Distances from Potential Contaminant Sources (i.e. septic, sewer lines, structures, petroleum storage, surface water bodies, etc.):



23. Well Type:

Drilled _x_____
Driven _____
Dug _____

25. Aquifer:

Name: Foreknobs
Hampshire_____
GAP #: _____
Confined _____
Unconfined _x___
Semi-confined _____

26. Quantity Used:

Daily Avg (gpd) _600__
Pumping Rate (gpm) _5 - 10
Hours run per day _____

27. Well Cap:

Type? _____
Seal Tight? O.K.
Vented? O.K.
Screened? No
Conduit OK? O.K.

28. Casing Diameter:

2" _____
4" _____
6" ___x___
Other _____

29. Casing Type:

PVC _____
Metal __x__
Concrete_____

NONCOMMUNITY WATER SUPPLY SANITARY SURVEY

1. System Name: Little Orleans Campground – Well D

2. WAS: 74 D

3. System Information:

Address: 31661 Green Forest Drive, SE

Little Orleans, Maryland

Phone No.: (301) 478-2325

4. ADC Map/Grid: N/A

5. Tax Map/Plat: N/A

6. Population:

Transient 50
Regular
Total 50+/-

7. Property Information:

Owner's Name Mr. Dale B. Sipes

Address: 31661 Green Forest Drive, SE

Little Orleans, Maryland

Phone No. (301) 478-2325 (301) 478-2429

8. No. Service Connections:

9. Type of Facility:

Food Service
Church
Campground x
Daycare
Other (specify)

10. Contact Person:

Name: Mr. Dale B. Sipes

Phone No. (301) 478-2429

11. Operator:

Name:

Cert. No.

12. Sample History (Has the system had any violations?):

Bacteria: None apparent or reported

Nitrate: None apparent or reported

SURVEY RESULTS

13. Comments on System, Recommendations:

ALWI did not find acute conditions suggesting non-potability of a type warranting immediate reporting, resampling, or other emergency corrective action. ALWI developed the recommendations herein following MDE guidelines but also in light of site-specific practicalities. ALWI recommends the following key contaminant source reduction measures:

- ❑ Discontinue Use of Well D for Potable Purposes or Regularly Test for Aldehydes, Ketones, and Surface Water Influence and Retrofit as Necessary.

Well D – The roadside location of this well places it at risk from deicing and from vehicular damage (see recommendations for Well C, above). Baseline and periodic sampling for sodium and chlorides should be considered. Additionally, the Campground's wastewater disposal lagoons are within approximately 750 feet of this well in a cross-gradient direction. ALWI recommends frequent bacteriologic sampling and/or a pro-active retrofit with disinfection equipment (chlorine or UV). Alternately and given the seasonal use of this well, Campground customers within its service area could be cautioned to boil water before use as a potable supply.

Property ownership interests may wish to consider the long-term benefit of subsurface system interconnections. These could be used for emergency purposes (e.g., fire fighting; temporary supply shortfalls; pump failures; etc.) and to help meet peak demands during high summertime and hunting season use periods.

14. Inspected by:	15. Date inspected:	16. System Vulnerability
Mark W. Eisner	12/14/99	Protected Vulnerable yes (see report)

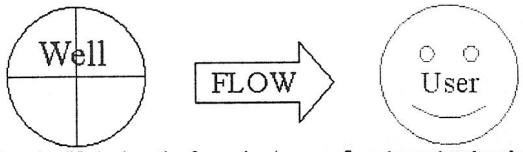
WATER PLANT INFORMATION

17. Type of Treatment:
(Check all that apply)

Disinfection
- Gas Chlorine: _____
- Sodium Hypochlorite _____
- Ultraviolet Radiation _____

Iron Removal _____
Nitrate Removal _____
PH Neutralizer _____
Other _____
Unknown _____

18. System Schematic (Process Flow):



NOTE: This diagram is a simplified schematic of operational process flow observed or described on the date of the reconnaissance. Many water systems possess malfunctioning, disconnected and/or occasionally/regularly-bypassed equipment. Actual treatment processes may differ, therefore, from those shown herein.

