

Section IV – Location Restrictions and Setbacks

This section addresses restrictions on the locations of well pads, pipelines, access roads, compressor stations, and other ancillary facilities. Certain ecologically important areas, recreational areas and sources of drinking water may only be fully protected if certain activities are precluded there. Similar reasoning can be applied to the protection of cultural and historic resources, where the presence of shale gas development infrastructure will detract from the interpretative value and visitor experience. Minimizing conflict with residential and community based uses is also an important consideration in defining location restrictions. In addition to designating certain places or features “off limit”, many of these resources also require a minimum setback distance to provide an additional buffer between the development activity and the resource of concern. The setback distance will vary based on the resource of concern and the nature of the disturbance. This section also describes additional avoidance, minimization and mitigation criteria and siting best practices.

A. Location Restrictions and Setbacks

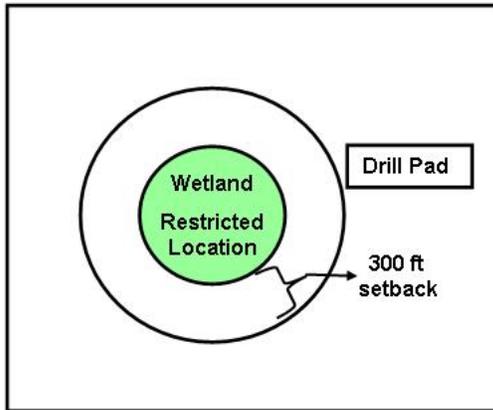
UMCES-AL Report recommendations 1-E, 1-H, 1-I, 1-J, 4-A, 5-C, 5-C.1, 5-C.2, 5-C.3, 6-B, 8-F, 8-G, 9-C

Certain location restrictions and setbacks exist in current law and regulation, and these will be continued. In addition to a statutory prohibition against drilling for gas or oil in the waters of the Chesapeake Bay, any of its tributaries, or in the Chesapeake Bay Critical Area (Md. Env. Code §14-107), these are:

Distance (feet)	From	To	Waivers	Cite
1,000	Well	The boundary of the property on which the well is to be drilled	Can be granted by the Department if a well location closer than 1,000 feet is necessary due to site constraints.	Md. Env. Code §14-112 and COMAR 26.19.01.09 C and D
2,000	Gas Well	Existing gas well in the same reservoir	Unless the Department is provided with geologic evidence of reservoir separation to warrant granting an exception	COMAR 26.19.01.09 E
1320	Oil Well	Existing oil well in the same reservoir	Unless the Department is provided with geologic evidence of reservoir separation to warrant granting an exception	COMAR 26.19.01.09 F

1,000	Well	A school, church, drinking water supply, wellhead protection area, or an occupied dwelling	Unless written permission of the owners is submitted with the application and approved by the Department	COMAR 26.19.01.09 G
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The figure below illustrates the concept of location restrictions and setbacks that uses the UMCES-AL recommendation for aquatic habitat. The resource of concern is a wetland.



UMCES-AL has recommended that the edge of drill pad disturbance should be 300 feet or greater from the wetland habitat. The drill pad must be located outside of the restricted resource and the required setback distance.

A preliminary analysis was conducted by DNR to evaluate the effect of a subset of proposed location restrictions and setbacks on the ability to access Marcellus shale gas through horizontal drilling (Appendix D: Marcellus shale constraint analysis). The surface constraint factors selected

were those which were appropriate for a coarse, landscape scale analysis. Under a scenario that excluded drilling from the Accident gas storage dome and assumed an 8,000 foot horizontal drill length, approximately 98 % of the Marcellus shale would be accessible. In an effort to be conservative, the same analysis was run using a 4,000 foot horizontal drill length, resulting in about 94 % accessibility to the Marcellus shale formation. This assessment supports the UMCES-AL suggestion that it is reasonable to expect that shale gas resources can be broadly accessed while minimizing surface disturbance, particularly in areas with sensitive resources. Setback recommendations from the UMCES-AL report, with the Departments' comments, are provided in Table I-2 below.

