Capsule Summary of Source Water Protection Effort Initially Funded by MDE 2011-13

Prepared for the City of Salisbury

July 29, 2015

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Initial WHPAs/SWAPs: Early 2000s

In 2011-2013, We Updated Prior SWAP

MDE Focus Was on "Implementation"

When Our MDE-Funded Work Concluded:

We Offered Implementation Recommendations (Tabled)

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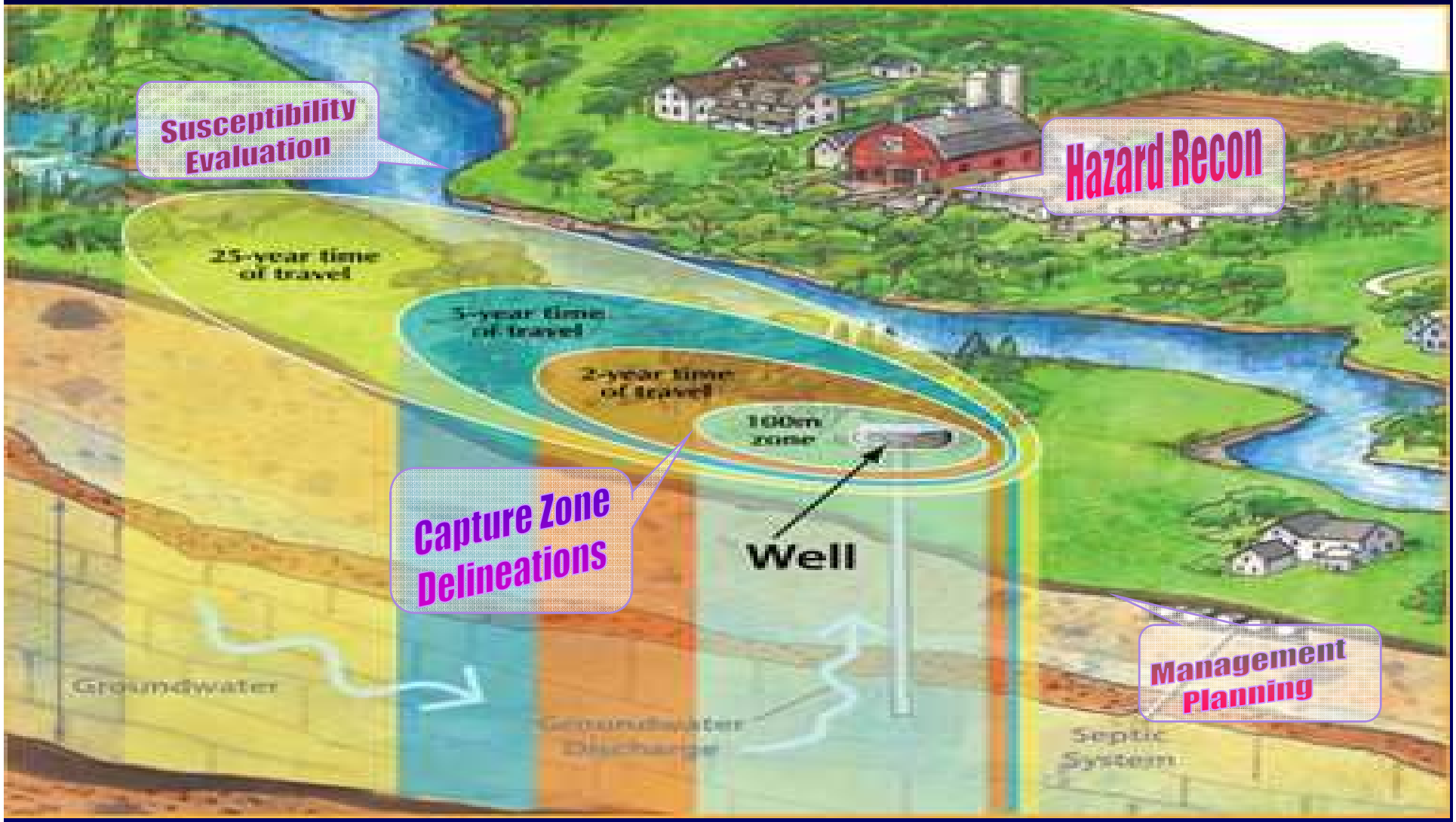
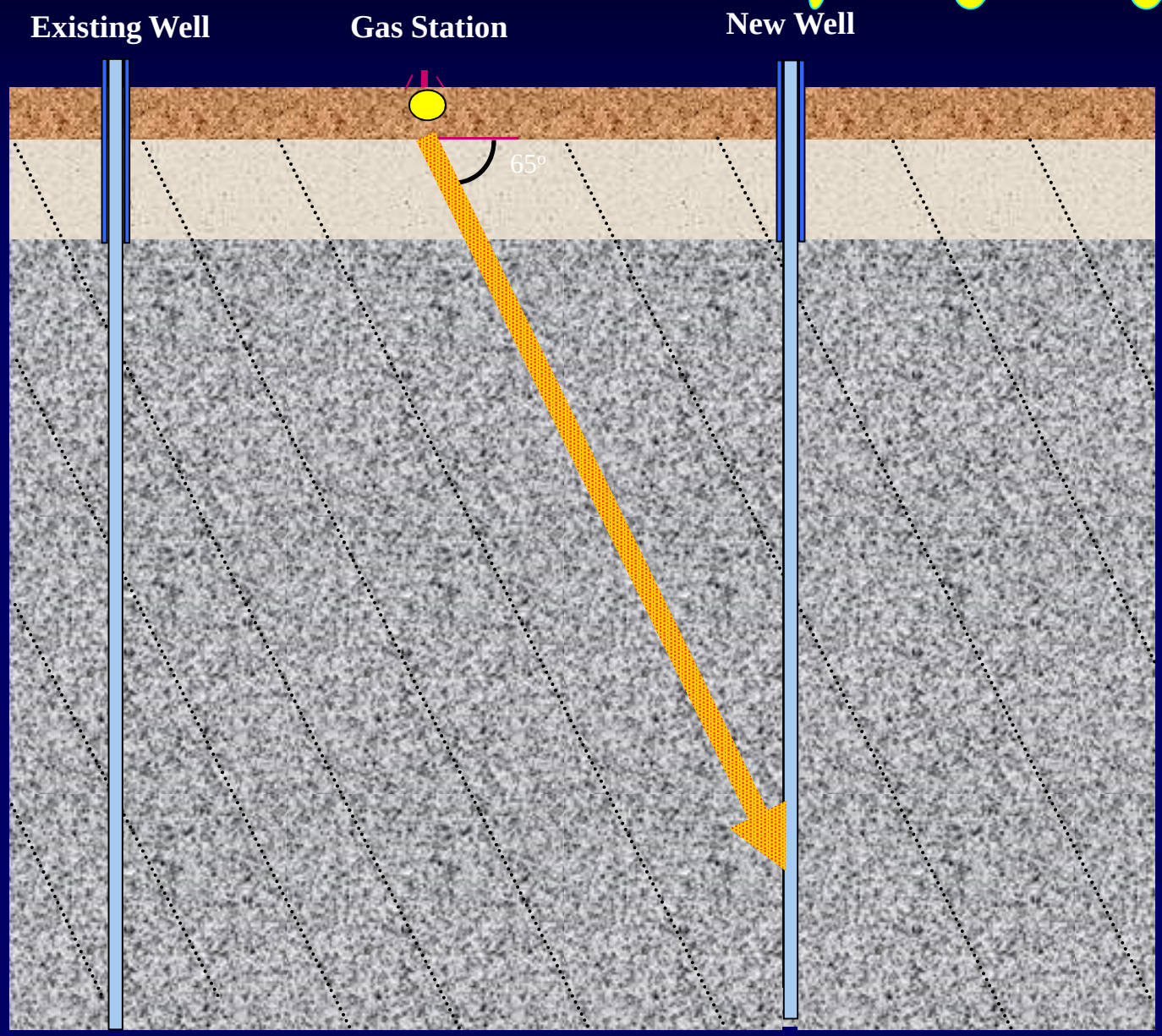
What is Source Water Protection?