19. System Storage:

Ground Storage _____
Elevated Storage _____
Hydropneumatic Tank _____
Other _____

20. Storage Capacity:

Typical Domestic

21. Untreated water sampling tap?

Yes _x_ No _____

WELL INFORMATION

22. Well Information:

Tag Number: AL-73-1010
(report unavailable)
Year Drilled: _____

Casing Depth: _____

Well Depth: _____

Well Yield: _____

Casing Height: _____

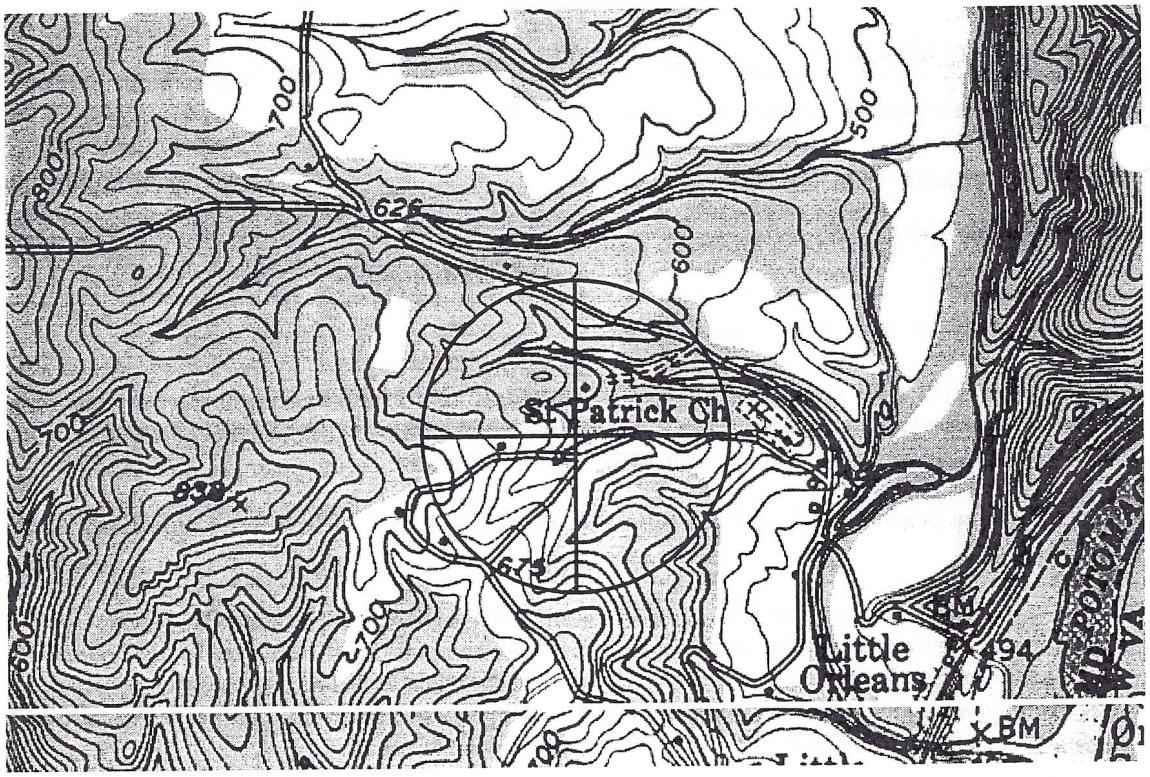
Grout Depth: _____

Pitless Adapter? _____

Wiring OK? unknown

Pump OK? unknown

24. Well Location Diagram (1 in. = 1250 ft.) with Approximate Distances from Potential Contaminant Sources (i.e. septic, sewer lines, structures, petroleum storage, surface water bodies, etc.):



