

# Linear and Redevelopment: MIDS Design Sequence Flow Chart

MIDS Work Group

April 19, 2013

p-gen3-15e

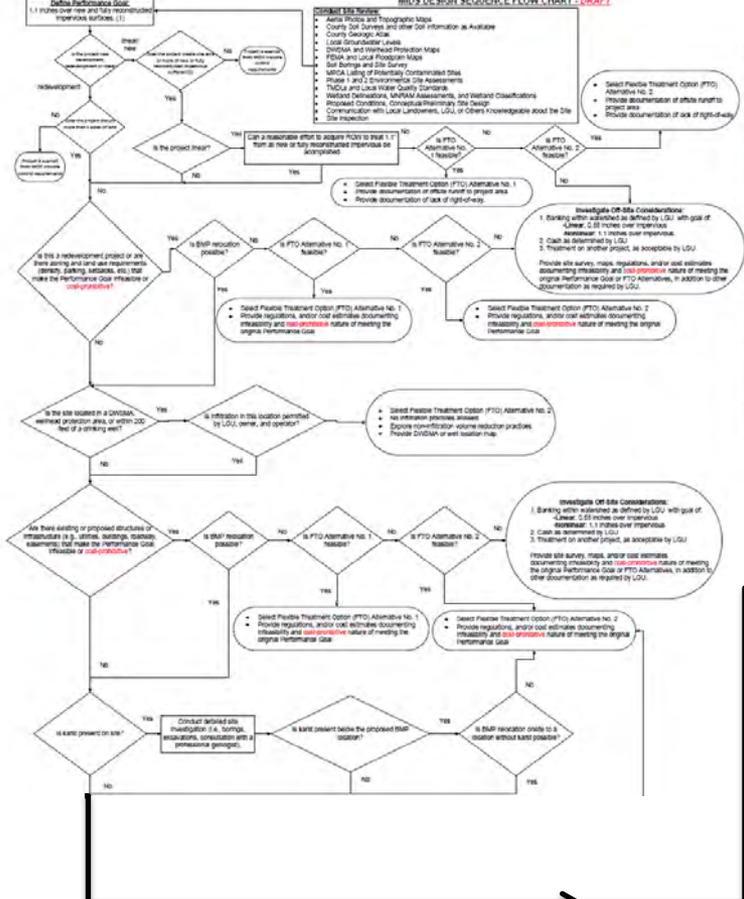
# Objectives

- Assist regulators and developers throughout entire design and permitting process
- Identify most common site constraints
- Suggest documentation for each constraint
- Link to Flexible Treatment Options



Source: Barr





- Define Performance Goal:**
- 1.1 Infiltrate over new and fully reconstructed impervious surfaces. (1)

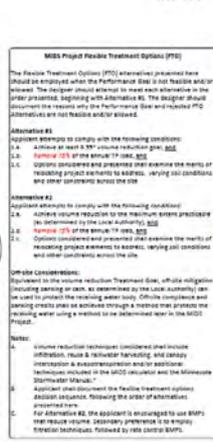
- Define Performance Goal:**
- 1.1 Infiltrate over new and fully reconstructed impervious surfaces. (1)
  - 1.2 Infiltrate over new and fully reconstructed impervious surfaces. (2)
  - 1.3 Infiltrate over new and fully reconstructed impervious surfaces. (3)
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1.1 Infiltrate over new and fully reconstructed impervious surfaces. (1)

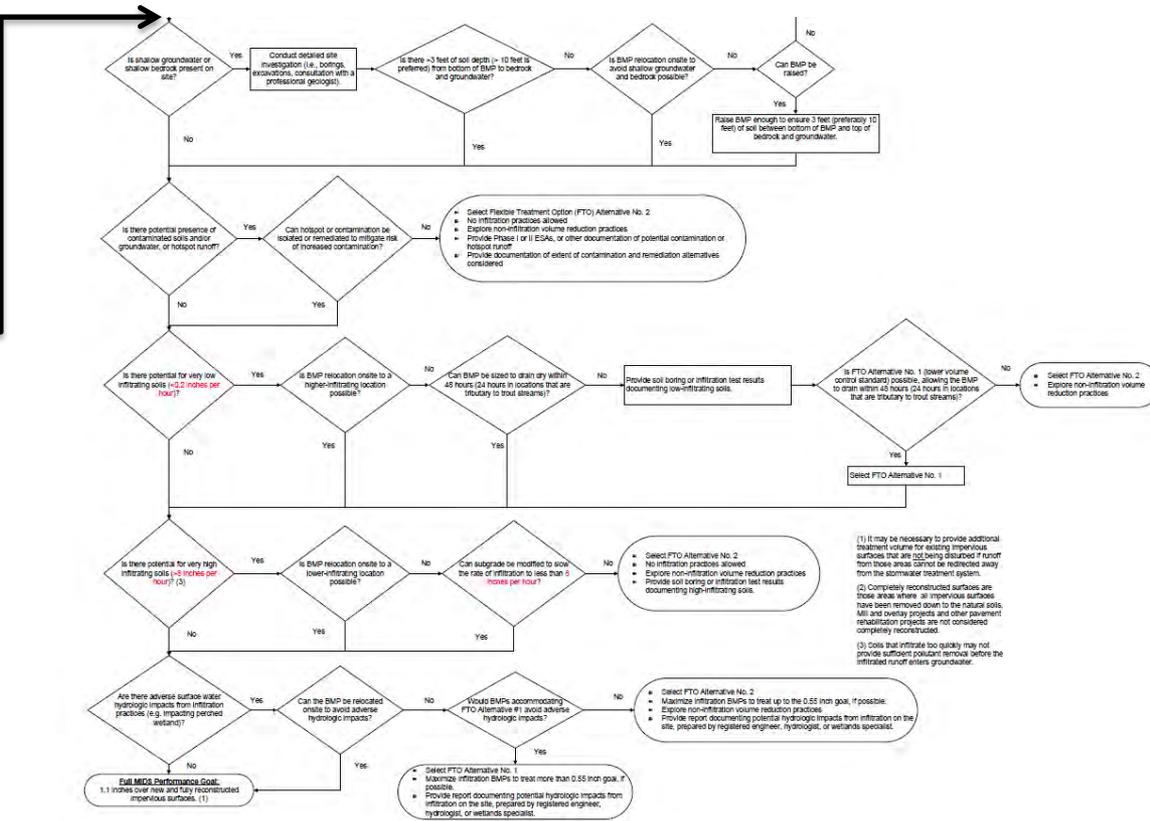
1.2 Infiltrate over new and fully reconstructed impervious surfaces. (2)

1.3 Infiltrate over new and fully reconstructed impervious surfaces. (3)

1.4 Infiltrate over new and fully reconstructed impervious surfaces. (4)



Better???



(1) It may be necessary to provide additional treatment volume for existing impervious surfaces that are not being disturbed. If runoff from those areas cannot be redirected away from the stormwater treatment system.

(2) Completely reconstructed surfaces are those areas where all impervious surfaces have been removed down to the natural soils. Mill and overlay projects and other pavement rehabilitation projects are not considered completely reconstructed.

(3) Soils that infiltrate too quickly may not provide sufficient pollutant removal before the infiltrated runoff enters groundwater.