Some Hazards may be Observed Directly

Other Hazards can be Inferred Hydrogeologically



Delineation Update

- **Review of 1993 Maryland Geological Survey Model** –Multi-zone approach based on 10-, 20- and 50-year times of travel.
  - These travel zones became revised SWPA Zones 1, 2 and 4, respectively.
  - Present Zone 4 was termed Zone 3 in 1997.
  - New Zone 3 represents the remainder of the Paleochannel outside of what otherwise would be Zones 1 or 2.

- **Filling in Spatial Gaps** - As directed by MDE and approved by the City, spatial gaps on the 1993 MGS delineation maps were filled in to achieve more uniform and implementable SWPAs & increased protected areas.

- **Scaling of MGS Delineations to Account for Permit Increase** – Prior SWAP relied on the 1993 MGS delineations (5.2 mgd), which needed to be expanded once the overall appropriation was increased to 7.6 mgd.

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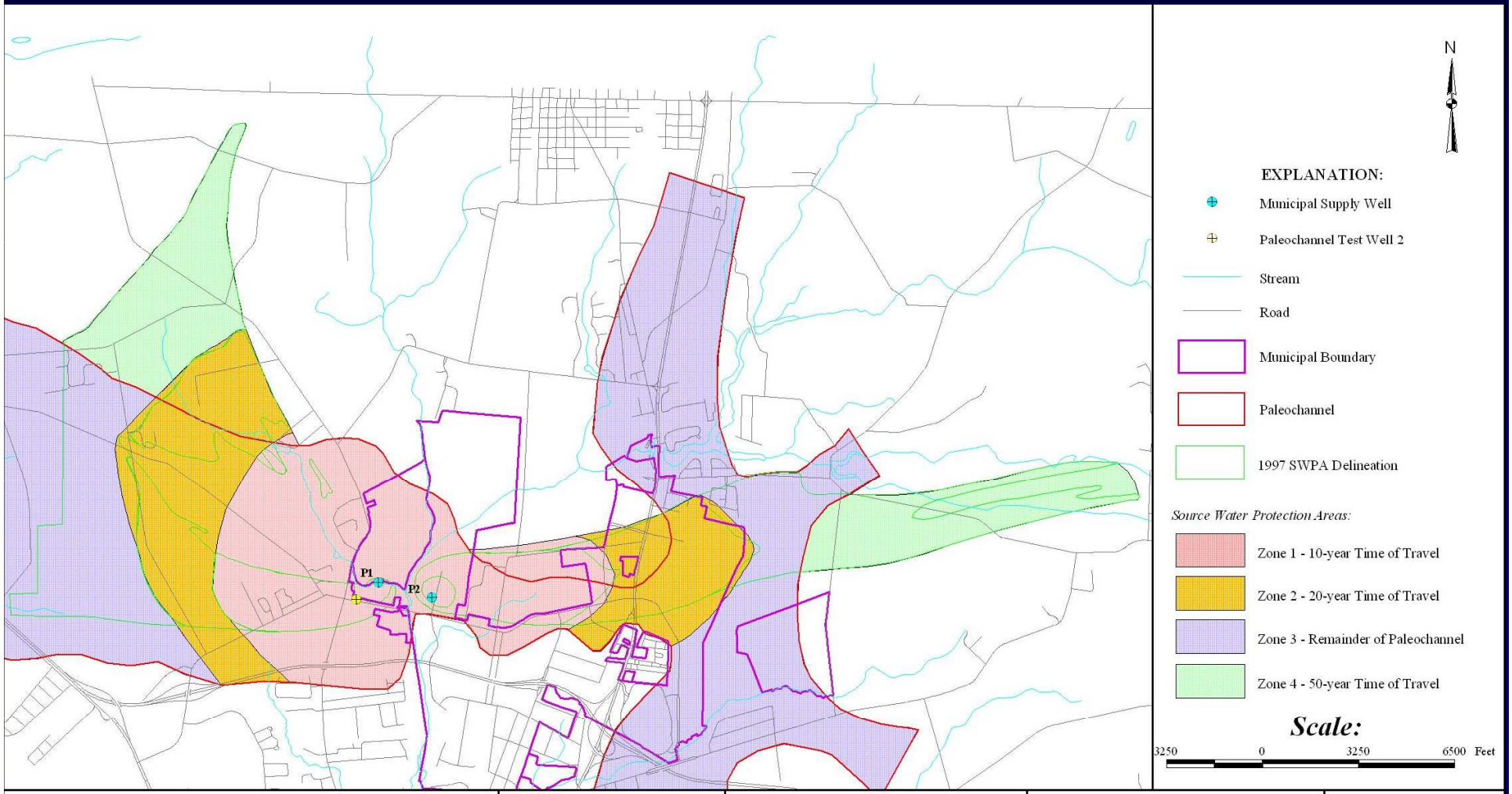
Overview of Our Recommendations: Protective Strategies for Various Zones

Zone	Basis / Description	Contaminant Hazards (Chapter 3)	Protection Strategy (Chapters 4 and 5)
1	10-Year Time of Travel; Scaled to Accommodate Permit & Population Changes Since Original 1993 Models	Inventoried & Mapped	Functionally Identical City and County Ordinances
2	20-Year Time of Travel; Scaled to Accommodate Permit & Population Changes Since Original 1993 Models	Inventoried & Mapped	Functionally Identical City and County Ordinances
3	Remainder of Paleochannel	Inventoried or Mapped if also in a Travel Time Zone	Functionally Identical City and County Ordinances
4	50-Year Time-of-Travel	Inventoried & Mapped	Public Awareness & Community Outreach

Paleo Well Field SWPAs



Notes:
1. Municipal boundary from the Maryland Department of Planning.
2. Streams and roads from the Maryland State Highway Administration.
3. Paleochannel from Map 5-1 of the 2010 draft Wicomico County Code.
4. 1007 SWPA delineation areas based on Andreasen and Smith (1997).
5. Zone 3 extends beyond the field of view of this map.
6. This figure is integral to a written report and should only be used in that context.
7. This figure is not intended to be used for boundary verification or survey control purposes.

Client:

Maryland Department of the Environment

PROJECT NO. MD7S075

Project:

SOURCE WATER PROTECTION PROGRAM

Benefiting the City of Salisbury

Wicomico County, Maryland

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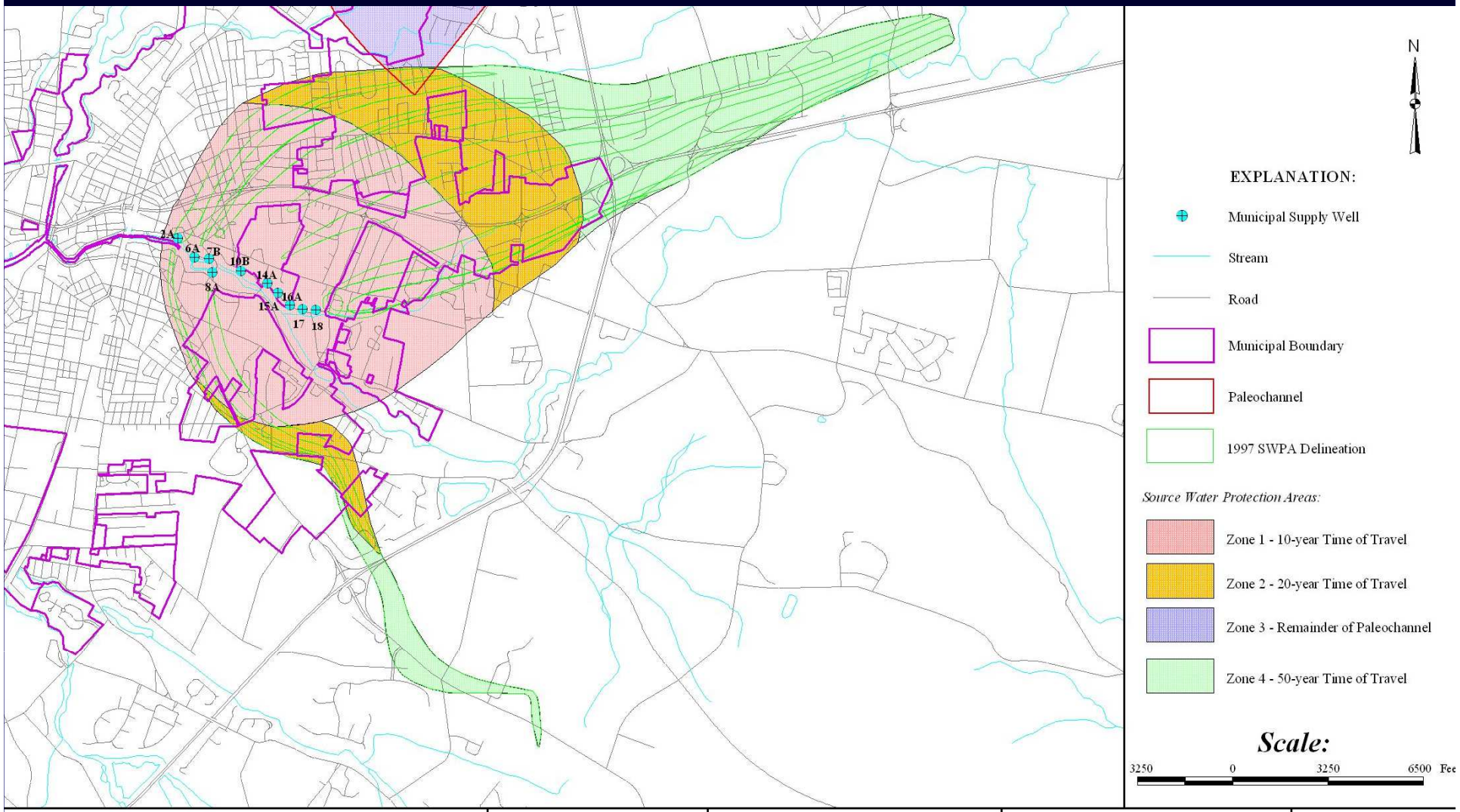
Figure 1:

Paleochannel Well Field Source Water Protection Areas

July 23, 2013

Park Well Field SWPAs



Notes:

1. Municipal boundary from the Maryland Department of Planning.