23. Well Type:

Drilled _x_
Driven _____
Dug _____

25. Aquifer:

Name: Foreknobs
Hampshire
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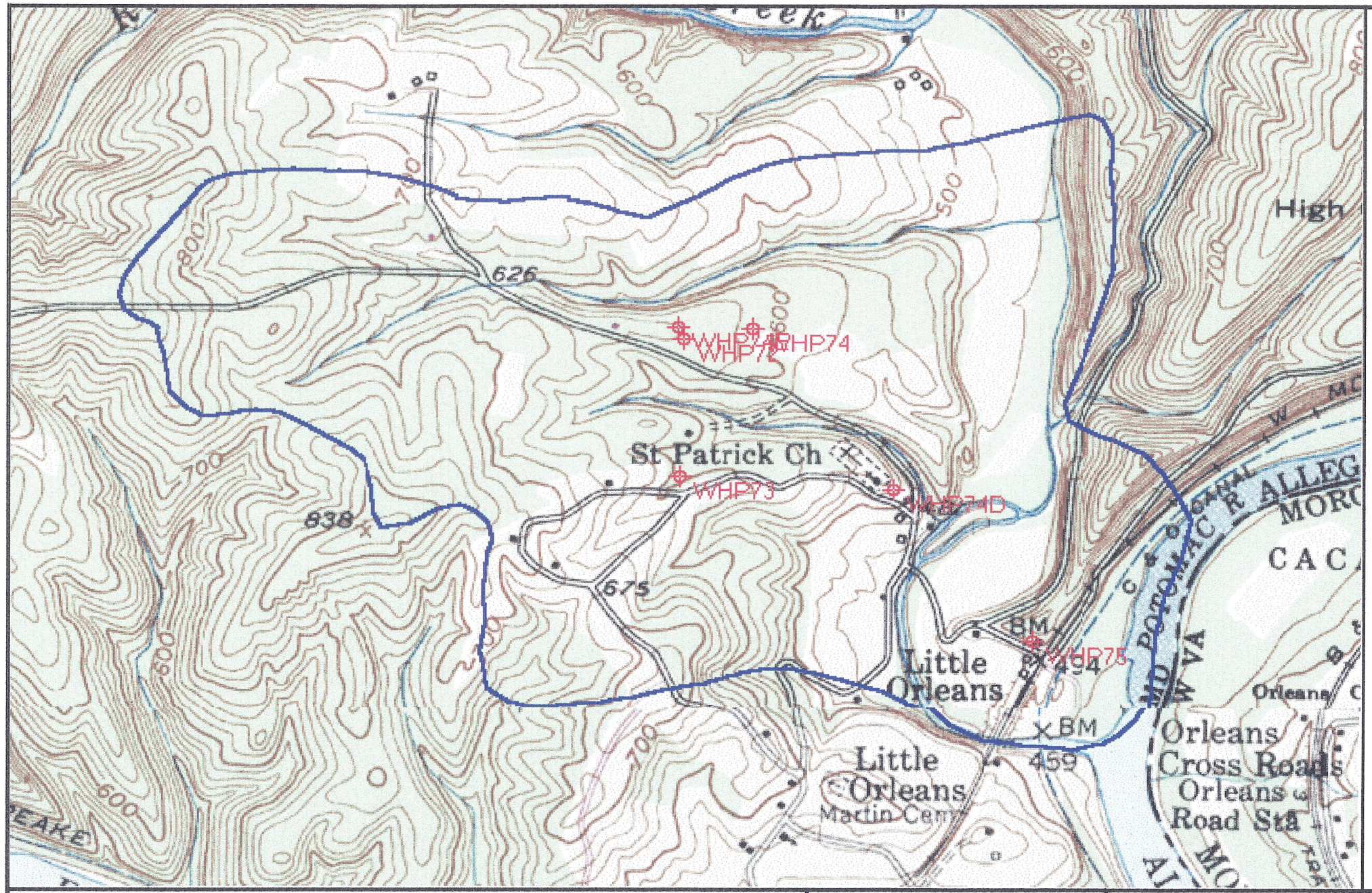

Preliminary Draft

Subject to Revision

N

EXPLANATION:

⊕	**TNC or NTNC well**
72 →	Campground Well A
73	Campground Well B
74	Campground Well C
74D	Campground Well D
74E	Campground Well E
75	Orleans Grocery

topographically-constrained sourced water protection area [includes areas within 1,000 feet of each surveyed well unless clear hydrogoelogic evidence suggested a need for a site-specific modificaiton of this MDE criterion.

APPROXIMATE SCALE 1"=1600 FT

0 — 1600 — 3200

Notes:

1 Base map imported from digital USGS topographic quadrangle maps for Artemas and Paw Paw, MD (1974 revision), provided to ALWI under liscence by Maptech, Inc.

2 This figure is integral to a written report and should only be used in that context.

3 This figure is solely intended to facilitate regulatory review and is not intended to be used for boundary verification, well location or survey control purposes.

Client:

ALLEGANY COUNTY HEALTH DEPARTMENT

ADVANCED Land and Water, Inc. (Global Environmental Solutions)

Project:

NON-COMMUNITY GROUNDWATER SOURCE ASSESSMENT PROGRAM

Prepared Pursuant to the Requirements of:
MD DEPT. OF THE ENVIRONMENT
PUBLIC DRINKING WATER PROGRAM

Figure 5.
Composite Source Water Protection Area
Little Orleans

October, 1999