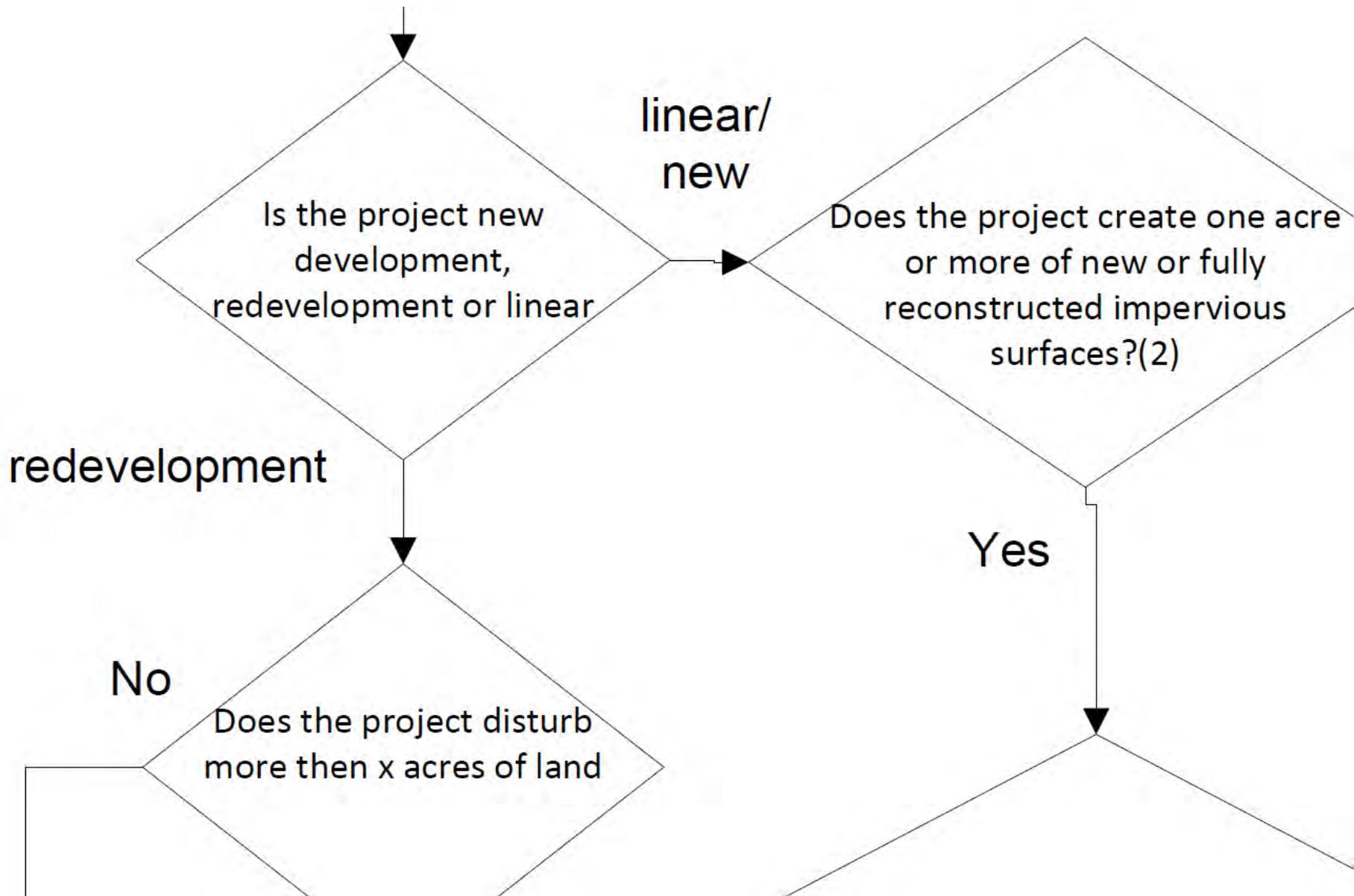
**Conduct Site Review:**

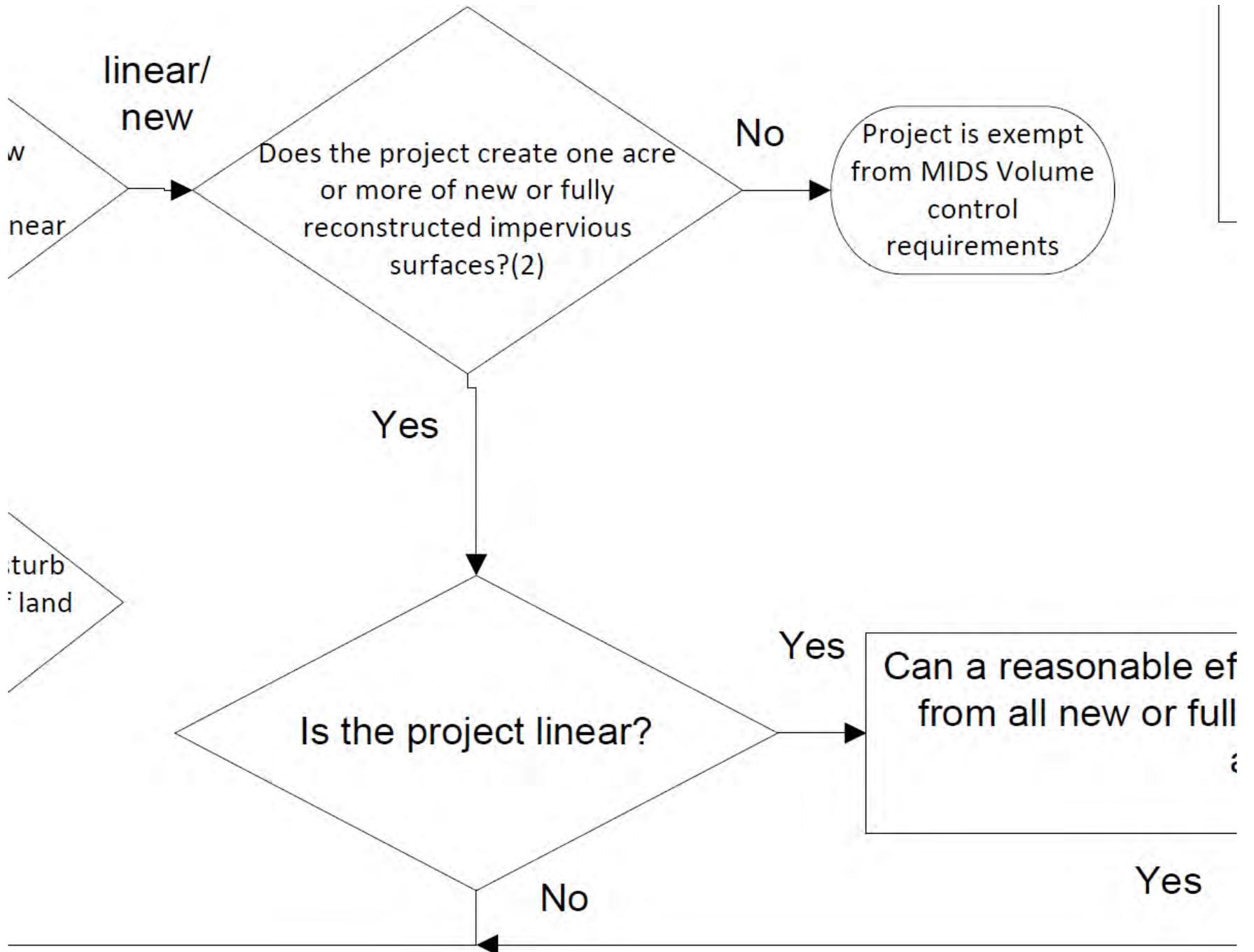
- Aerial Photos and Topographic Maps
- County Soil Surveys and other Soil Information as Available
- County Geologic Atlas
- Local Groundwater Levels
- DWSMA and Wellhead Protection Maps
- FEMA and Local Floodplain Maps
- Soil Borings and Site Survey
- MPCA Listing of Potentially Contaminated Sites
- Phase 1 and 2 Environmental Site Assessments
- TMDLs and Local Water Quality Standards
- Wetland Delineations, MNRAM Assessments, and Wetland Classifications
- Proposed Conditions, Conceptual/Preliminary Site Design
- Communication with Local Landowners, LGU, or Others Knowledgeable about the Site
- Site Inspection

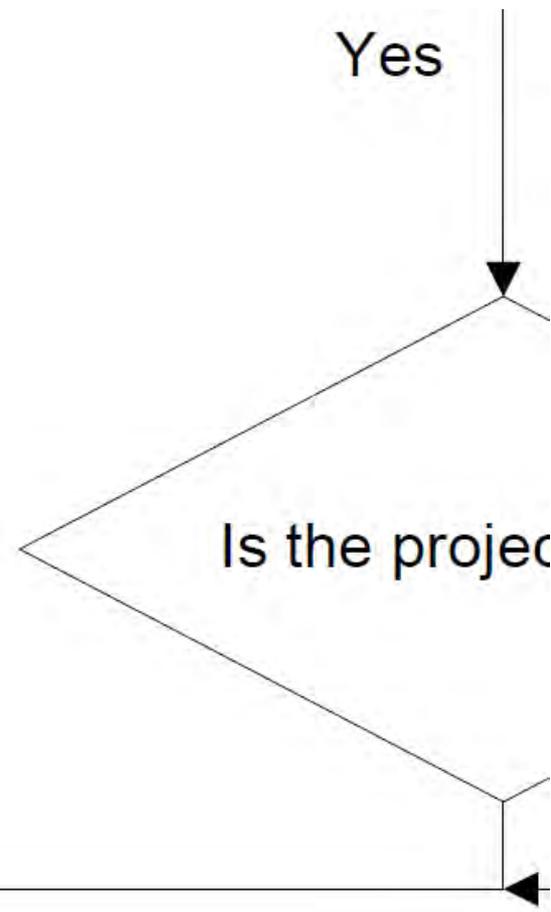
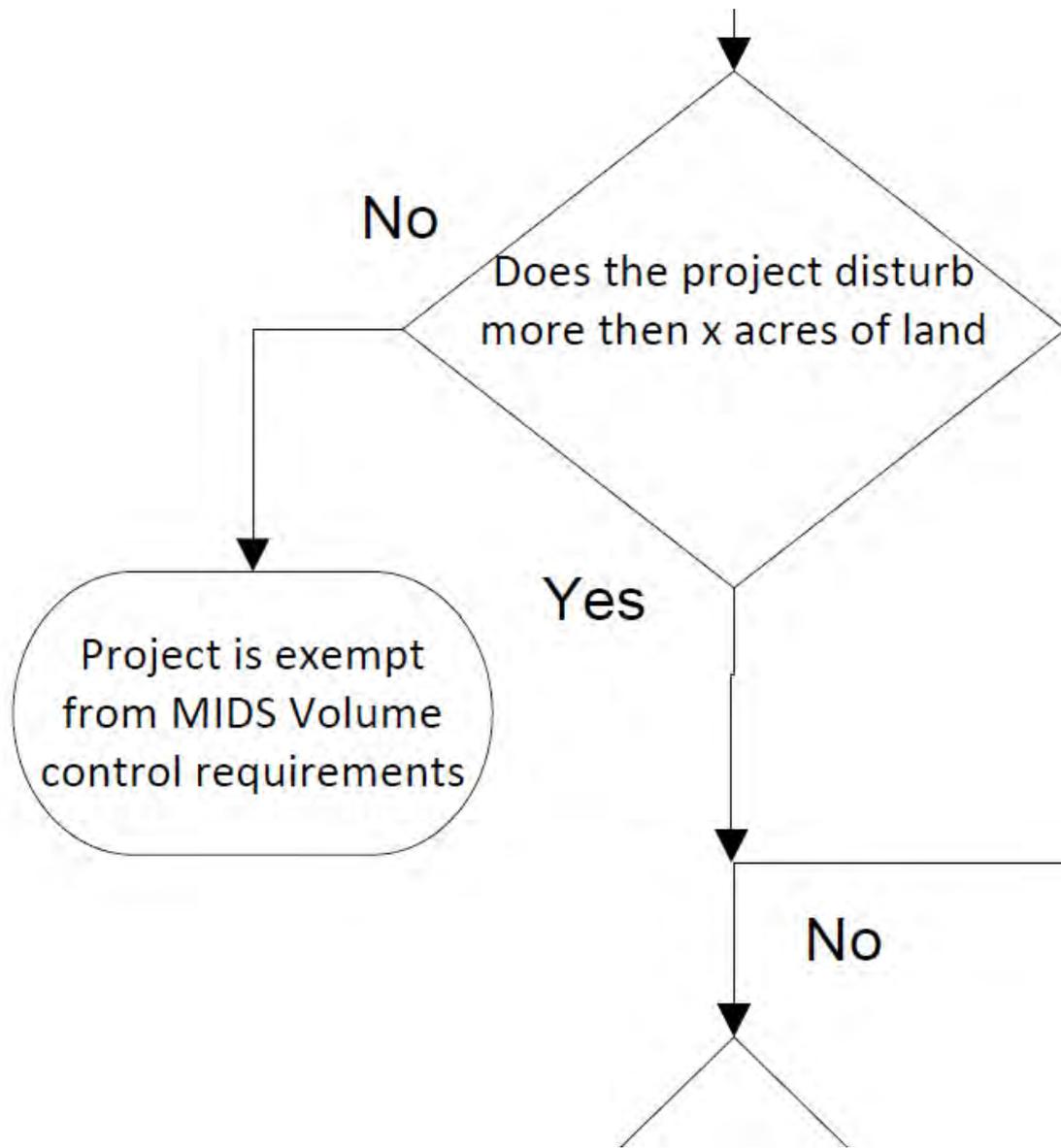