2. Streams and roads from the Maryland State Highway Administration.
3. Paleochannel from Map 5-1 of the 2010 draft Wicomico County Code.
4. 1997 SWPA delineation areas based on Andreasen and Smith (1997).
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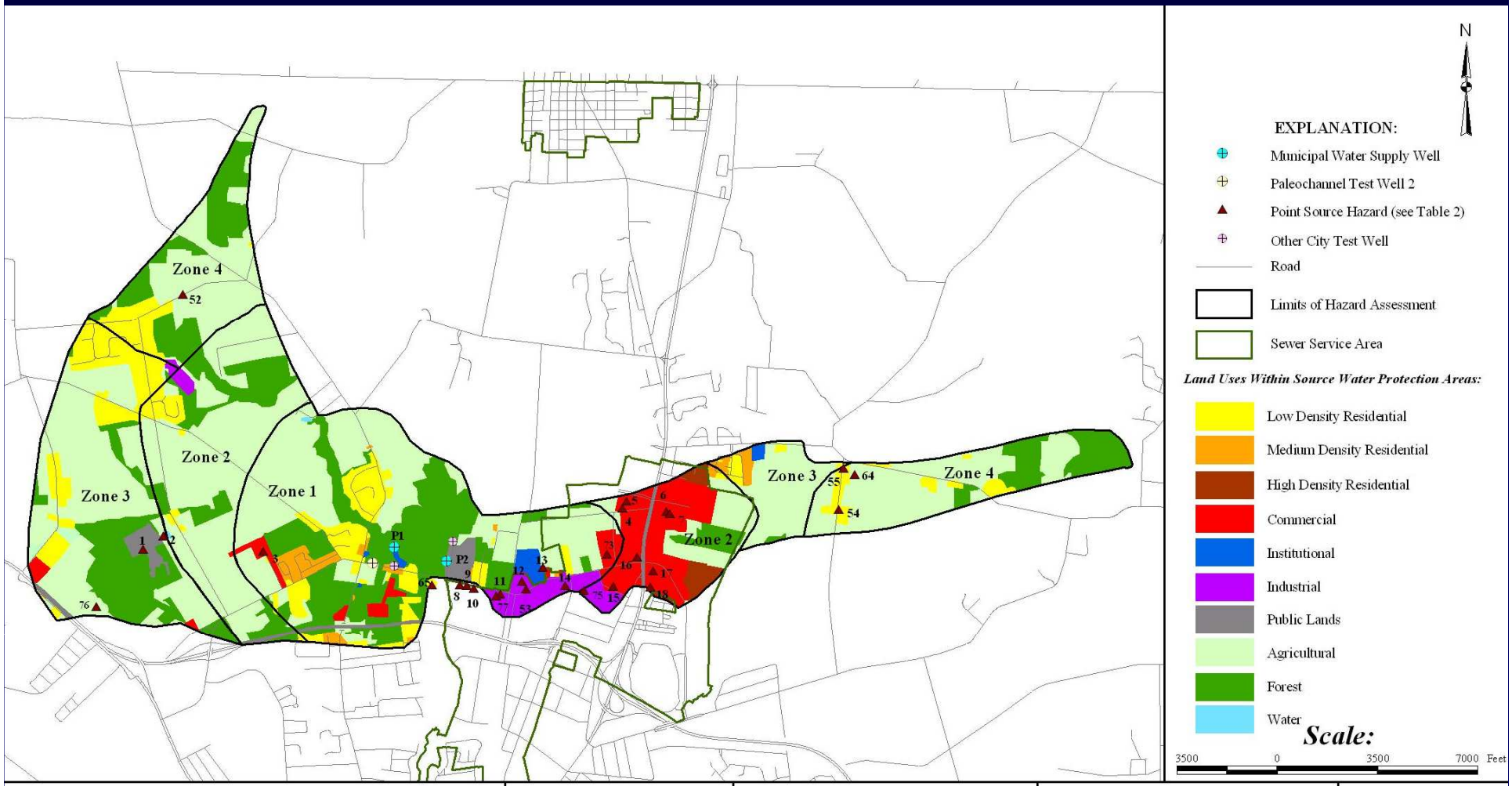
Figure 2:

Park Well Field Source Water Protection Areas

July 23, 2013

Paleo Well Field Hazard Assessment



Notes:

1. Sewer service area boundaries and land use data from the Maryland Department of Planning.
2. Roads from the Maryland State Highway Administration.
3. This figure is integral to a written report and should only be used in that context.
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Figure 3:

Paleochannel Well Field Point Source Hazard and Land Use Map

July 23, 2013

Park Well Field Hazard Assessment

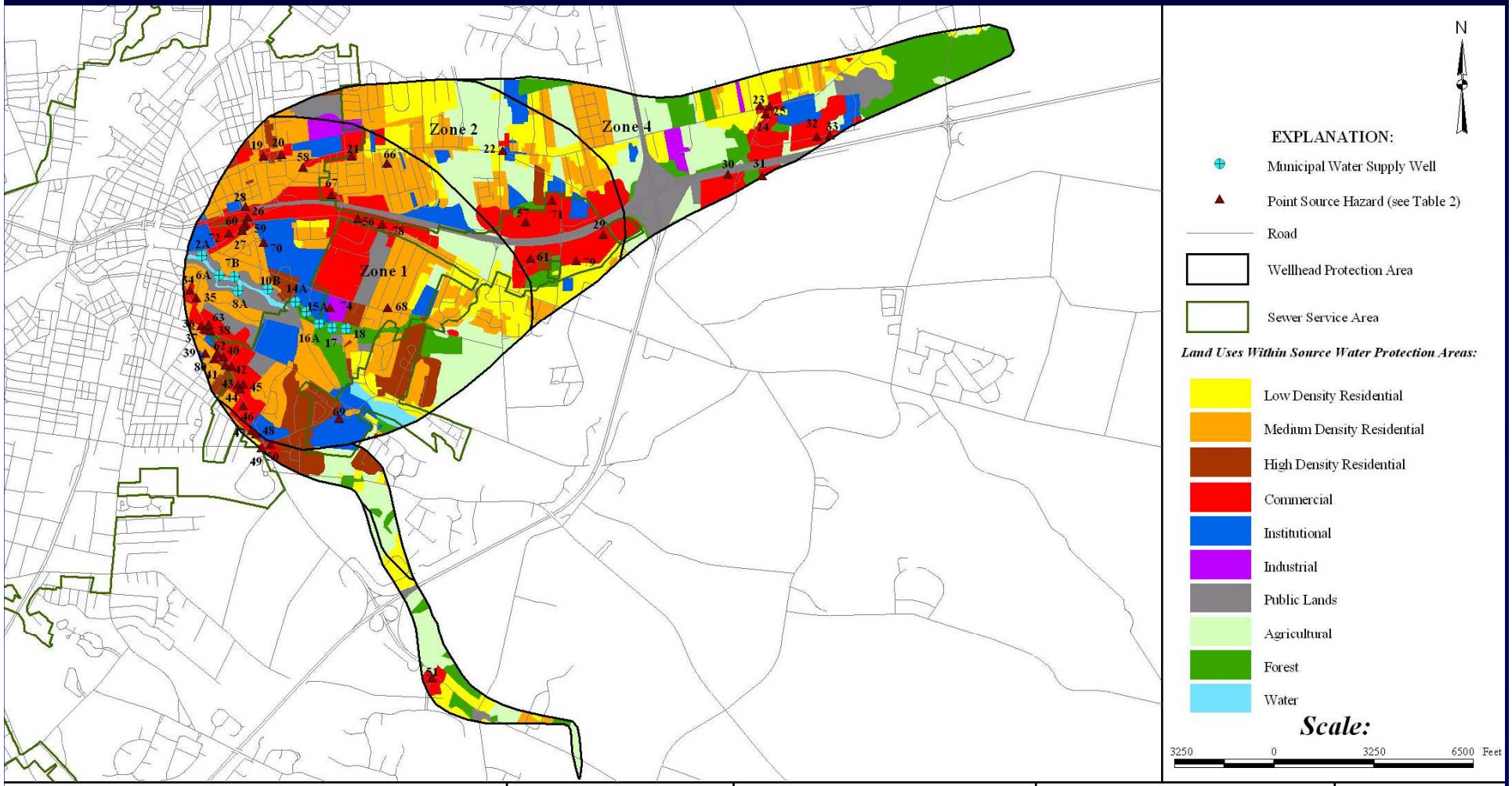

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Figure 4:

Park Well Field Point Source Hazard and Land Use Map

July 23, 2013

Contaminant Susceptibility (General)

- These Susceptibility Analyses were **NOT** evaluations of System compliance. Matters of compliance are addressed through MDE-mandated sampling protocols.

