

Pollution Prevention Plans For Construction Sites

Development and
Implementation

The logo for Siltbuster is displayed in a large, bold, orange font, slanted upwards from left to right. Below the text are three wavy orange lines. A registered trademark symbol (®) is located in the top right corner of the logo area.

Siltbuster

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Golden Planning Rules.....

- ❑ Planning for the management of excess site run-off water must be completed prior to works commencing.
- ❑ Implementation of the plan commences on the day that site works commence.
- ❑ The plan needs to be reviewed, amended and modified in response to feed back on it's effectiveness.
- ❑ As the site evolves the plan will similarly need to evolve to keep it relevant.
- ❑ If non-complaint water is being discharged, the plan and work practices must be modified so as to prevent the discharge of dirty water.

Roles and Responsibilities.....

Two Key Players:

- ❑ The Construction Team
- ❑ The Regulator

These two groups have different areas of responsibility.

They may not necessary see eye to eye.

Key Issues that need to be addressed by the plan.....

- ❑ How much water will be generated ?
- ❑ What can be done to reduce the volumes of dirty water ?
- ❑ Where will the excess water be discharged ?
- ❑ What treatment standard will be applied to the discharge ?
- ❑ What treatment solution will be adopted, what size does it need to be and what will the quality of the water discharged from the treatment system ?

Stages in plan development.....

1. Site Evaluation and Design Development
2. Assessment
3. Control Selection/Plan Design
4. Construction/Implementation
5. Final Reinstatement/Completion

1 Site Evaluation and Design Development.....

A Collect Site Information

- Existing Soils Information
- Existing Run-Off Water Quality
- Location of Surface Waters
- Name of Surface Waters
- Size and Quality of Water Present in Surface Water Bodies

B Develop Site Plan

Identify objectives which

- Disturb the smallest area possible
- Avoid disturbance of sensitive areas such as:
 - Existing drainage channels
 - Location of areas to be preserved, left untouched, or left as open space

C Describe Construction Activity

D Prepare Pollution Prevention Site Map

Combine the information collected into a comprehensive pollution prevention site map. In addition to location of surface waters show:

- Slopes after grading
- Disturbed Areas
- Drainage Patterns/Discharge Points

2 Site Assessment.....

A Measure the Site Area

- Calculate the total area of the site and extent of the areas which will be disturbed. Take account of the program of site works (Site Phases)

B Determine the Drainage Area

- Determine the extent size of each drainage area where concentrated flow will leave the site. Show the boundary of the drainage area on the site plan. Assign a unique identifier to each drainage area.

C Calculate The Peak Flow

- For each drainage area calculate the peak flow rate (m³/hr) which will be generated by the design storm return period eg 1 in 10 year storm.

D Calculate Storage Requirements

- For the peak flow calculate the minimum storage requirement to provide for attenuation (temporary storage) of the peak flow.

E Calculate Effective Settlement Area Needed To Recover Suspended Particles

- Calculate the minimum settlement area needed to enable gravity removal of the suspended particles.
- Do water treatment chemicals need to be used to increase particle removal efficiency

3 Control Selection/Plan Design.....(1)

A Review and Incorporate Regulatory Requirements

- Prior to assessing the type of treatment solution which will be used it is imperative to have a clear understanding of the position of the regulator regarding water quality standards.

B Select Erosion and Sediment Controls

- Provide a description of the erosion and sedimentation controls which will be used to prevent loss of soil from the working area. For example:

Stabilisation of exposed areas.

- Temporary seeding
- Permanent seeding
- Mulching
- Geotextile erosion blanket

Structural Controls

- Earth Dike
- Silt Fence
- Sediment Trap
- Sediment Basin

C Select Active Control Measures

- Settlement Lagoon/Tank
- Water Treatment System

D Select Other Controls

- In addition to erosion and sediment controls, the pollution prevention plan must address other pollutant sources that may exist on the site.

3 Control Selection/Plan Design.....(2)

D Indicate the Location of Controls on a Site Plan

- Show the location of the pollution prevention measures on the site map.