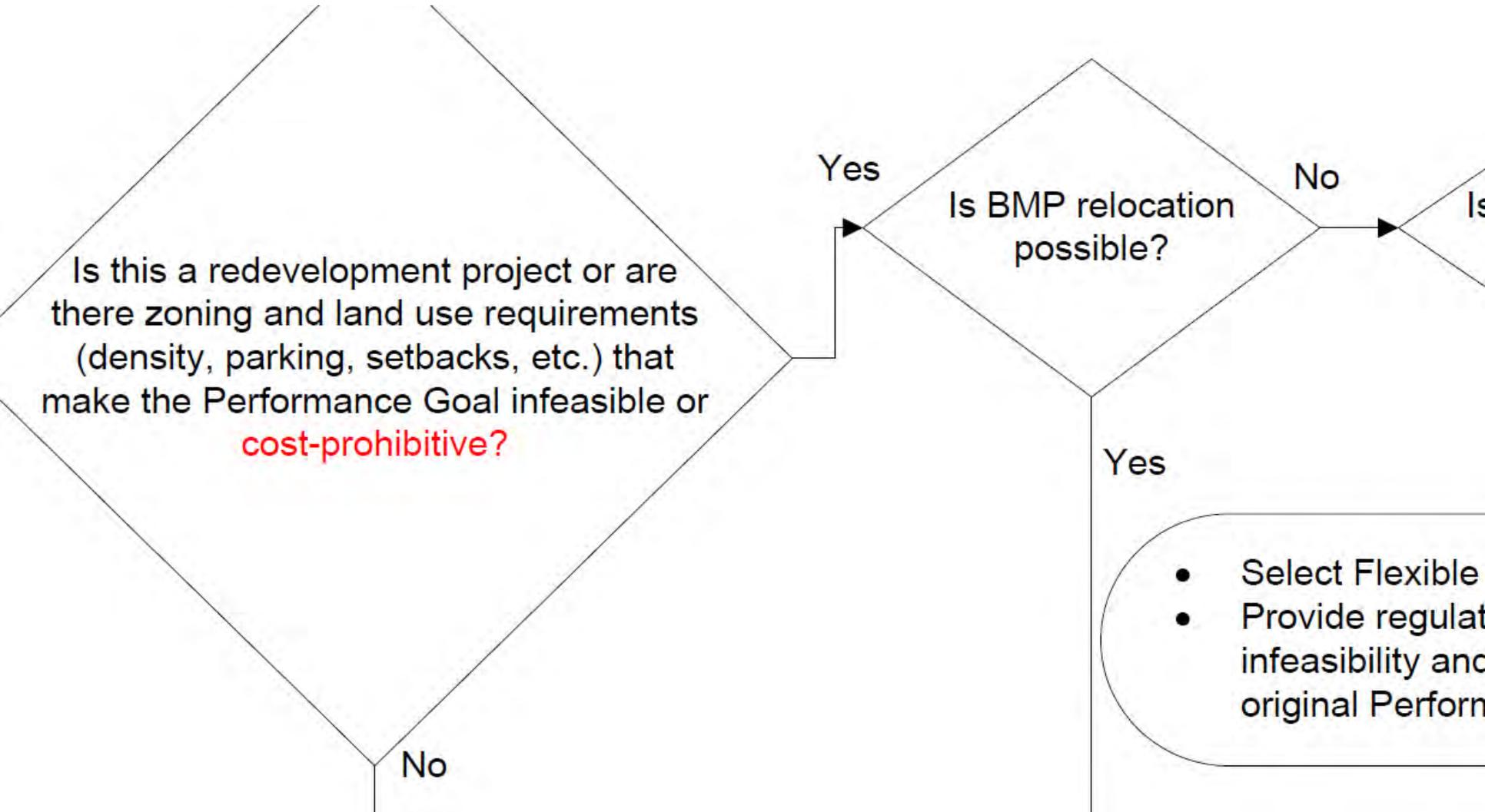
**Define Performance Goal:**

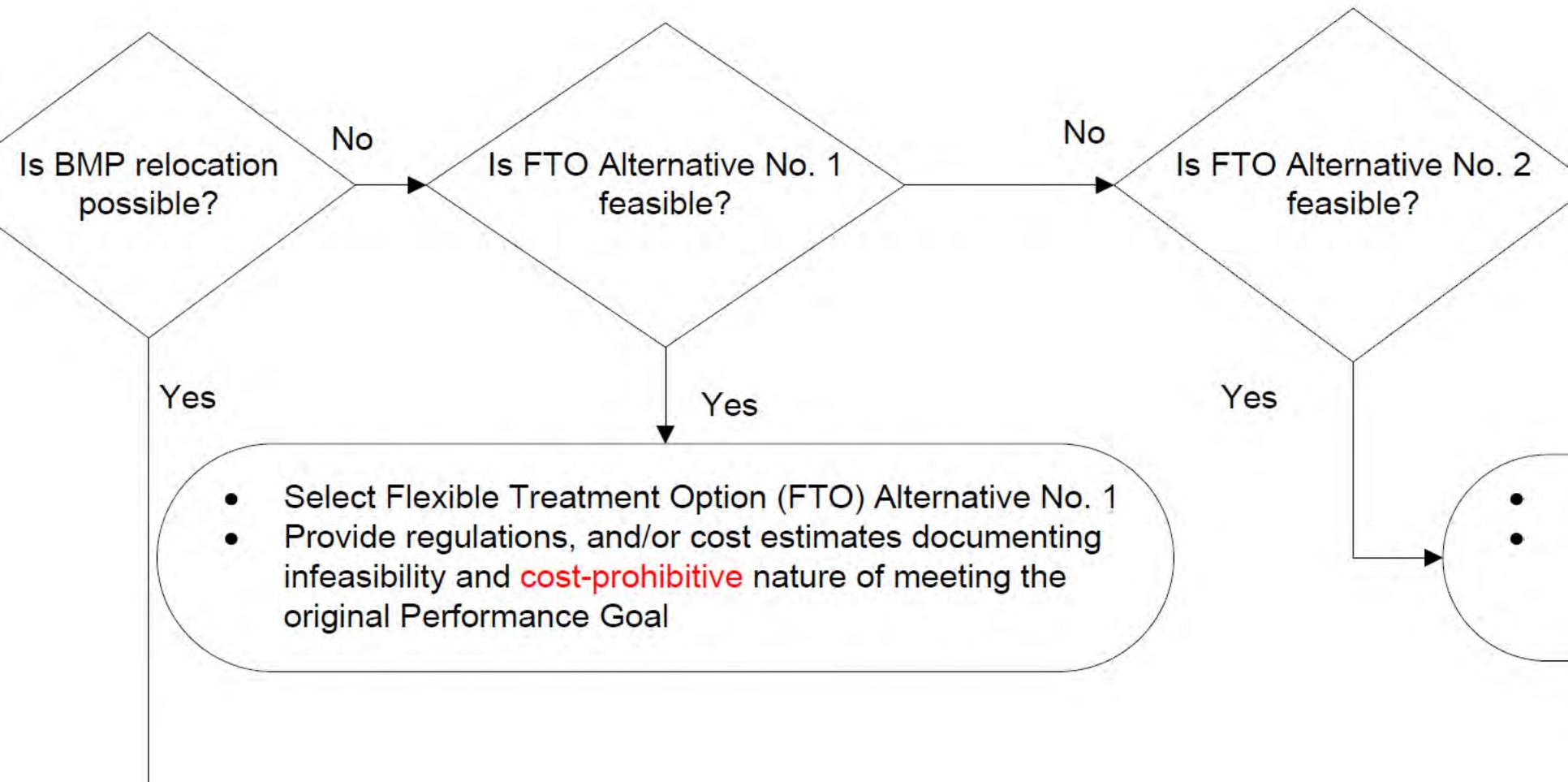
1.1 inches over new and fully reconstructed  
impervious surfaces. (1)

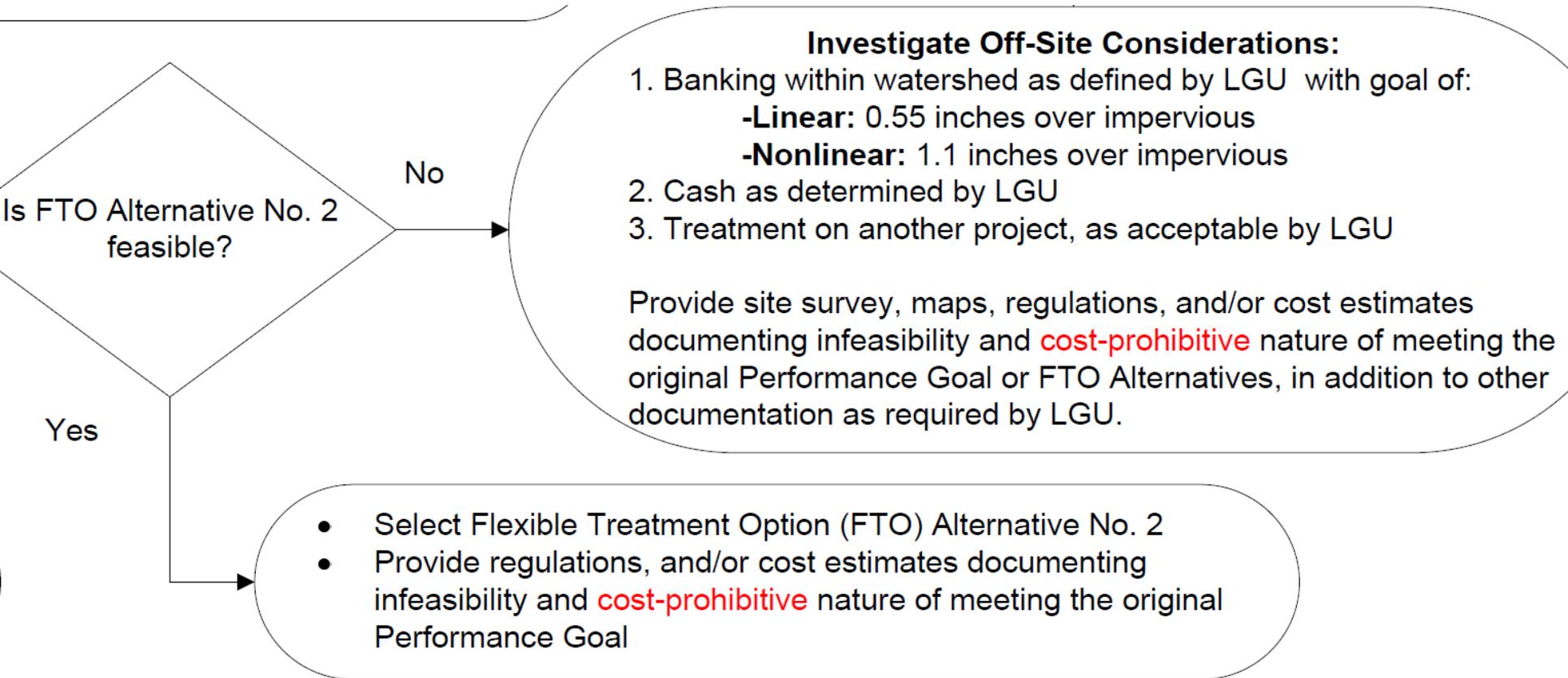












Is FTO Alternative No. 2 feasible?

No

**Investigate Off-Site Considerations:**

1. Banking within watershed as defined by LGU with goal of:
  - Linear: 0.55 inches over impervious
  - Nonlinear: 1.1 inches over impervious
2. Cash as determined by LGU
3. Treatment on another project, as acceptable by LGU

Provide site survey, maps, regulations, and/or cost estimates documenting infeasibility and **cost-prohibitive** nature of meeting the original Performance Goal or FTO Alternatives, in addition to other documentation as required by LGU.

Yes

- Select Flexible Treatment Option (FTO) Alternative No. 2
- Provide regulations, and/or cost estimates documenting infeasibility and **cost-prohibitive** nature of meeting the original Performance Goal

## **MIDS Project Flexible Treatment Options (FTO)**

The Flexible Treatment Options (FTO) alternatives presented here should be employed when the Performance Goal is not feasible and/or allowed. The designer should attempt to meet each alternative in the order presented, beginning with Alternative #1. The designer should document the reasons why the Performance Goal and rejected FTO Alternatives are not feasible and/or allowed.

## Alternative #1

Applicant attempts to comply with the following conditions:

- 1.a. Achieve at least 0.55" volume reduction goal, and
- 1.b. *Remove 75%* of the annual TP load, and
- 1.c. Options considered and presented shall examine the merits of relocating project elements to address, varying soil conditions and other constraints across the site