- A finding of susceptibility does **NOT** indicate or suggest an out-of-compliance condition or a need for immediate, corrective action.

- Overall, the System's drinking water is of **high quality**.

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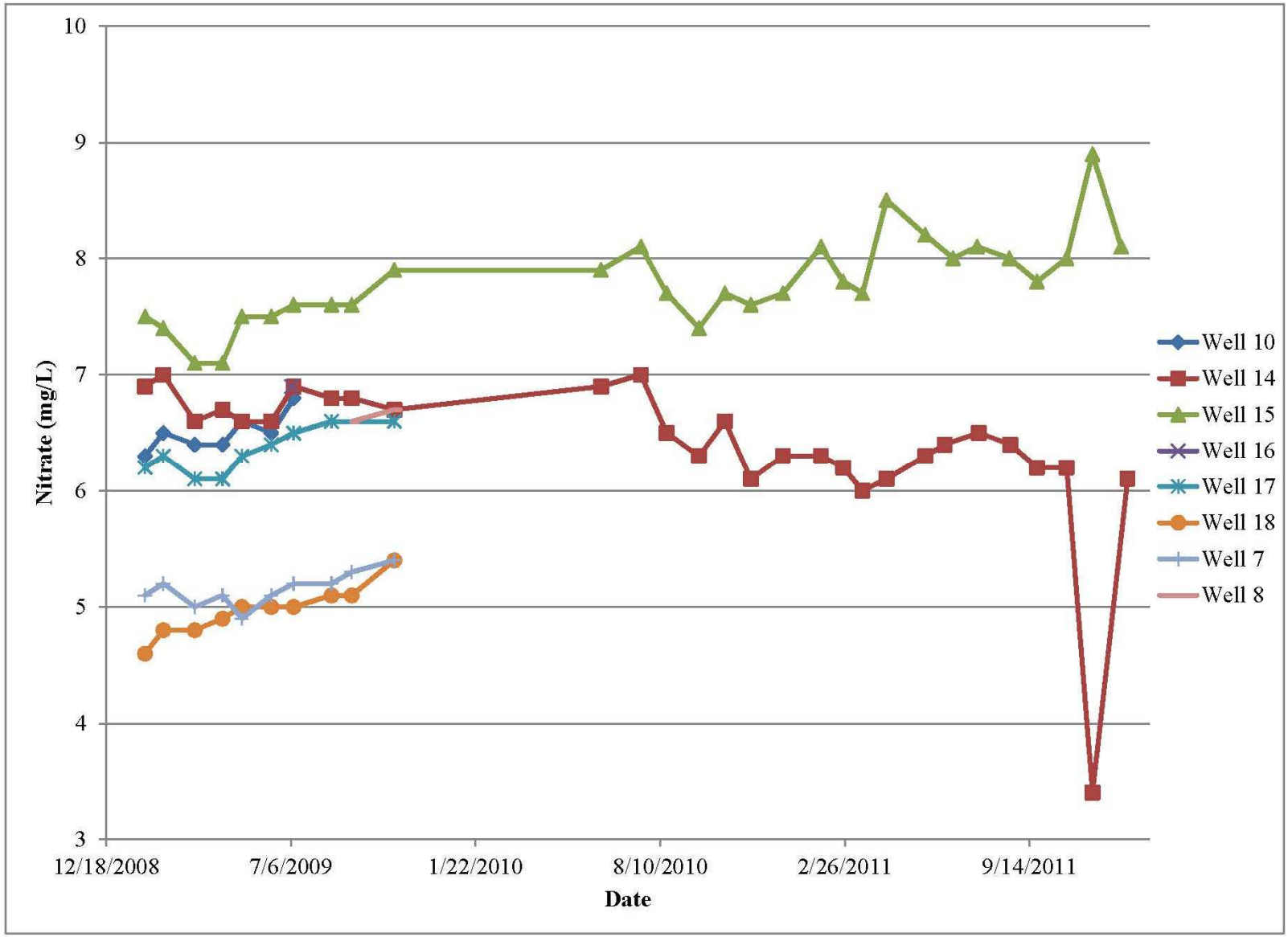
Nitrate Susceptibility - Park

- Nitrate concentrations exceeded 50% of the MCL more than 10% of the time in Wells 7, 8, 10, 14, 15, 16, 17 and 18.
- The Park well field collectively is susceptible to nitrate contamination and data to exclude specific wells from this determination is insufficient.
- Several point and non-point nitrate sources exist within and adjacent to Park well field - Elks Golf Course, the Salisbury Pony League, Salisbury Zoo, residential lawns and agricultural lands.

Figure 5: Park Wellfield Nitrate Concentrations By Well



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Nitrate Susceptibility - Paleo

- Landowners who are not connected to the public sewer system may use septic systems that could contribute nitrate to groundwater.

- The Paleo well field is not (by the numbers) presently susceptible to nitrate contamination. A future finding of elevated nitrate concentrations seemed possible given the predominant land uses within the SWPA (agriculture and residential on septics), and the elevated nitrate WQ testing results for nearby test wells.