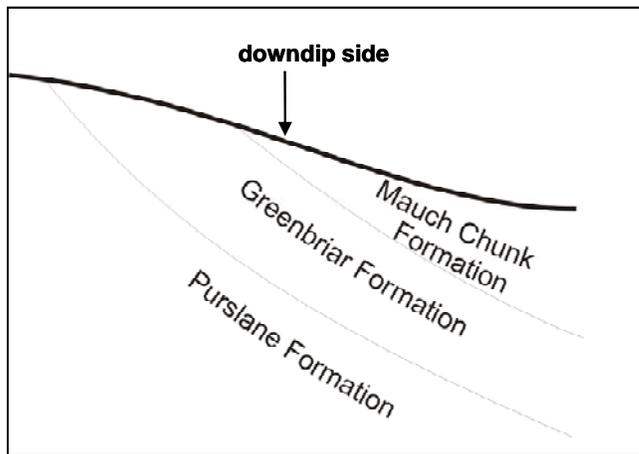
Table I-2: Setback Recommendations from UMCES-AL Report with Adjustments Recommended by the Departments			
Distance (feet)	From	To	MDE and DNR Adjustment
300 ¹⁰	Aquatic habitat (defined as all streams, rivers, seeps, springs, wetlands, lakes, ponds, reservoirs, and 100 year floodplains)	Edge of drill pad disturbance	Agree
600	Special conservation areas (<i>e.g.</i> , irreplaceable natural areas, wildlands)	Edge of drill pad disturbance	Agree; may be expanded on a case by case basis, after DNR conducts a participatory GIS workshop; apply not just to drill pad locations but to all permanent surface infrastructure
300	All cultural and historical sites, state and federal parks, trails, wildlife management areas, scenic and wild rivers, and scenic byways	Edge of drill pad disturbance	Apply not just to drill pad locations but to all permanent surface infrastructure
1,000	Mapped limestone outcrops or known caves	Borehole	Agree as to caves; for limestone outcrops, reduce to a setback of 500 feet on the downdip side
1,000	Mapped underground coal mines	Borehole	Unnecessarily restrictive; alternative approach recommended; see Section VI-D
1,320	Historic gas wells	Any portion of the borehole, including laterals	Agree
1,000	Any occupied building	Compressor stations	Agree
1,000	Any occupied building	Borehole	Agree

¹⁰ This distance shall be measured from the center of a perennial stream or from the ordinary high water mark of any river, natural or artificial lake, pond, reservoir, seep or spring, determined as conditions exist at the time of the approved CGDP.

500	Private groundwater wells	Borehole	Expand to 1,000 feet, as required by current regulations.
2,000	Public groundwater wells or surface water intakes	Borehole	Agree; drinking water reservoirs must also be protected

The Departments generally accept the proposed location restrictions and setbacks with the following modifications and additions that were based on the subject matter expertise of the agencies.

1. Well pads shall not be constructed on land with a slope > 15%. This was recommended in the report, but not included as a key recommendation.
2. Setback distances may be expanded on a case by case basis if the area includes steep slopes or highly erodible soils.
3. Modify restrictions for setbacks from limestone outcrops to the borehole; setback areas for mapped limestone outcrops apply only to 500 feet on the downdip side of the formation.



There is no need to adhere to setbacks on the updip side because the limestone formation – the Greenbrier – will not be encountered (see figure to left). This setback recommendation was established to avoid karst features. However, the Maryland Geological Survey states that most limestone in Garrett County is not karst, but when these features do occur, they rarely penetrate below 100 – 200 feet from the surface. In Garrett

County, these formations generally dip at 20 degrees, while the beds in Allegany County dip at steeper angles. Using a 200 foot depth for potential karst development as a conservative estimate, a 500 foot setback on the downdip side of the limestone outcrop would be sufficiently protective.

4. Setbacks for known and discovered caves should remain at 1000 feet because of the biological resource sensitivity and the potential for groundwater contamination.
5. Modify restrictions for setbacks from mapped underground coal mines to the borehole. MDE’s mining program notes that Maryland’s deep coal mines may cover thousands of acres, are only several hundred feet deep, and can be safely cased through, particularly if pilot holes are drilled to identify these features and drilling processes are modified to address the known hazards. A setback of 1000 feet is unnecessarily restrictive. Instead the Departments recommend pre-drill planning as an alternative which

involves careful site evaluation and pilot hole investigations. See Section VI-D for a description on pre-drill planning.

