

**ATTACHMENT B1b  
(INDUSTRIAL SOLID WASTE LANDFILL)**

INFORMATION TO BE SHOWN ON PLANS AND/OR SUBMITTED WITH PLANS

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**DETAIL ENGINEERING PLAN COVER SHEET**

(B)(1)(a)	Name of the industrial landfill facility		
(B)(1)(b)	Precise geographic location, boundaries, etc.		
(B)(1)(c)	Name and address of the applicant		
(B)(1)(d)	Name and address of the owner and of the operator		
(B)(1)(e)	Name and address of the person who prepared the plans		
(B)(1)(f)	Index of plan sheets		

**PLAN DRAWINGS**

(B)(2)(b)(i)	All zoning classifications, property owners, political subdivisions		
(B)(2)(b)(ii)	Potential gas migration pathways and sources		
(B)(2)(b)(iii)	Limits of the regulatory floodplain		
(B)(2)(b)(iv)	National park or recreation area, candidate areas for potential inclusion into the national park system, and any state park or established state park purchase areas		
(B)(2)(b)(v)	State nature preserves, state wildlife areas, national and state scenic rivers, any national wildlife refuge, special interest areas, research natural areas in the Wayne National Forest, outstanding resource waters, coldwater habitats, and exceptional warmwater habitats		
(B)(2)(b)(vi)	Public and private water supply wells and their status (to be shown within 2,000' of waste placement)		
(B)(2)(b)(vii)	Limits of wellhead protection areas etc.		
(B)(2)(b)(viii)	Faults that have had displacement in Holocene time		
(B)(2)(b)(ix)	Surface and underground mining (to be shown within 2,000' of the limits of solid waste placement)		
(B)(2)(b)(x)	Limits of sole source aquifer		
(B)(2)(c)	Limits of disturbance and the facility boundary		
(B)(3)(b)	Location of existing and proposed pipes and conduits, etc.		
(B)(3)(c)	Location of subsurface investigation sites		
(B)(3)(d)	Potentiometric maps of the uppermost aquifer system		
(B)(3)(e)	Location of ground water control structures		
(B)(3)(f)	Location of explosive gas control structures		
(B)(3)(g)	Diagram of phases		
(B)(3)(h)	Land set aside for leachate treatment/pretreatment		

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**PLAN DRAWINGS** (continued)

(B)(4)(a)	Horizontal and vertical limits of excavation		
(B)(4)(b)	Horizontal limits and elevations of soil liner		
(B)(4)(c)	Elevations and layout of leachate management system		
(B)(4)(d)	Horizontal limits and top and bottom elevations of solid waste placement		
(B)(4)(e)	Horizontal limits and elevation of separatory liner (if required)		
(B)(4)(f)	Horizontal limits and top and bottom elevations of cap system and surface drainage		
(B)(4)(g)	Grid system		

**CROSS SECTIONS**

(B)(5)(a)(i)	Existing topography		
(B)(5)(a)(ii)	Horizontal and vertical limits of excavation		
(B)(5)(a)(iii)	Horizontal limits and bottom elevations of any added geologic material		
(B)(5)(a)(iv)	Horizontal limits and bottom elevations of the recompacted soil liner		
(B)(5)(a)(v)	Geologic stratigraphy and significant zones of saturation		
(B)(5)(a)(vi)	Uppermost aquifer and saturated strata above aquifer		
(B)(5)(a)(vii)	Well logs of intercepted borings		
(B)(5)(a)(viii)	Any permanent ground water control structures		
(B)(5)(b)	Perimeter of the property showing explosive gas migration pathways		
(B)(5)(c)(i)	Existing topography		
(B)(5)(c)(ii)	Limits of excavation		
(B)(5)(c)(iii)	Limits of waste placement		
(B)(5)(c)(iv)	Horizontal limits and top and bottom elevations of cap system		
(B)(5)(d)(i)	Limits of existing waste (if proposed vertical expansion)		
(B)(5)(d)(ii)	Approved and proposed limits of waste placement (if proposed vertical expansion)		
(B)(5)(d)(iii)	Separatory liner/LCS (if proposed vertical expansion)		