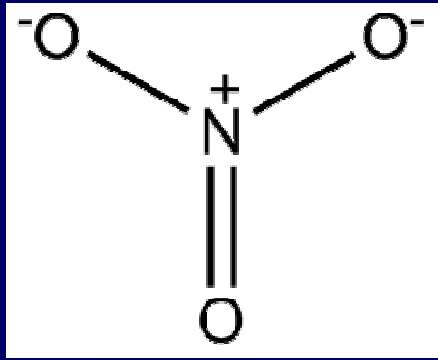

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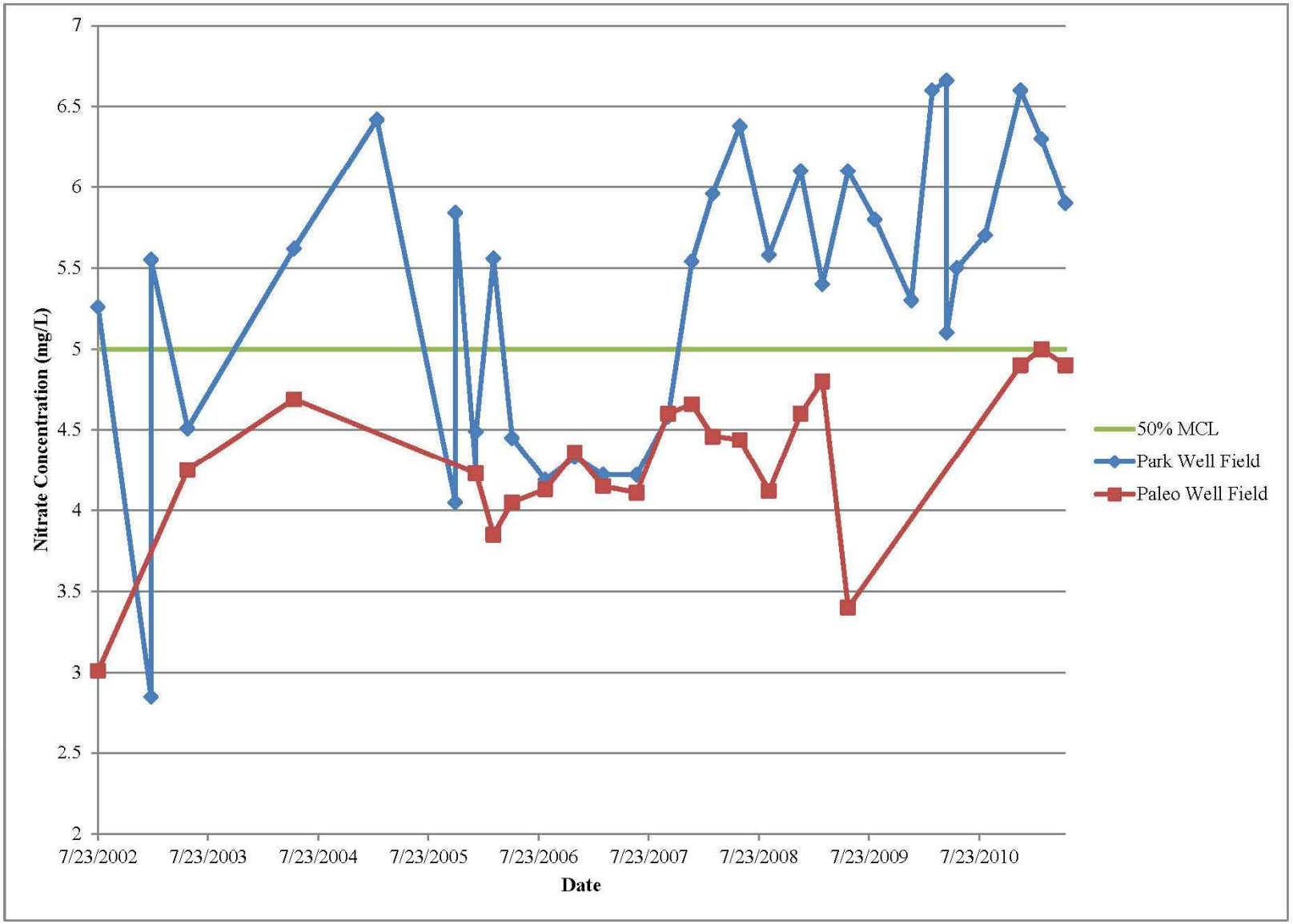
Figure 6: Nitrate Over Time at Park and Paleo Treatment Plants



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Lead Susceptibility (Technicality)

- Park Well 17 had a lead concentration that exceeded drinking water MCL of 0.015 mg/L.
- Distribution of lead is not indicative of aquifer-wide contamination. Lead may be leaching from pumping or pipe equipment in Well No. 17 as an indirect consequence of groundwater acidity.
- **Recommendation –** City should consider replacing the Well 17 pump and supporting appurtenances with equipment of assured lead-free design.