E Prepare an Inspection and Maintenance Plan

- For each pollution prevention measure, develop a formal written inspection and maintenance plan. Provide instruction/training to site staff in the operation of the plan. Develop a inspection checklist as a means of documenting that the inspection and maintenance has been performed.

F Prepare a Description of Controls

- Compile a list of each type of control which will be used. Include a description of each control, describe its purpose and explain why it is appropriate in this location. The description should also include specific information about the control such as size, flow rate of water that can be treated, required materials, and methods of installation/use.

G Prepare a Sequence of Major Activities

- Prepare a program showing the sequence of major activities that includes the installation of all the controls, earth disturbing activities, all stabilisation activities and the maintenance required.
 - Install downslope and slide slope perimeter controls before land disturbing activity occurs
 - Do not disturb an area until it is necessary for construction to proceed
 - Cover or stabilize disturbed areas as soon as possible
 - Time construction activities to limit impact from seasonal climate changes or weather events
 - Do not remove temporary perimeter controls until after all upstream areas have been stabilised/completed.

4 Construction/Implementation.....(1)

A Implement Controls

- Show the location of the pollution prevention measures on the site map.

B Inspection

- For each pollution prevention measure, develop a formal written inspection and maintenance plan. Provide instruction/training to site staff in the operation of the plan. Develop a inspection checklist as a means of documenting that the inspection and maintenance has been performed.

C Maintenance/Repairs

- Compile a list if each type of control which will be used. Include a description of each control, describe its purpose and explain why it is appropriate in this location. The description should also include specific information about the control such as size, flow rate of water that can be treated, required materials, and methods of installation/use.

D Maintain Records of Construction Activities

- Prepare a program showing the sequence of major activities that includes the installation of all the controls, earth disturbing activities, all stabilisation activities and the maintenance required.
 - Install downslope and slide slope perimeter controls before land disturbing activity occurs
 - Do not disturb an area until it is necessary for construction to proceed
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 - Time construction activities to limit impact from seasonal climate changes or weather events
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4 Construction/Implementation.....(2)

E Update/Change The Plan

- Update the plan as required to ensure it accurately reflects the site features and operations, ensure that it accurately reflects the current site conditions.

F Report Releases of Reportable Quantities

- For all releases of significant volumes of polluting surface water which has the potential to cause environmental harm to the receiving water course should be recorded in the incident register. Notification of the event to the Environmental Regulator, to include the measures taken in response to the incident and amendments and improvement to prevent reoccurrence.

G Location and Access to Records

- Plan Location
- Retention of Records
- Access

5 Final Reinstatement/Completion

Until such time that:

- All disturbed soils have been completely stabilised and temporary erosion and sediment controls have been or will be removed, or the permanent water management systems have been commissioned and become fully operational, the construction site must remain compliant with the pollution prevention plan.

Worked Example

A high-speed photograph of water splashing, creating a large, textured splash on the right side and smaller droplets on the left. The background is a light, hazy blue.

Some Real Data.

What will the proposed lagoons capture.....

Lagoon	Size (m ²)	Peak Flow Rate (m ³ /hr)
1	3,200	1,476
2	2,700	2,160
3	2,170	5,112

Target Treated Water Quality:

Total Suspended Solids (TSS) 30 mg/l

What will the proposed lagoons capture.....

Lagoon	Size (m ²)	Peak Flow Rate (m ³ /hr)	Rise Rate (m/hr)
1	3,200	1,476	0.46
2	2,700	2,160	0.80
3	2,170	5,112	2.35

Target Treated Water Quality:

Total Suspended Solids (TSS) 30 mg/l

Measuring Settling Characteristics.....

But what settling rates will the fine soils from the site achieve?

Measuring Settling Characteristics.....