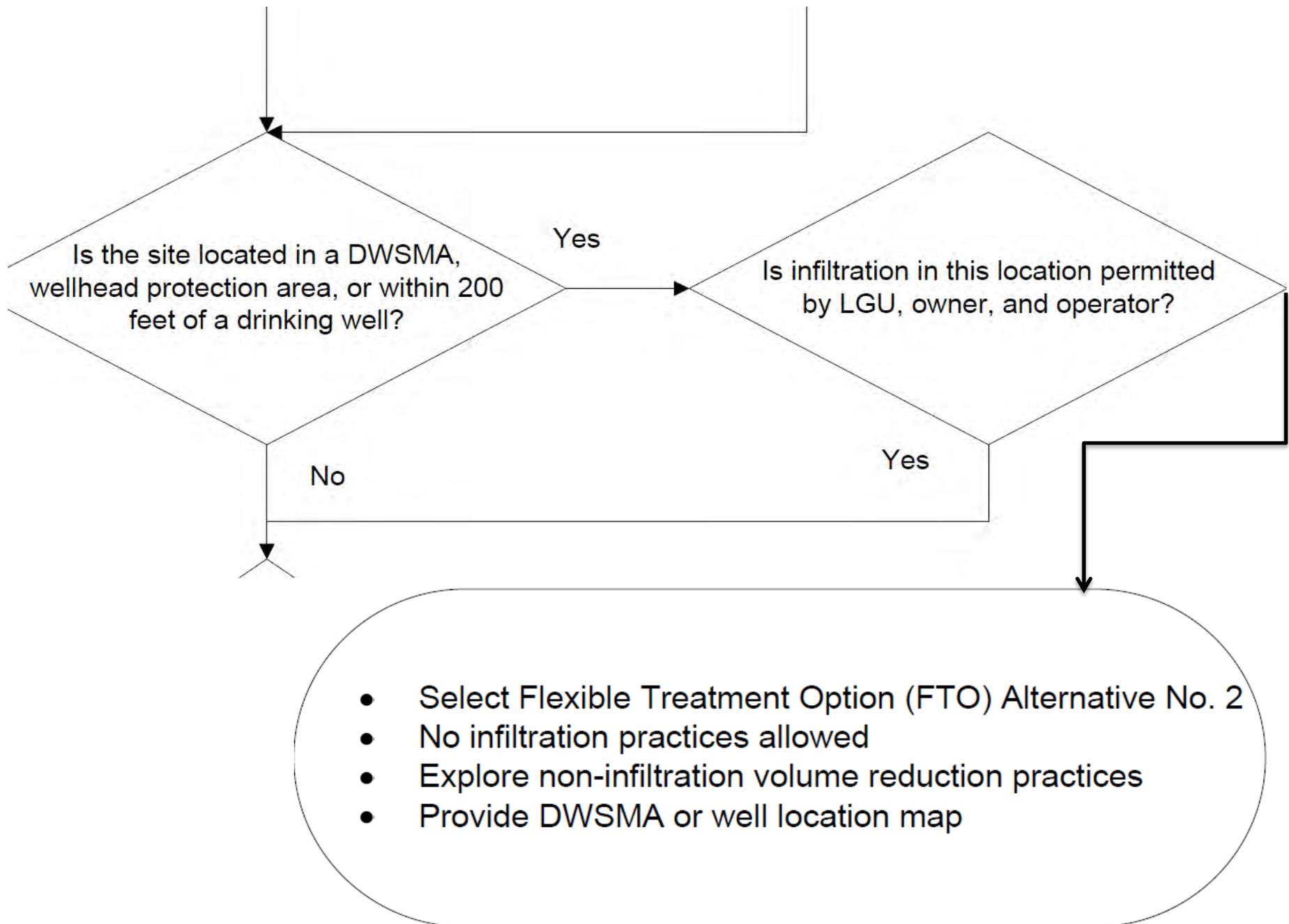
## Alternative #2

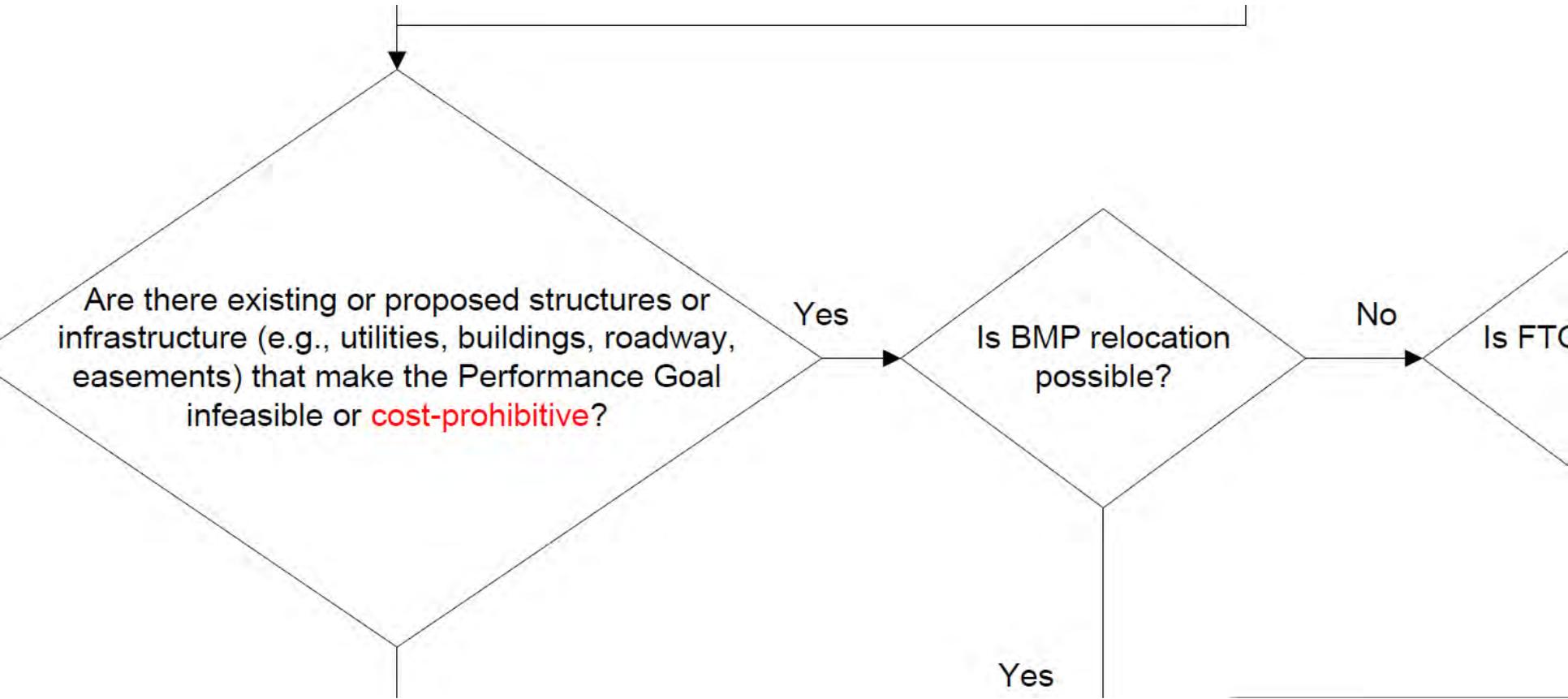
Applicant attempts to comply with the following conditions:

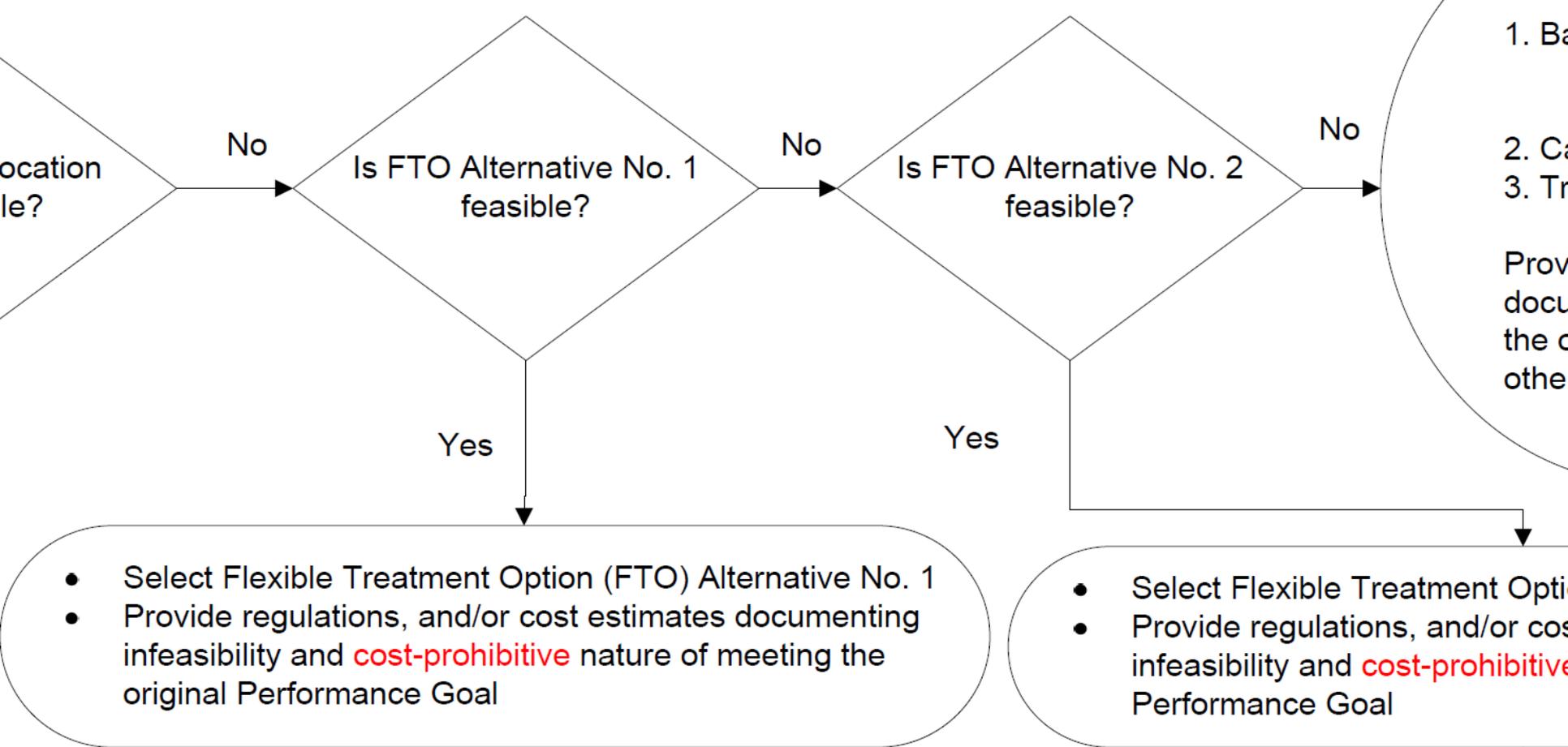
- 2.a. Achieve volume reduction to the maximum extent practicable (as determined by the Local Authority), and
- 2.b. *Remove 75%* of the annual TP load, and
- 2.c. Options considered and presented shall examine the merits of relocating project elements to address, varying soil conditions and other constraints across the site.

### **Off-site Considerations:**

Equivalent to the volume reduction Treatment Goal, off-site mitigation (including banking or cash, as determined by the Local Authority) can be used to protect the receiving water body. Off-site compliance and banking credits shall be achieved through a method that protects the receiving water using a method to be determined later in the MIDS Project.