**SYSTEMATIC DEVELOPMENT PLANS**

(B)(6)(a)	Monitoring wells to be installed for each phase		
(B)(6)(b)	Extent of waste placement		
(B)(6)(c)	Contours of previously filled phases		
(B)(6)(d)	Limits of cover on previously filled phases		
(B)(6)(e)	Contours of bottom limits of waste placement		
(B)(6)(f)	Access roads		
(B)(6)(g)	Surface water flow and points of concentration and measures to control		

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**DETAIL DRAWINGS**

(B)(7)(a)	Liner system, including interface between phases		
(B)(7)(b)	Composite cap system		
(B)(7)(c)	Relationship of composite cap system, leachate management system, soil liner, etc.		
(B)(7)(d)(i)	Leachate collection layer		
(B)(7)(d)(ii)	Collection pipes, bedding media, boots		
(B)(7)(d)(iii)	Filter layer		
(B)(7)(d)(iv)	Sumps		
(B)(7)(d)(v)	Conveyance structures		
(B)(7)(d)	Storage tanks		
(B)(7)(e)	Permanent ground water control structures, if any		
(B)(7)(f)	Ground water monitoring well and piezometer construction		
(B)(7)(g)	Explosive gas control system elements		
(B)(7)(h)	Separatory liner/LCS, if applicable		
(B)(7)(i)	Sedimentation pond, discharge structures, etc.		
(B)(7)(j)	Other (e.g. structural fill, gas collection layer, interim liner, etc)		

**NARRATIVE DESCRIPTION/INFORMATION (Summary)**

(C)(1)	Summary of the site environs, including discussion on compliance, waste placement limits, location restriction demonstrations, and operating criteria		
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**VARIANCE AND EXEMPTION REQUESTS**

(C)(2)	Any requests for variances and exemptions.		
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**SITE INVESTIGATION (Description of geology and hydrogeology)**

(C)(3)(b)(i)	Yield of regional aquifer		
(C)(3)(b)(ii)	Direction of flow in regional aquifer		
(C)(3)(b)(iii)	Recharge and discharge areas of regional aquifer		
(C)(3)(b)(iv)	Regional stratigraphy		
(C)(3)(b)(v)	Regional geomorphology		
(C)(3)(c)(i)	Letter from ODNR regarding mining in area		
(C)(3)(c)(ii)	Documentation of who owns the mineral rights		
(C)(3)(c)(iii)	Letter from ODNR regarding oil and gas wells in area		
(C)(3)(c)(iv)	Letter from COE regarding wetland delineation		

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**SITE INVESTIGATION** (Description of geology and hydrogeology, continued)

(C)(3)(d)(i)(a)(i)	Textural classification of soil - USCS		
(C)(3)(d)(i)(a)(ii)	Rock type		
(C)(3)(d)(i)(a)(iii)	Color, moisture content, etc		
(C)(3)(d)(i)(a)(iv)	Hydraulic conductivity		
(C)(3)(d)(i)(b)	Thickness		
(C)(3)(d)(i)(c)	Lateral extent		
(C)(3)(d)(i)(d)	Depth and elevation		
(C)(3)(d)(i)(e)	Variations in texture etc.		
(C)(3)(d)(ii)	Local geomorphology		
(C)(3)(d)(iii)	Local structural geology		
(C)(3)(d)(iv)(a)	Temporal fluctuations in ground water levels and effects on flow		
(C)(3)(d)(iv)(b)	Interpretation of the ground water flow system		
(C)(3)(d)(iv)(c)	Characterization of recharge and discharge areas of the site		
(C)(3)(d)(iv)(d)	Yield of significant zones of saturation		
(C)(3)(d)(v)	Justification, if necessary, no 100 gpm aquifer is present		
(C)(3)(e)	Description and quantification of ground water quality		