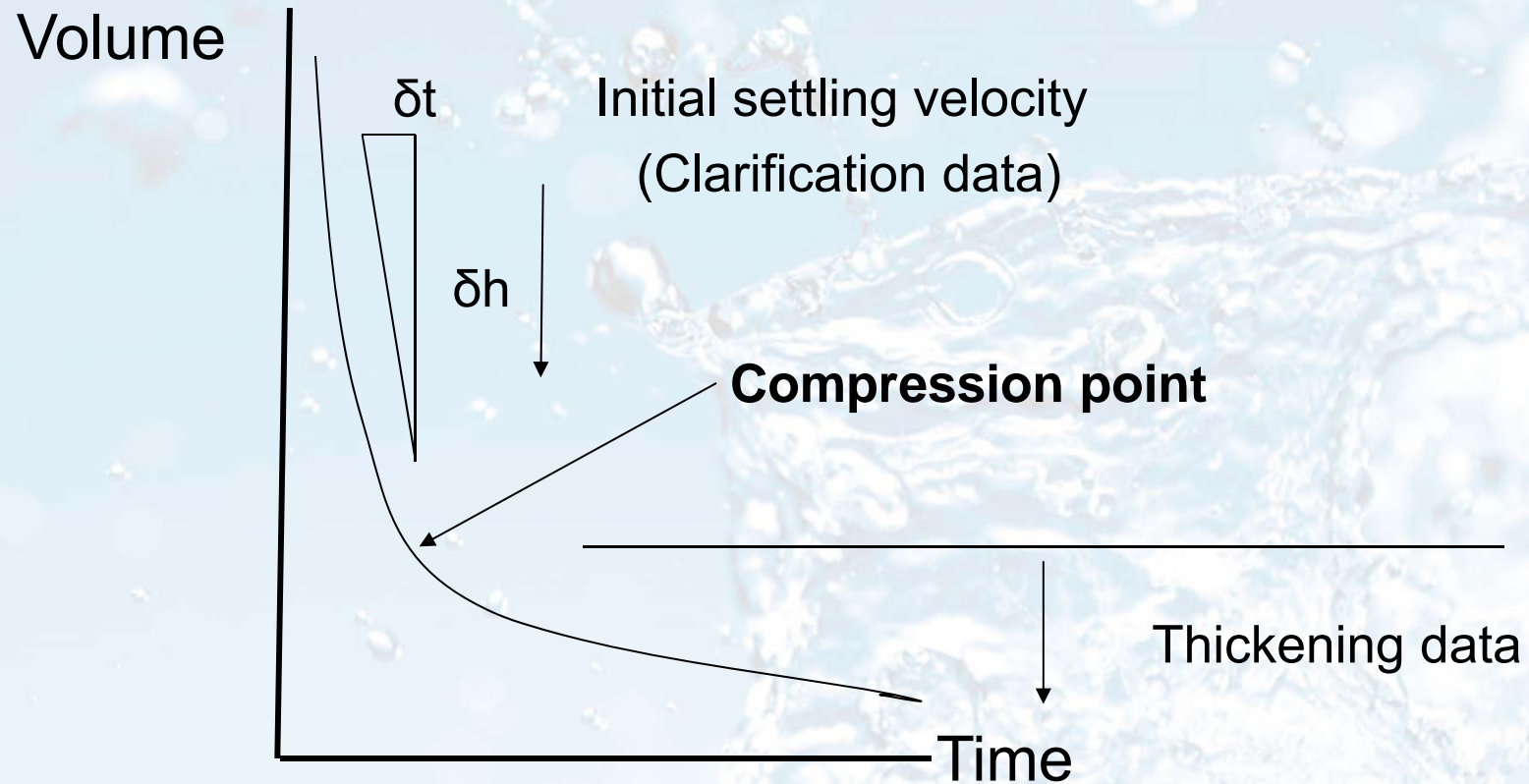


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Settlement Test



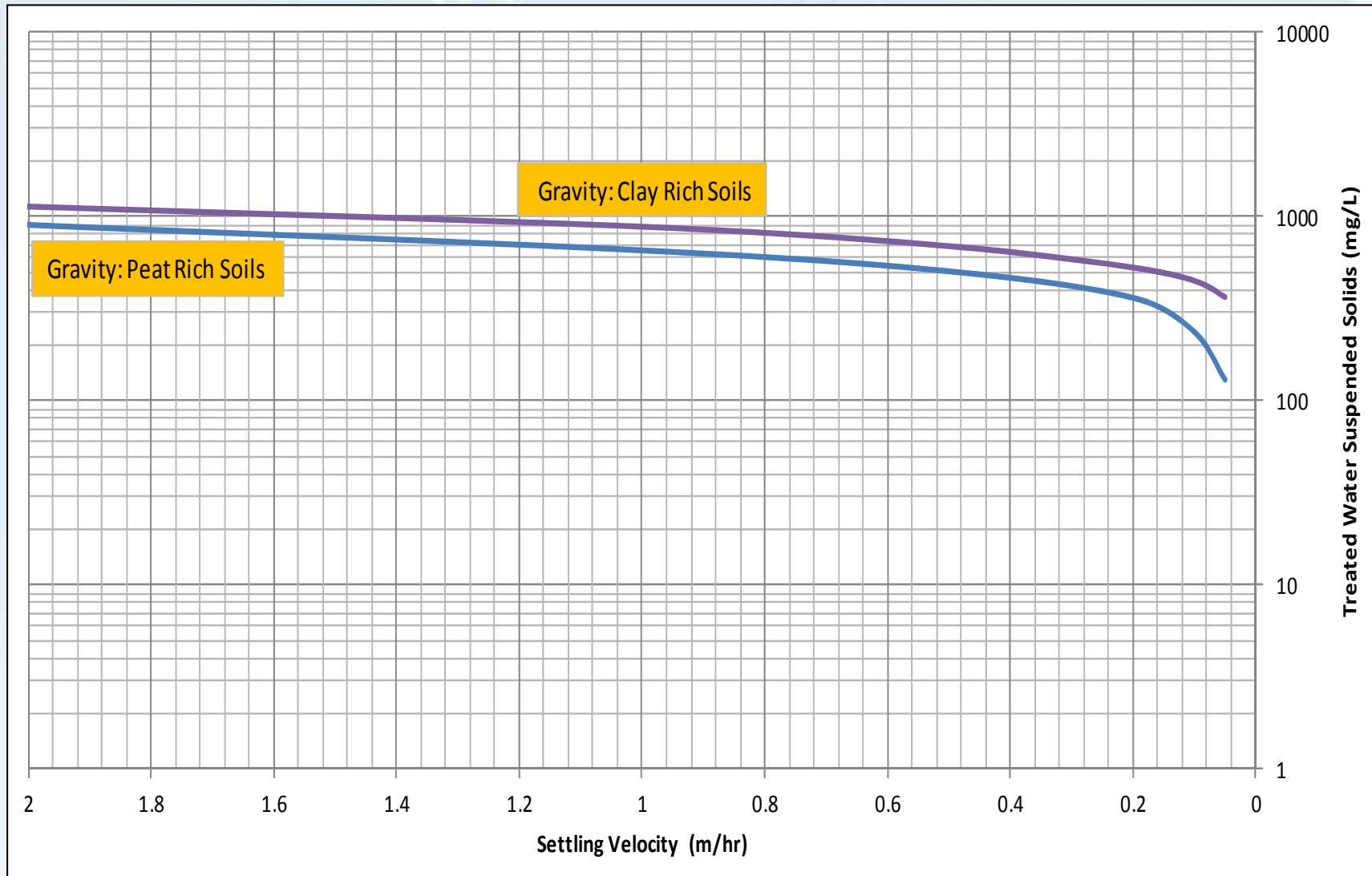
(A simple test that tells us how to size plant to a given flow)

Actual Site Settling Rates.....

What settling rates will the natural site soils achieve?

Ground Conditions Present at the Site
Peat and clay rich soil (Glacial Till) were subjected to a series of laboratory settling tests.

Actual Site Settling Rates.....Gravity Only



Conclusions.....Gravity Only

- ❑ A gravity operated settlement lagoon, even if operated under reduced flow conditions will not achieve the required treated water quality.
- ❑ Due to the poor settling characteristics of the site soils:
 - Increasing the size of the settlement lagoons; or
 - Reducing the flow rate treated by the lagoons;will have little effect on the quality of the treated water.
- ❑ The only viable option is to alter the settling characteristics of the solids to improve their settling characteristics.
- ❑ Following chemical pre-treatment it will be possible to remove the suspended particles within a reduced area. That is the lagoons can be made to work !.

Single Stage and Two Stage Treatment.....