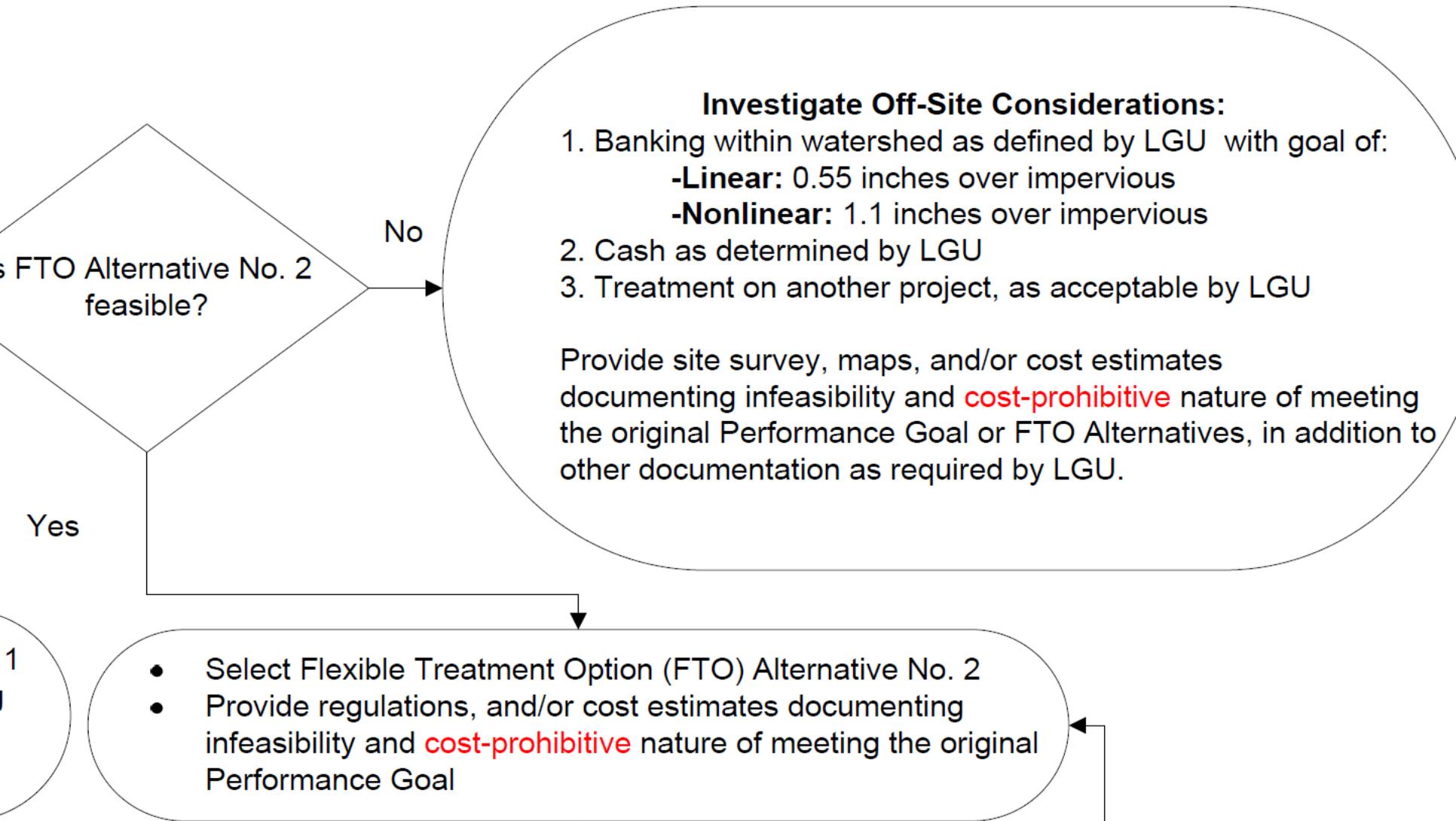


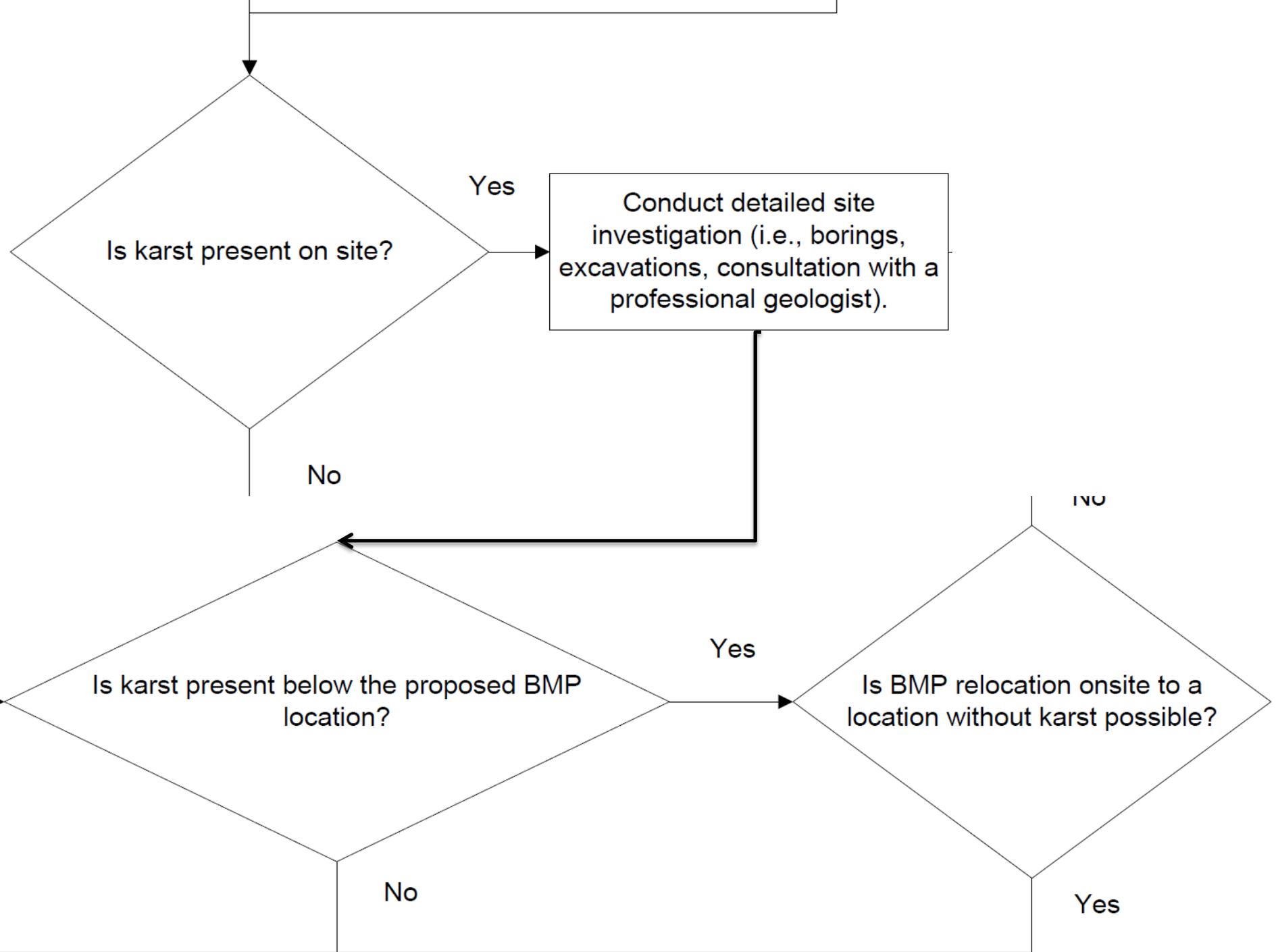




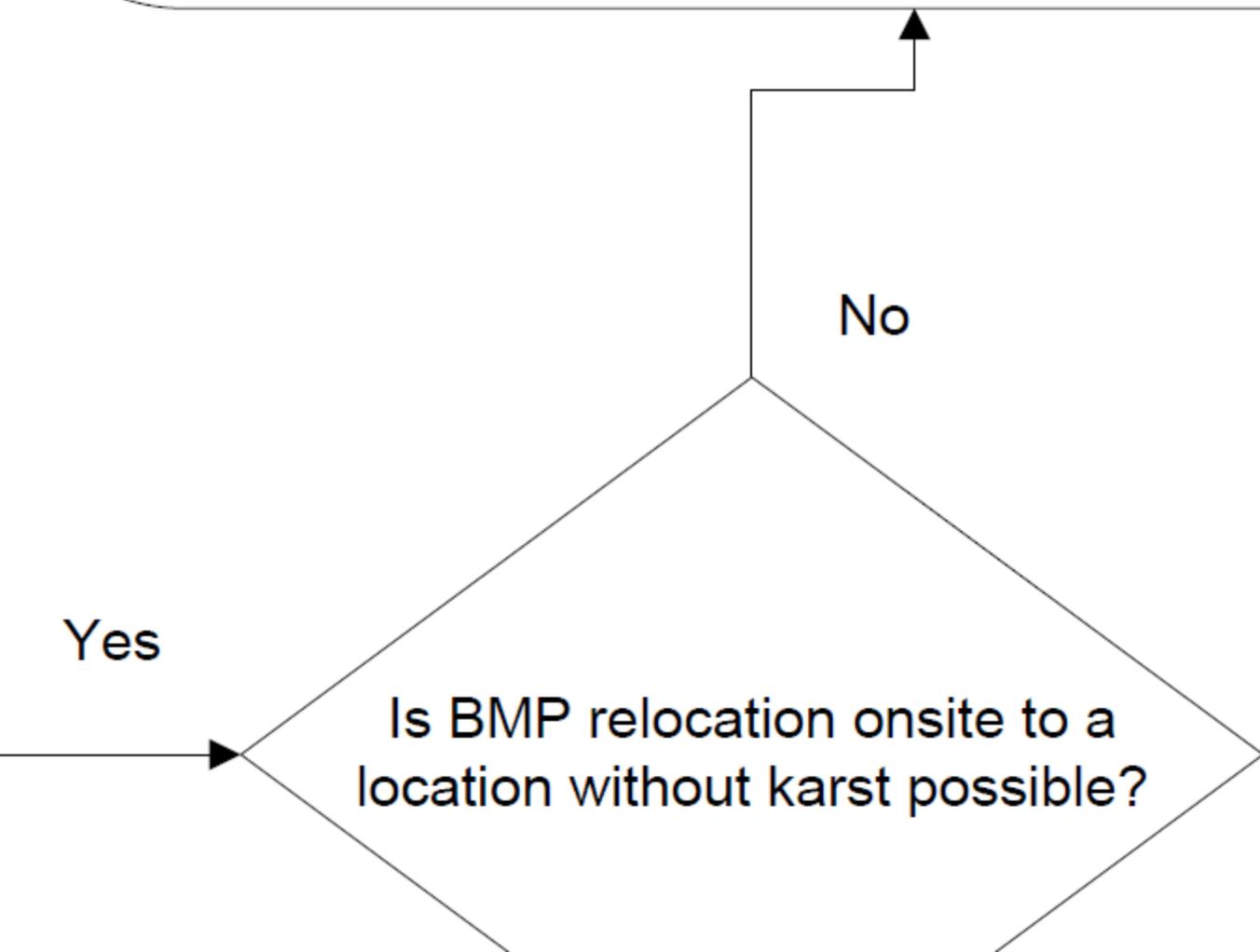
- Select Flexible Treatment Option (FTO) Alternative No. 1
- Provide regulations, and/or cost estimates documenting infeasibility and **cost-prohibitive** nature of meeting the original Performance Goal