**SITE INVESTIGATION** (Subsurface investigation information)

(C)(3)(f)(i)(a)	Publically available well logs		
(C)(3)(f)(i)(b)	ODNR ground water resource maps		
(C)(3)(f)(i)(c)	Other publically available information used for (C)(3)(b) and (B)(2)		
(C)(3)(f)(ii)	Logs of subsurface investigation		
(C)(3)(f)(iii)	Construction diagrams of wells and piezometers		
(C)(3)(f)(iv)	Ground water data from uppermost aquifer and all significant zones of saturation above the uppermost aquifer		
(C)(3)(f)(v)	Logs of subsurface investigation		
(C)(3)(f)(vi)(a)	Grain size distribution		
(C)(3)(f)(vi)(b)	Atterberg limits		
(C)(3)(f)(vi)(c)	Specific gravity		
(C)(3)(f)(vi)(d)	Unit weight, in situ		
(C)(3)(f)(vi)(e)	Moisture content, in situ		
(C)(3)(f)(vi)(f)	Dry unit weight		
(C)(3)(f)(vi)(g)	Results ASTM D3080, ASTM D2850, ASTM D6467 for bearing capacity		
(C)(3)(f)(vi)(h)	Results ASTM D3080, ASTM D4767, ASTM D6467 for stability		
(C)(3)(f)(vi)(i)	Results ASTM D2850 for pore water pressure		

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**SITE INVESTIGATION** (Subsurface investigation information, continued)

(C)(3)(f)(vi)(j)(i)	Coefficient of consolidation for settlement		
(C)(3)(f)(vi)(j)(ii)	Over consolidation ratio for settlement		
(C)(3)(f)(vi)(j)(iii)	Pre-construction pressure for settlement		
(C)(3)(f)(vi)(j)(iv)	Compression index for settlement		
(C)(3)(f)(vi)(j)(v)	Swelling index for settlement		
(C)(3)(f)(vi)(j)(vi)	In situ void ratio for settlement		
(C)(3)(f)(vi)(j)(vii)	Effective porosity for settlement		
(C)(3)(f)(vii)	Any other data		

**SITE INVESTIGATION** (Description of methodology)

(C)(3)(g)(i)	Sampling methods used to characterize soil and rock		
(C)(3)(g)(ii)	Analytical methods used to characterize soil and rock		
(C)(3)(g)(iii)	Methodology and procedures used to define the uppermost aquifer etc.		
(C)(3)(g)(iv)	Methodology and procedures used to determine ground water quality		
(C)(3)(g)(iv)(a)	Detection of immiscible layers		
(C)(3)(g)(iv)(b)	Collection of ground water samples		
(C)(3)(g)(iv)(c)	Performance of field analysis		
(C)(3)(g)(iv)(d)	Decontamination of equipment		
(C)(3)(g)(iv)(e)	Analysis of ground water samples		
(C)(3)(g)(iv)(f)	Chain of custody control		
(C)(3)(g)(iv)(g)	Field and laboratory QA/QC		

**STABILITY ANALYSIS**

(C)(4)(a)(i)	Findings of subsurface investigation for hydrostatic uplift		
(C)(4)(a)(ii)	Rationale used for hydrostatic uplift parameters		
(C)(4)(a)(iii)	Method used to calculate hydrostatic uplift		
(C)(4)(a)(iv)	Assessed failure modes and conditions		
(C)(4)(a)(v)	Rationale used for hydrostatic critical cross-section		
(C)(4)(a)(vi)	Temporal high phreatic and piezometric surfaces		
(C)(4)(a)(vii)	Profile view of critical area		
(C)(4)(a)(viii)	Hydrostatic uplift calculations		

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**STABILITY ANALYSIS (continued)**

(C)(4)(b)(i)	Findings of subsurface investigation for bearing capacity		
(C)(4)(b)(ii)	Rationale used for bearing capacity parameters		
(C)(4)(b)(iii)	Method used to calculate bearing capacity		
(C)(4)(b)(iv)	Assessed failure modes and conditions		
(C)(4)(b)(v)	Profile view of critical area		
(C)(4)(b)(vi)	Plan view of critical cross-section		
(C)(4)(b)(vii)	Bearing capacity calculations		
(C)(4)(c)(i)	Findings of subsurface investigation for static stability		
(C)(4)(c)(ii)	Rationale used for static stability parameters		
(C)(4)(c)(iii)	Method used to calculate static stability		
(C)(4)(c)(iv)	Assessed failure modes and conditions		
(C)(4)(c)(v)	Rationale for choosing internal, interim, and final slopes cross-sections		
(C)(4)(c)(vi)	Profile view of critical cross-sections		
(C)(4)(c)(vii)	Plan view of critical cross-sections		
(C)(4)(c)(viii)	Summary of results		
(C)(4)(c)(ix)	Static stability calculations		
(C)(4)(d)(i)	Findings of subsurface investigation for seismic stability		
(C)(4)(d)(ii)	Rationale used for seismic stability parameters		
(C)(4)(d)(iii)	Method used to calculate seismic stability		
(C)(4)(d)(iv)	Assessed failure modes and conditions		
(C)(4)(d)(v)	Rationale for choosing internal, interim, and final slopes cross-sections		
(C)(4)(d)(vi)	Profile view of critical cross-sections		
(C)(4)(d)(vii)	Plan view of critical cross-sections		
(C)(4)(d)(viii)	Summary of results		
(C)(4)(d)(ix)	Seismic stability calculations		
(C)(4)(e)(i)	Findings of subsurface investigation for settlement		
(C)(4)(e)(ii)	Rationale used for settlement parameters		
(C)(4)(e)(iii)	Method used to calculate settlement		
(C)(4)(e)(iv)	Assessed failure modes and conditions		
(C)(4)(e)(v)	Summary of results		
(C)(4)(e)(vi)	Settlement calculations		