A background image showing a dynamic splash of water with many bubbles and droplets, set against a light blue gradient. The water is captured in mid-air, creating a sense of movement and freshness.

Strategies for adding Treatment Chemicals

Hire, Sales & Technical Support

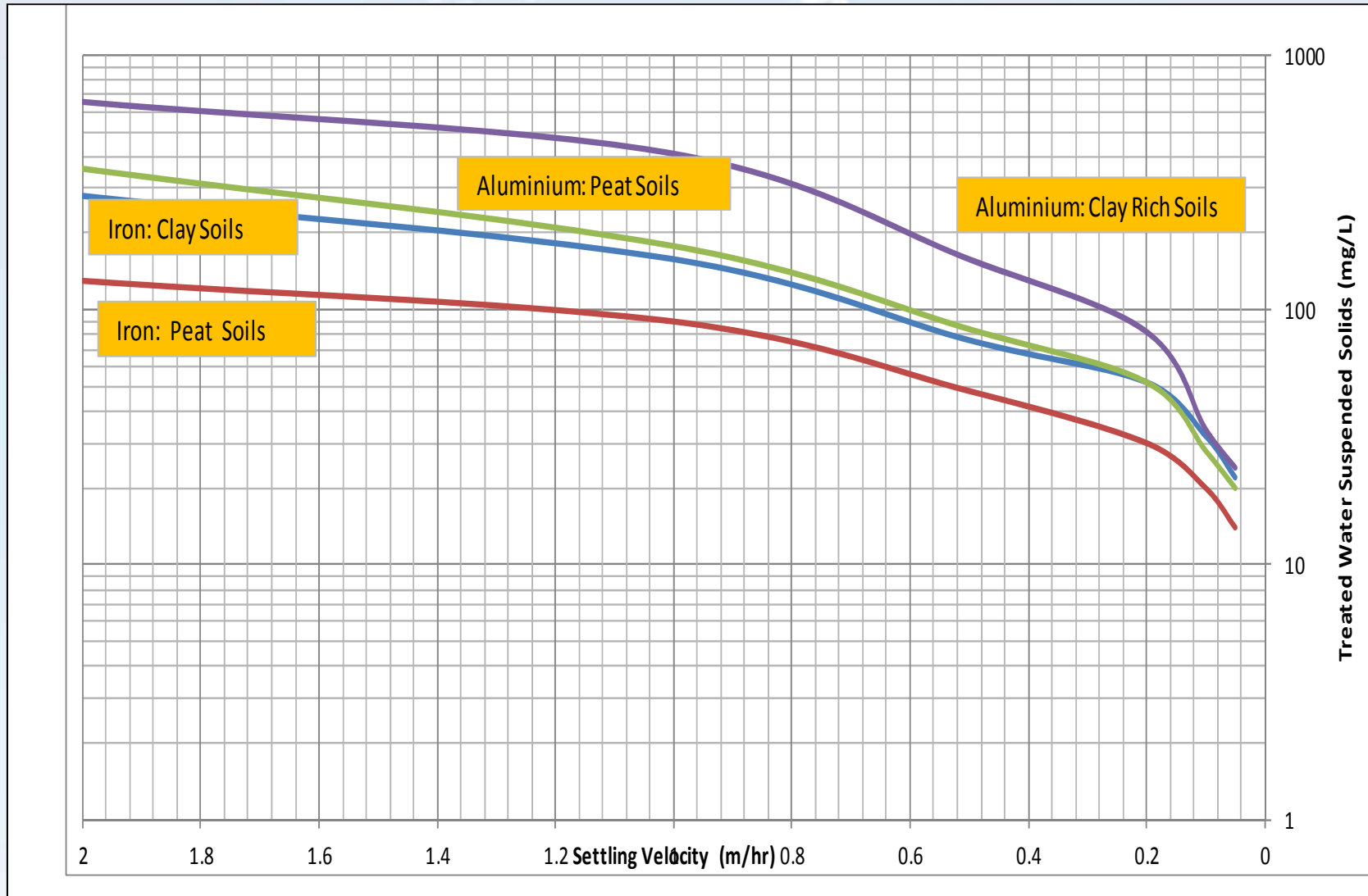
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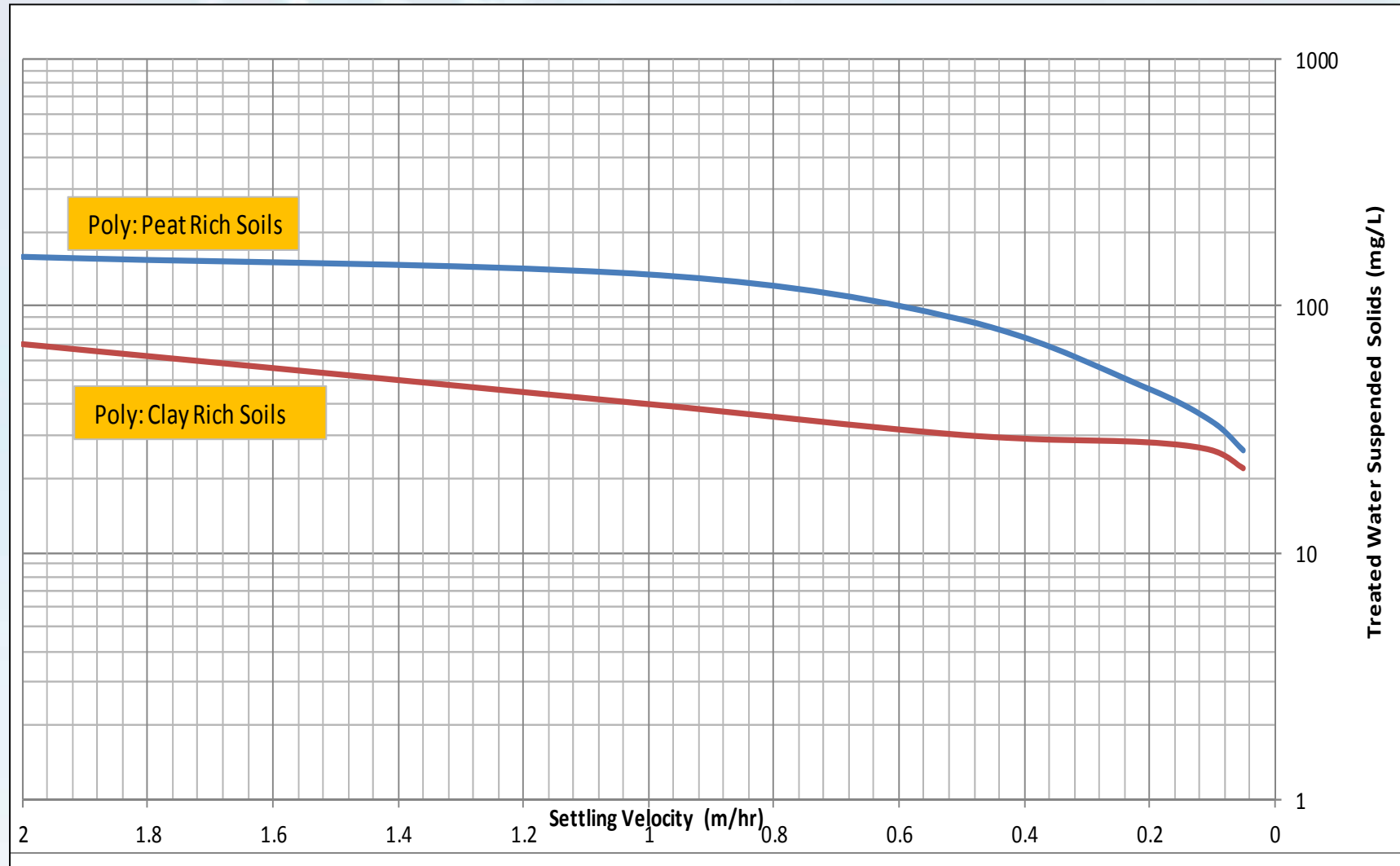
Single Stage Treatment.....