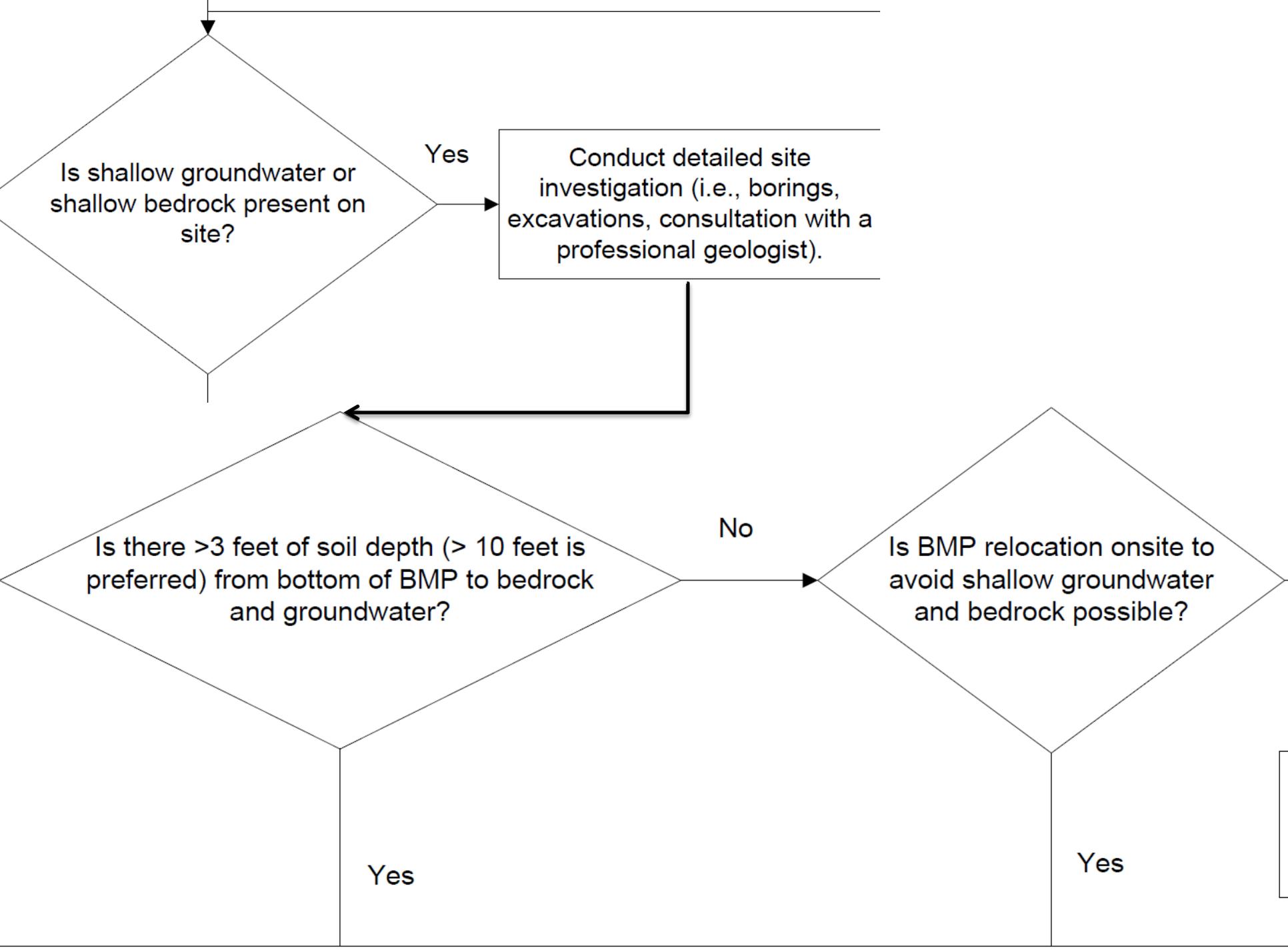
- Select Flexible Treatment Option...
- Provide regulations, and/or cost... infeasibility and **cost-prohibitive**... Performance Goal





- Select Flexible Treatment Option (FTO) Alternative No. 2
- Provide regulations, and/or cost estimates documenting infeasibility and **cost-prohibitive** nature of meeting the original Performance Goal





Is shallow groundwater or shallow bedrock present on site?

Yes

Conduct detailed site investigation (i.e., borings, excavations, consultation with a professional geologist).

Is there >3 feet of soil depth (> 10 feet is preferred) from bottom of BMP to bedrock and groundwater?

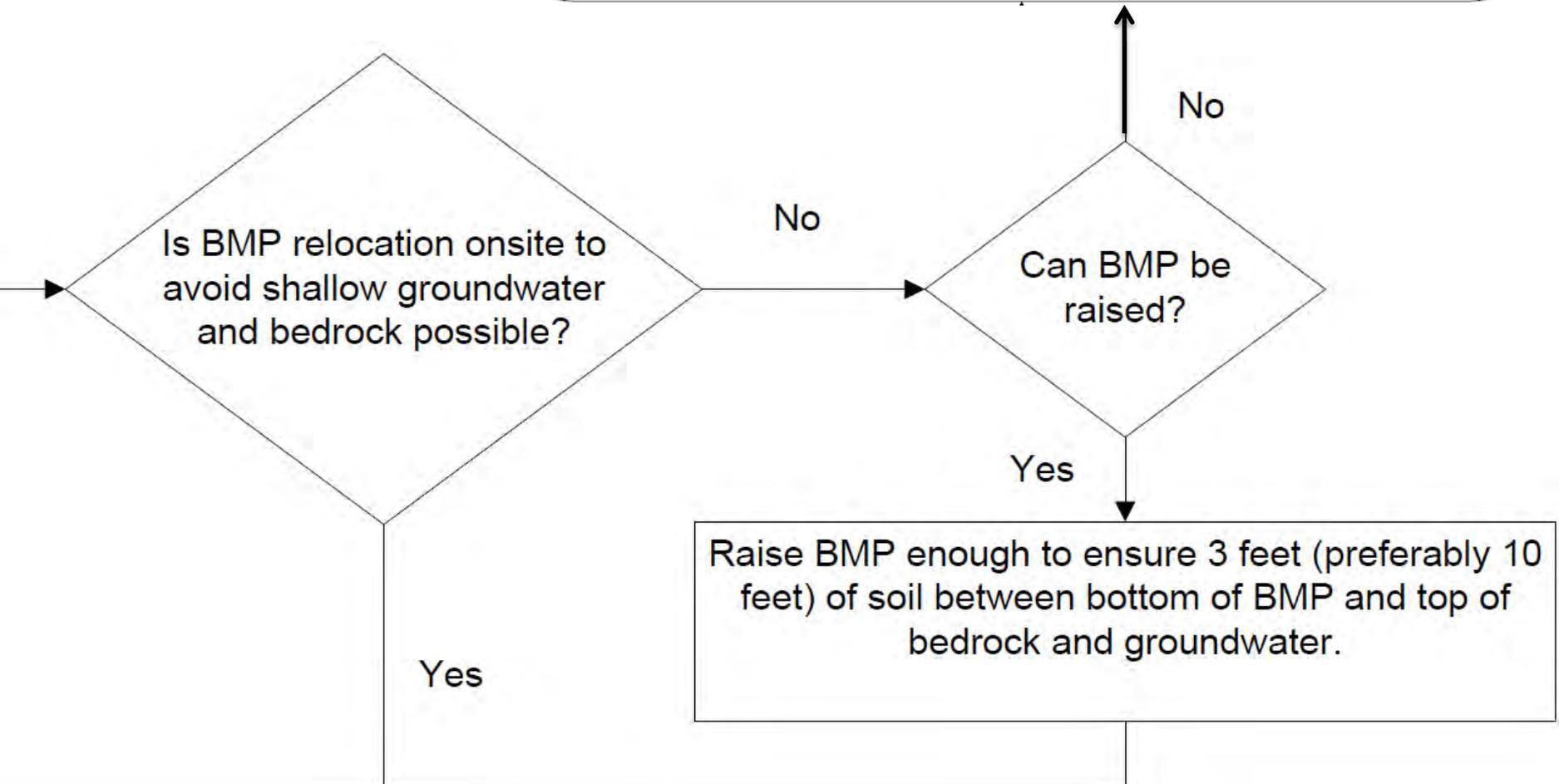
Yes

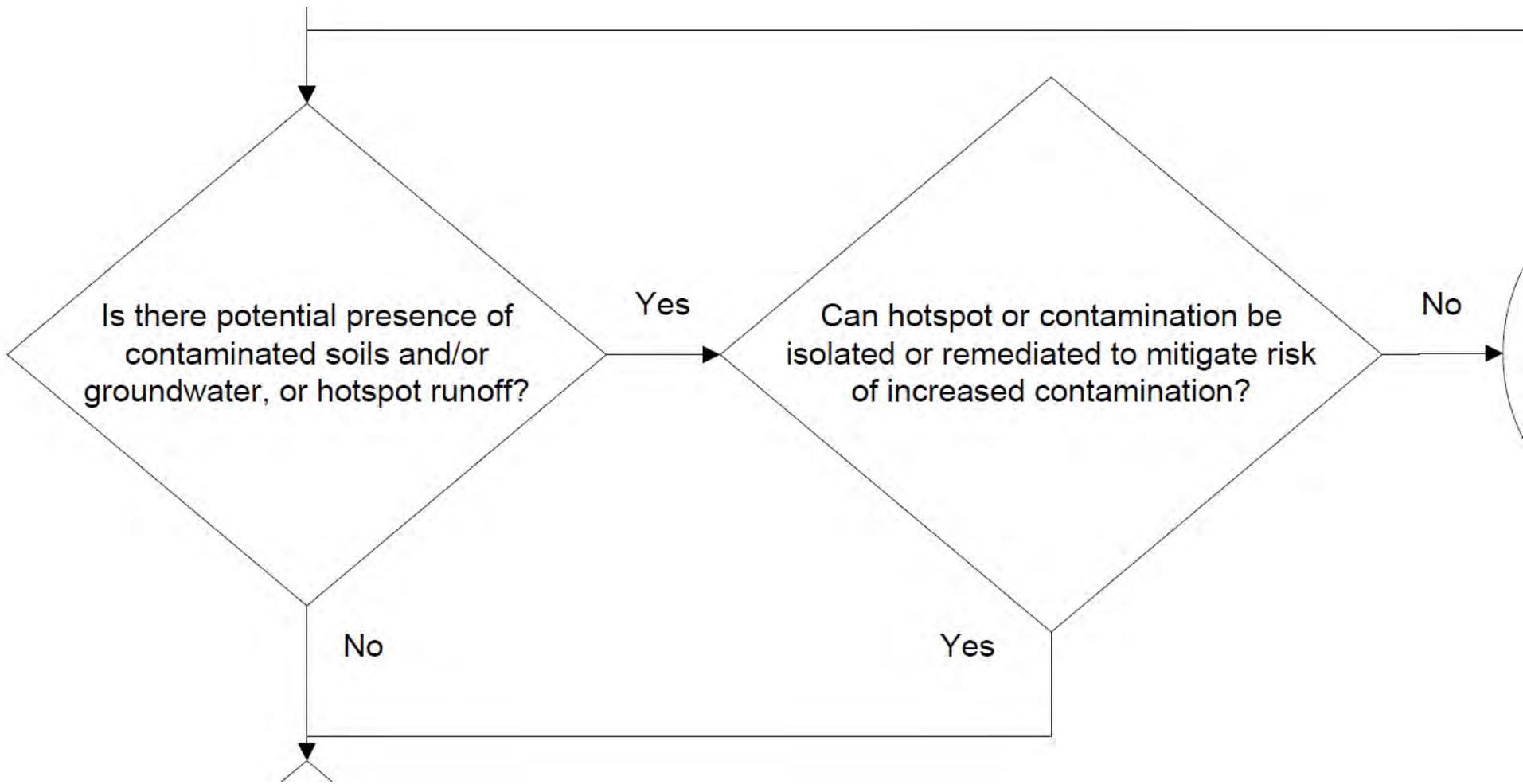
No

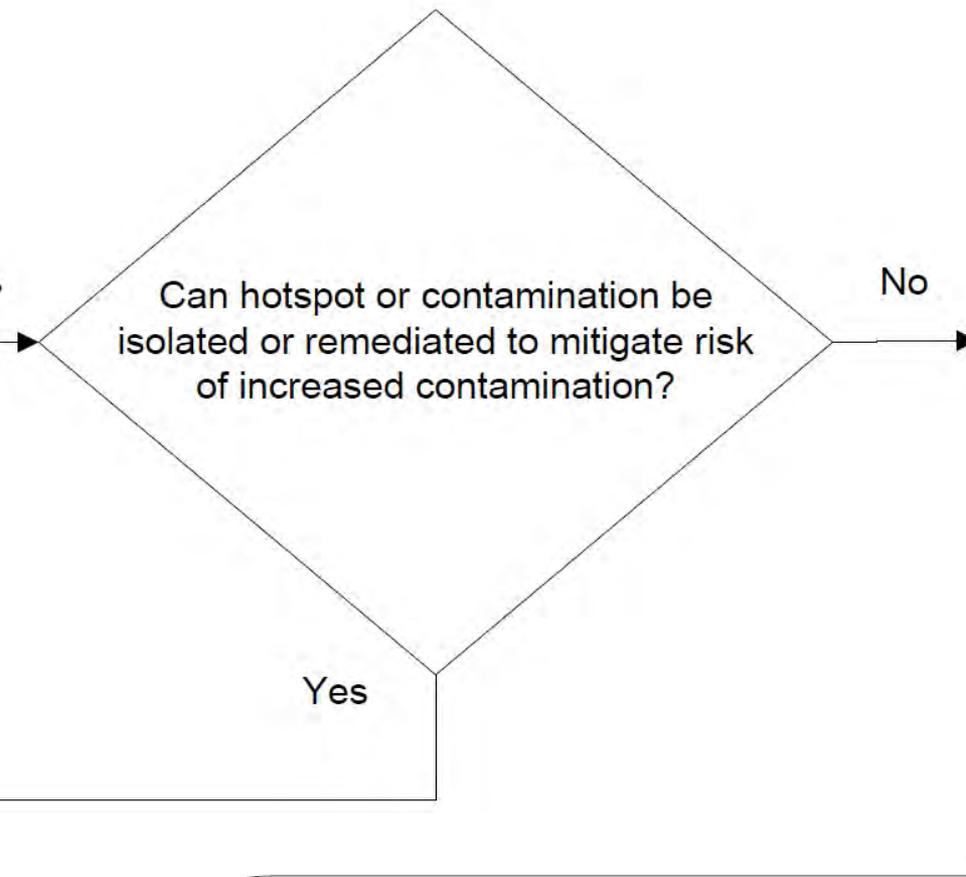
Is BMP relocation onsite to avoid shallow groundwater and bedrock possible?