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**STABILITY ANALYSIS (continued)**

(C)(4)(f)(i)	Findings of subsurface investigation for settlement of separatory liner		
(C)(4)(f)(ii)	Method used to calculate settlement of separatory liner		
(C)(4)(f)(iii)	Assessed failure modes and conditions		
(C)(4)(f)(iv)	Summary of results		
(C)(4)(f)(v)	Settlement calculations		
(C)(4)(g)	Analysis that the design meets OAC 3745-29-08(C)(12)		
(C)(4)(g)(i)	Regional stratigraphic or structural features of unstable areas		
(C)(4)(g)(ii)	Areas susceptible to liquefaction		
(C)(4)(g)(iii)	Areas susceptible to mass movement		
(C)(4)(g)(iv)	Areas impacted by natural and human induced activities		
(C)(4)(g)(v)	Presence of karst terrain		
(C)(4)(g)(vi)	Presence of underground mining		
(C)(4)(g)(vii)	Areas susceptible to coastal and river erosion		

**CALCULATIONS**

(C)(5)(a)	Volume and life of the facility and each unit		
(C)(5)(b)	Liner thickness		
(C)(5)(c)	Leachate head and flow		
(C)(5)(d)	Amount of leachate to be recirculated and leachate head and flow		
(C)(5)(e)	Leachate storage tank size		
(C)(5)(f)	Pump size		
(C)(5)(g)	Pipe strength and pipe deflection		
(C)(5)(h)	Itemized closure costs - If not presented on PTI Attachment A		
(C)(5)(i)	Itemized post-closure care costs - If not presented on PTI Attachment A		
(C)(5)(j)	Soil erosion		
(C)(5)(k)	Surface water control structure size		
(C)(5)(l)	Sedimentation basin		
(C)(5)(m)	Other		

**CONSTRUCTION INFORMATION**

(C)(6)(a)	Installation of ground water monitoring program items		
(C)(6)(b)	Physical and chemical resistance of FML and LCS pipes		
(C)(6)(c)	Compaction equipment slope limitations		

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**OPERATIONAL INFORMATION**

(C)(7)(a)	Authorized maximum daily waste receipt		
(C)(7)(b)	Technique of waste receipt		
(C)(7)(c)	Type of waste received		
(C)(7)(d)	Type of equipment to be used for construction, operation, and maintenance		

**PLANS**

(C)(8)(a)	Ground water detection plan		
(C)(8)(b)	Explosive gas monitoring plan		
(C)(8)(c)	QA/QC plan		
(C)(8)(d)	Final closure/post-closure care plan		

**NOTIFICATIONS AND CERTIFICATION**

(C)(9)(a)(i)	Letter of intent to the government		
(C)(9)(a)(ii)	Letter of intent to the solid waste management district		
(C)(9)(a)(iii)	Letter of intent to the owner or lessee		
(C)(9)(a)(iv)	Letter of intent to the local zoning authority		
(C)(9)(a)(v)	Letter of intent to the airport administrator		
(C)(9)(a)(vi)	Letter of intent to the park system administrator		
(C)(9)(a)(vii)	Letter of intent to the conservancy district		
(C)(9)(b)	If facility exclusively disposes of solid waste generated by the facility owner, pollution prevention efforts		
(C)(9)(c)	List of permits, licenses, plans approvals, authorizations that have been applied for - If not presented on PTI Attachment A		
(C)(9)(d)	Proof of property ownership or lease agreement		

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