- ❑ The addition of single treatment chemical either a coagulant or flocculent

Addition of a Coagulant.....



Addition of a Flocculant.....

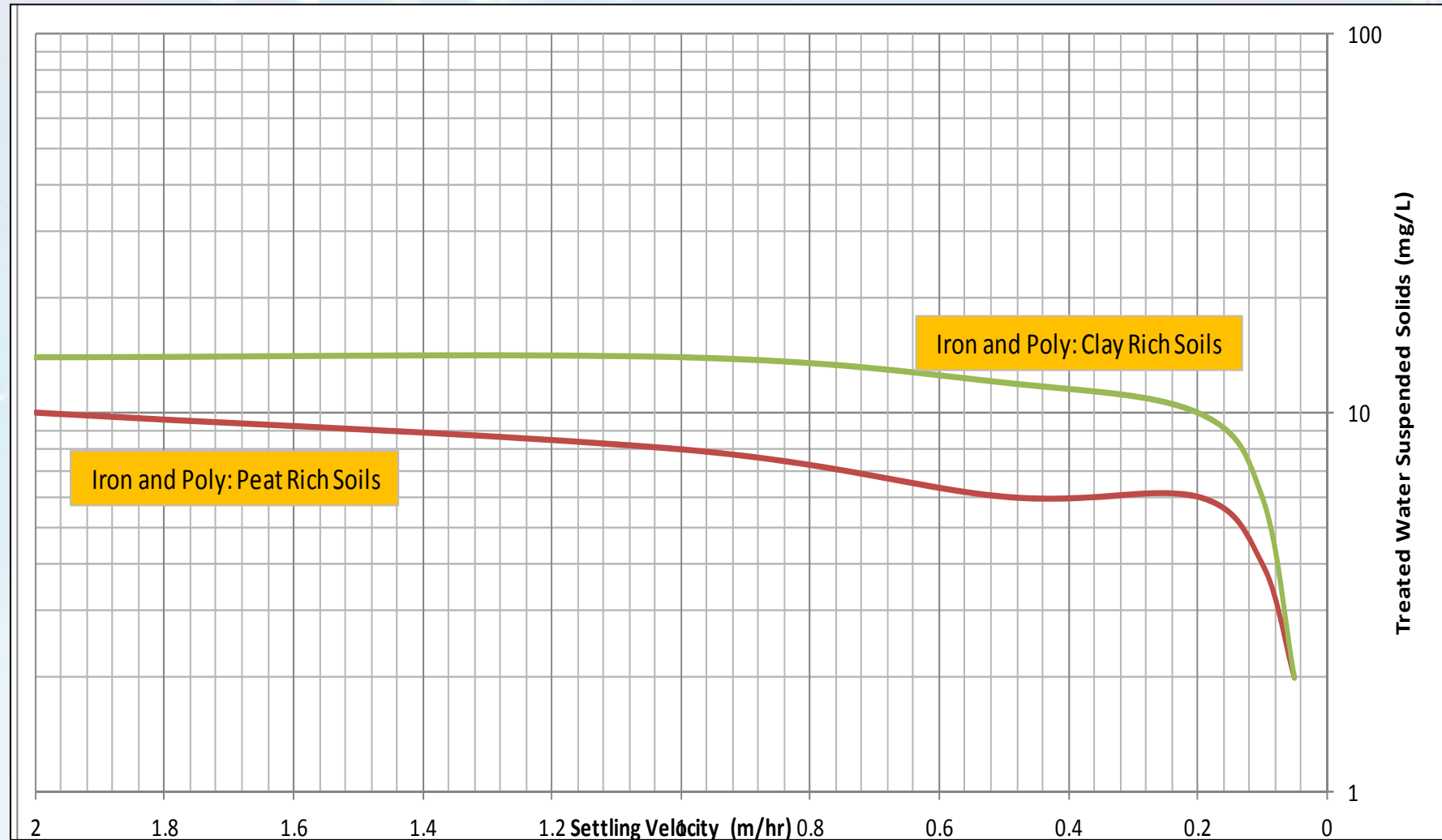


Two Stage Treatment.....

The addition of a coagulant and flocculant:

- ❑ Firstly the addition of a Coagulant to cause the fine particles to agglomerate together into small clusters.
- ❑ Secondly the addition of a flocculent to cause the formation of large rapidly settling flocs.

Two Stage Treatment.....



Any Questions



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