Yes

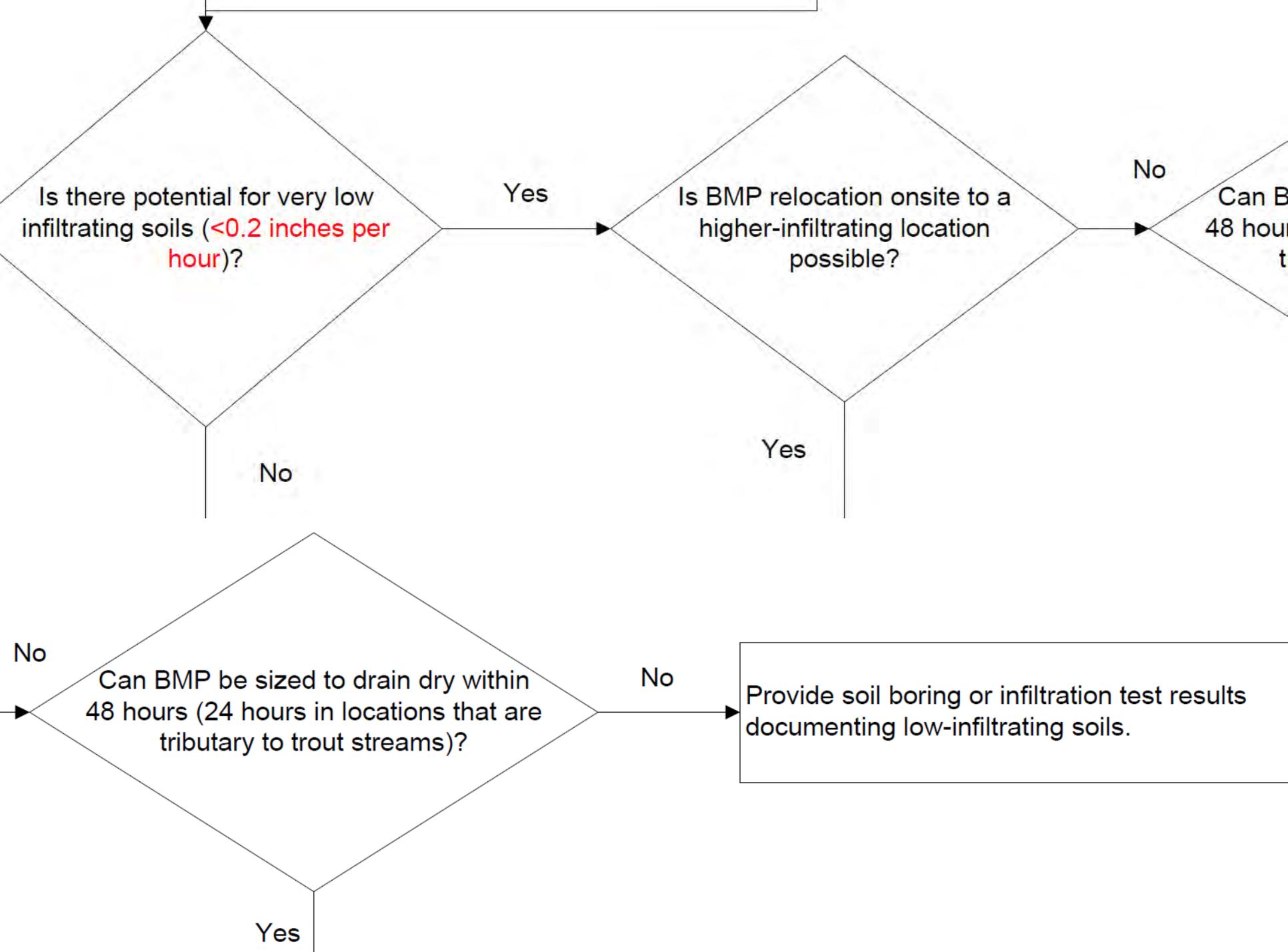
- Select Flexible Treatment Option (FTO) Alternative No. 2
- Provide regulations, and/or cost estimates documenting infeasibility and **cost-prohibitive** nature of meeting the original Performance Goal







- Select Flexible Treatment Option (FTO) Alternative No. 2
- No infiltration practices allowed
- Explore non-infiltration volume reduction practices
- Provide Phase I or II ESAs, or other documentation of potential contamination or hotspot runoff
- Provide documentation of extent of contamination and remediation alternatives considered



Is there potential for very low infiltrating soils (<0.2 inches per hour)?

Yes

Is BMP relocation onsite to a higher-infiltrating location possible?

No

Can B  
48 hour  
t

No

Yes

No

Can BMP be sized to drain dry within 48 hours (24 hours in locations that are tributary to trout streams)?

No

Provide soil boring or infiltration test results documenting low-infiltrating soils.

Yes

Provide soil boring or infiltration test results documenting low-infiltrating soils.



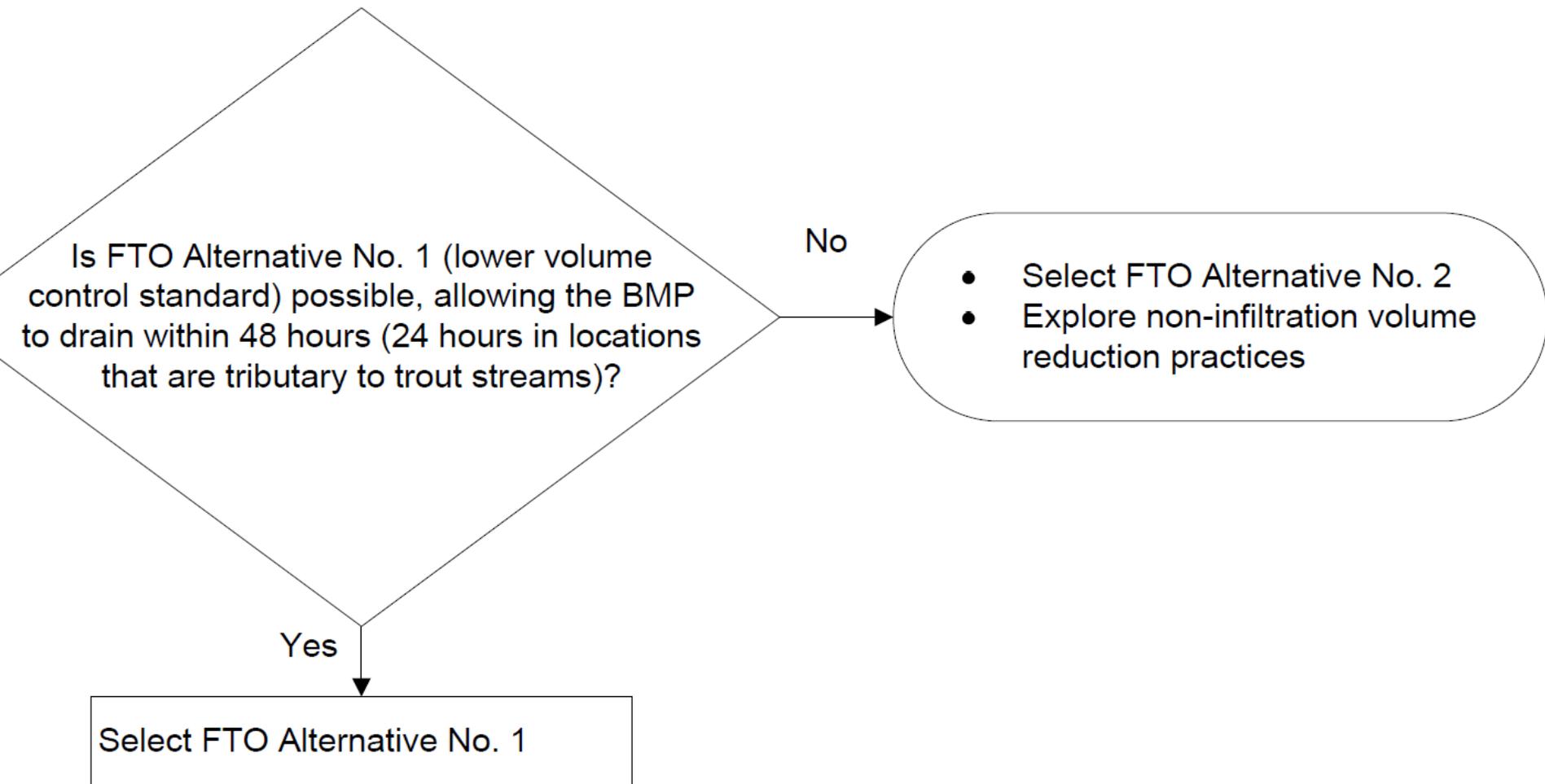
Is FTO Alternative No. 1 (lower volume control standard) possible, allowing the BMP to drain within 48 hours (24 hours in locations that are tributary to trout streams)?