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Existing Ordinances

Topic	City	County
Number of Districts & Protection Zones	Two Districts; Paleochannel & Park	Paleochannel Overlay District only; outside of City control
Delineation Sources, Methods & Refinement Provisions	Paleo District based on paleochannel as illustrated in MGS Bulletin 31 (1977); no clear basis stated for Park District; no stated means or plan for revision or update	"... Paleo District... Include[es] ing all that area outside… Salisbury shown as the Paleochannel on the Maryland Geological Survey Map…" No mention of Park district; no clear provision for revision.
Which Ordinance Governs	Does not extend outside City boundaries; no recognition of multi-zonal protection strategy	Does not extend into City boundaries; no recognition of multi-zonal protection strategy
Development Reviews and Approvals	Development within "Districts shall require submission of a Comprehensive Site Plan to be reviewed by the Planning Commission."	"All proposals for either uses or development allowed as Permitted or Special Exception uses on any lot or parcel of land which is wholly or partially located in the Paleochannel overlay district, shall first be reviewed and approved by the Planning Commission."
USTs	See "store" under "Restricted Uses" - the storage provision would seemingly include USTs	Prohibits "any use that will include the underground storage or generation of materials that are ignitable, corrosive, reactive, toxic, hazardous, infectious or chemical or petroleum laden." Provides sweeping grandfathering to existing industrial and agricultural uses **[1]**
Septics	Not Specified	Not Specified
Other Point Source Hazards	**Restricted Uses:** "Uses which discharge excessive amounts of water or use, store or generate raw or waste materials which are ignitable, corrosive, reactive or toxic, such as, but not limited to, manufacture of organic and inorganic chemicals, paint and pigments, petroleum refining, steel, metal products fabrication, electroplating and textile dyeing and finishing."	**Prohibited Uses:** Soil remediation facility, Hazardous waste storage or facility, Toxic waste storage or facility, Infectious waste storage or facility, Mineral extraction (i.e., sand, gravel and clay excavations) or borrow pit operation, Sanitary landfill, Salvage or recycling yards and junkyards, Rubble landfill, Sludge storage or application.
Non-Point Source Hazards	Not Specified	Not Specified

[1] This provision shall not apply to:
(a) Existing industrial uses where materials that are ignitable, corrosive, reactive, toxic, hazardous, infectious, chemical or petroleum laden are part of the means of production, or.
(b) The storage of petroleum or chemicals incidental to permitted agriculture uses.
(c) Storage of natural gas or propane used for heating and cooling the premises where located.
(d) Above ground storage of such materials in compliance with all State and Federal regulations which may from time to time be promulgated

Administrative Recommendations; Same Whether in City or County; Same Whether Park or Paleo SWPA

Topic	Recommendation
Number of Districts & Protection Zones	Four Zones of Protection: **Zone 1** is 10yr TOT, **Zone 2** is 20yr TOT, **Zone 3** is Paleochannel; **Zone 4** is 50-yr TOT
Delineation Sources and Methods; Provision for Refinement & Revision	Four Zones (approved by MDE) guided by: 1) Filling in spatial gaps from MGS model 2) Present appropriation permit (7.6 mgd), 3) MGS 2010 forecasted models, 4) Paleochannel as delineated by MGS; and 5) any party can fund a delineation revision subject to County, City and MDE review and approval
Which Ordinance Governs	**Protection strategies same both inside and outside City;** Zones 1 & 2 protected by travel zone strategies discussed and agreed on 5/12/12; Zone 3 protected in manner of present County ordinance; Zone 4 is public awareness and outreach only
Development Reviews and Approvals	Language Consistency (County should govern); does this cover prohibited and restrictive uses adequately? Recommend revision of "any lot or parcel of land" to "any proposed building, improvement or impervious surface"

Land Use Recommendations;
Same Whether in City or County;
Same Whether Park or Paleo SWPA

Topic	Recommendation
USTs	**Zone 1:** No new non-agircultural hazardous material or petroleum product USTs (vaulted ASTs are OK). Existing USTs to use vaulted ASTs when upgrading (i.e., pulling a building permit) anyway
	Zone 2: No new non-agircultural hazardous material or petroleum product USTs greater than 275 gallons. Existing USTs to use vaulted ASTs when upgrading anyway
Septics	**Zones 1 and 2:** No New or Replacement Septic Systems without BAT Pretreatment and arrangement for perpetual maintenance (Nitrates)
Other Point Source Hazards	**Zones 1 and 2:** Add MDE groundwater discharge permittees, as well as coal combustion waste products and byproducts emplacement to list of prohibited uses; allow grandfathering - these provisions should apply to newly proposed uses only.
Non-Point Source Hazards	**Zone 1:** No New Commercial Fertilization
	Zone 1 and 2: No Existing Commercial Fertilization without MDE - Approvable Nutrient Management Plans (golf course and ballfield)

Primary Recommendations

Ordinances

- Have functionally identical ordinances for City and County to reflect a single set of protection measures operative both within and outside of City limits.

Deliberations and Agreements

- **Deliberations** – Anyone can propose a change based on technical criteria. MDE should serve as approving agency for any changes.

- **Ordinance Revisions** – Functionally identical protection strategies for both jurisdictions. Both need revision for clarity.

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Other Recommendations

- **Extend Service Areas to Annexed Properties -** Once this is achieved, private wells and septic systems should be abandoned.

- **Create a Spill Notification System -** give the City notice of potential contaminants that could impact drinking water quality and incorporate measures to reduce impacts.

- **Abandon Unused Wells -** The City should go forward with the plan to abandon the Paleo well field test borings once they no longer are needed

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Other Recommendations (continued)

- **Agricultural Outreach** - Consider financial incentives (property tax reductions) offered to property owners for proactive and voluntary cooperation in changing land management practices in ways that result in improved City water quality.

- **Acquire or Ease Specific Properties** - Would reduce likelihood of existing or potentially incompatible land uses.

- **Post "No Dumping" Signs Within SWPA** - discourage informal disposal of hazardous materials/products within SWPAs

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