6. Replace the recommended 500 foot setback from private groundwater wells to the borehole with a 1,000 foot setback.

Current regulations, COMAR 26.19.01.19G, are more protective and state that an oil and gas well cannot be closer than 1,000 feet to a drinking water supply. Private groundwater wells are considered a drinking water supply.

7. The setback requirement of 2,000 feet shall apply upstream of any surface water intake on a flowing stream, as a radius around any drinking water well, and from the edge of any drinking water reservoir.

8. Expand drill pad location restrictions and setbacks listed in Table 1-1 to all gas development activities resulting in permanent surface alteration that would negatively impact natural, cultural and historic resources. This includes permanent roads, compressor stations, separator facilities and other infrastructure needs. This expansion applies to aquatic habitat, special conservation areas, cultural and historical sites, State and federal parks and forests, trails, wildlife management areas, wild and scenic rivers and scenic byways.

9. DNR will develop new maps of public outdoor recreational use areas to establish additional recreational setbacks and mitigation measures for minimizing public use conflicts. DNR will initiate the first of a series of participatory GIS workshops to develop these new maps in the fall of 2013, focusing on the recreational amenities of Savage River State Forest. The results of this workshop will be weighed against the alternative option of expanding the setback to 600 feet.

Maryland has a number of well-developed and nationally-recognized networks of scenic and historic byways and hiking and water trails that provide opportunities for the public to experience nature, cultural and historical features and the outdoors through unique vistas and long-distance travel routes. The location and features that make these routes unique (*e.g.* vistas, through-trail hikes, canopy cover) should be considered during setback discussions. The proposed recreational setback from Marcellus shale gas infrastructure is a minimum of 300 feet with additional setback considerations for noise, visual impacts and public safety. Additional factors will include hunting and fishing activities, light, odor and other issues that would affect public use and enjoyment of these resources. A more detailed discussion of these issues and concerns is provided in Appendix E: Marcellus Shale and Recreational & Aesthetic Resources in Western Maryland. DNR will launch a formal process for developing new maps of use areas that would include participatory GIS workshops conducted with facility managers, friends groups, frequent visitors, and other stakeholders. The maps generated from these discussions and workshops could then be used to inform comprehensive gas development plans, setback considerations, mitigation measures and timing of shale gas development activities. This recommendation could be incorporated as an element of the public comment period of a CGDP process, or be developed independently of the CGDP and included in the Shale Gas Development Toolbox.

10. For good cause shown and with the consent of the landowner protected by the setback, MDE may approve exceptions to the setback requirements.

B. Siting Best Practices

UMCES-AL Report recommendations 3-B, 4-D, 5-A.2, 6-J.2, 6-J.4, 8-C, 8-D, 8-H, 9-G, 9-H, 10-A, 10-C, 10-D

This section also includes best practices recommended for siting pipelines, access roads and other supporting infrastructure. The Departments generally accept the proposed siting best practices with the following modifications and additions.

1. Forest mitigation that is required to meet a no-net-loss of forest standard will be evaluated differently based on whether the loss is temporary or permanent.
2. Site-specific viewshed analysis should be conducted (as recommended by UMCES-AL), but temporary and permanent impacts will be evaluated differently.
3. Conservation of high value forest land through easements or fee-simple acquisitions should be considered as an additional mitigation option for implementing the no-net-loss of forest recommendation, particularly since reforestation options in western Maryland locations may be limited. Conservation banking may also be an additional mechanism to meet forest conservation mitigation.
4. DNR will provide additional GIS conservation planning data layers and guidance for avoiding, minimizing and mitigating impact to aquatic and terrestrial high priority conservation areas. These data layers will be included in the Shale Gas Development Toolbox described in Section III-D.
5. Stream crossings will avoid impact to brook trout spawning beds.
6. Operations, water withdrawals and infrastructure siting should avoid thermal impacts to cold water streams.

The setback and other recommendations provide a high level of protection to Tier II waters from MSGD activities. MDE will consider whether additional anti-degradation protections are necessary for MSGD when it revises its anti-degradation regulations.