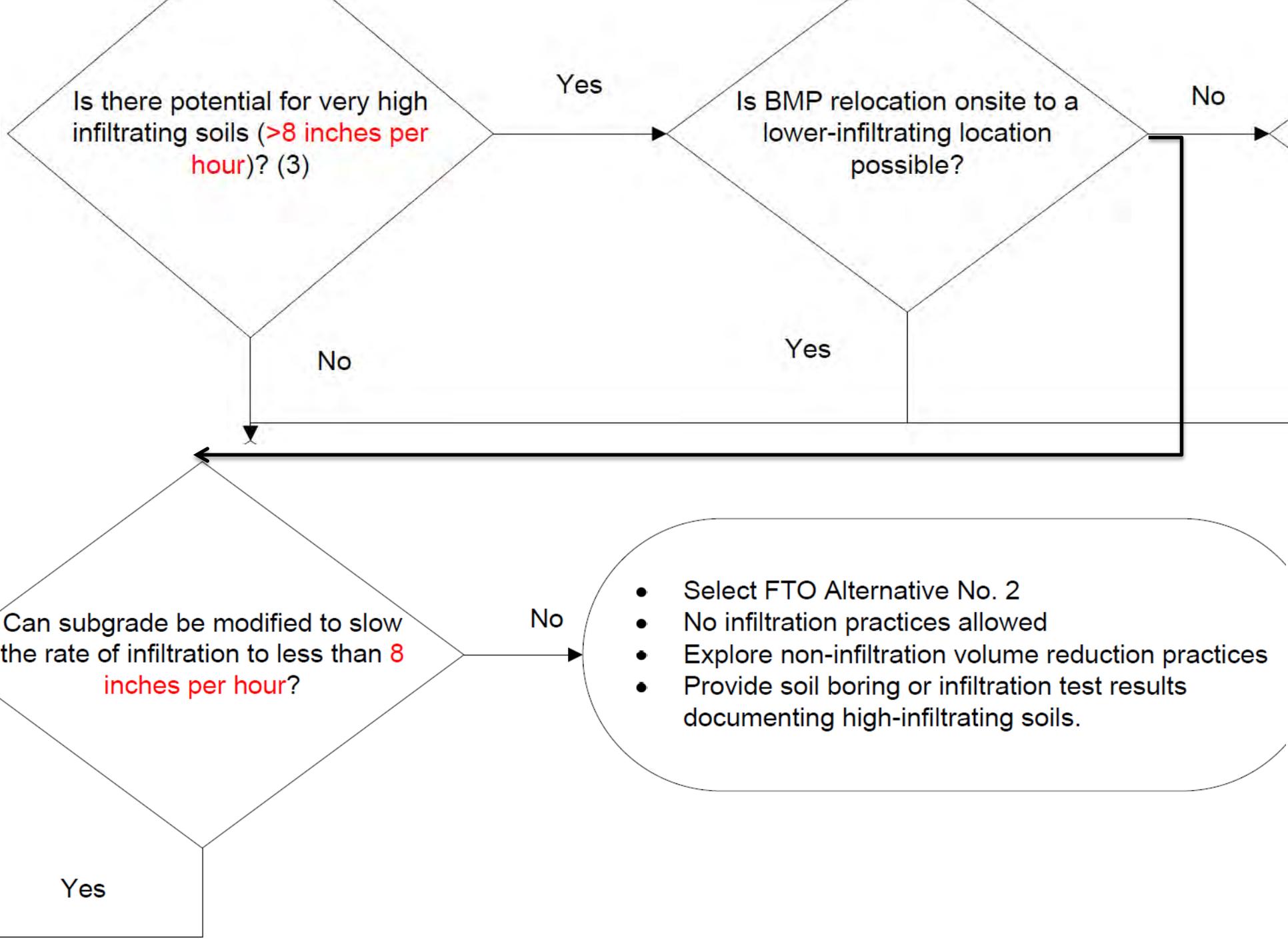
Yes



Select FTO Alternative No. 1







Is there potential for very high infiltrating soils (>8 inches per hour)? (3)

Yes

Is BMP relocation onsite to a lower-infiltrating location possible?

No

No

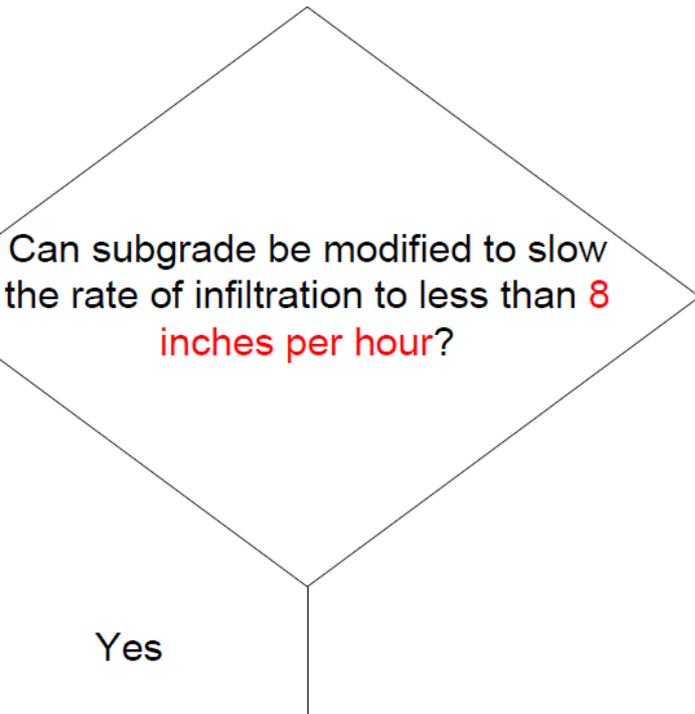
Yes

Can subgrade be modified to slow the rate of infiltration to less than 8 inches per hour?

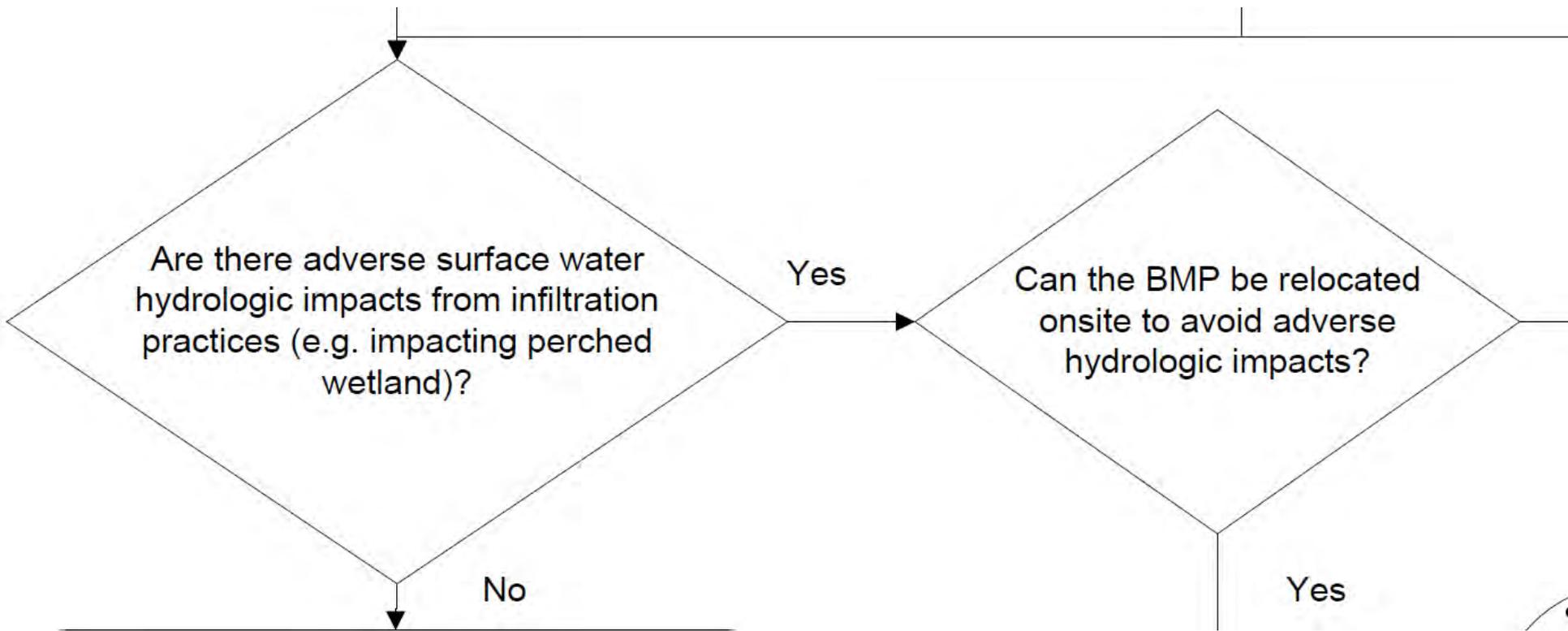
No

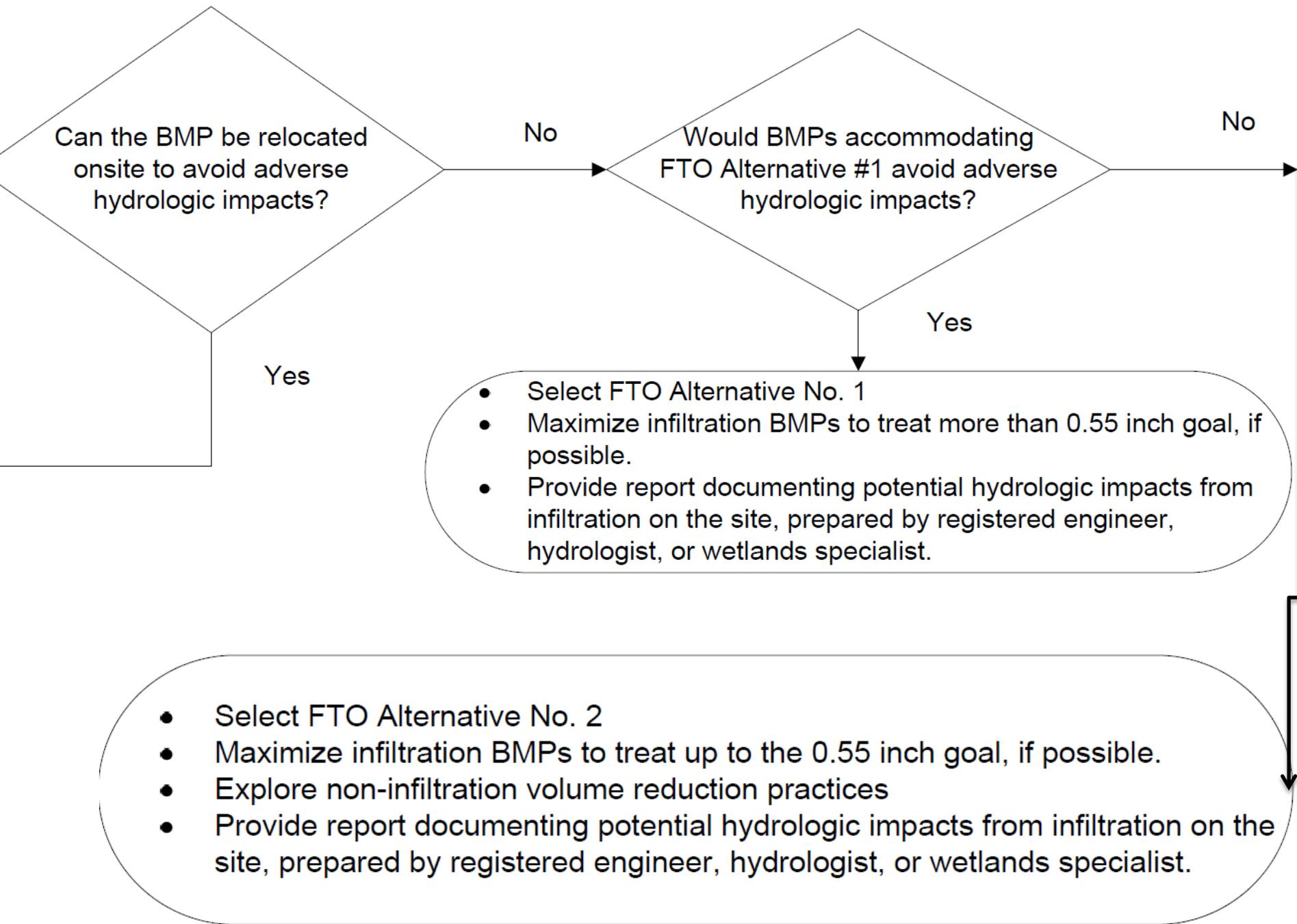
- Select FTO Alternative No. 2
- No infiltration practices allowed
- Explore non-infiltration volume reduction practices
- Provide soil boring or infiltration test results documenting high-infiltrating soils.

Yes



- Select FTO Alternative No. 2
- No infiltration practices allowed
- Explore non-infiltration volume reduction practices
- Provide soil boring or infiltration test results documenting high-infiltrating soils.

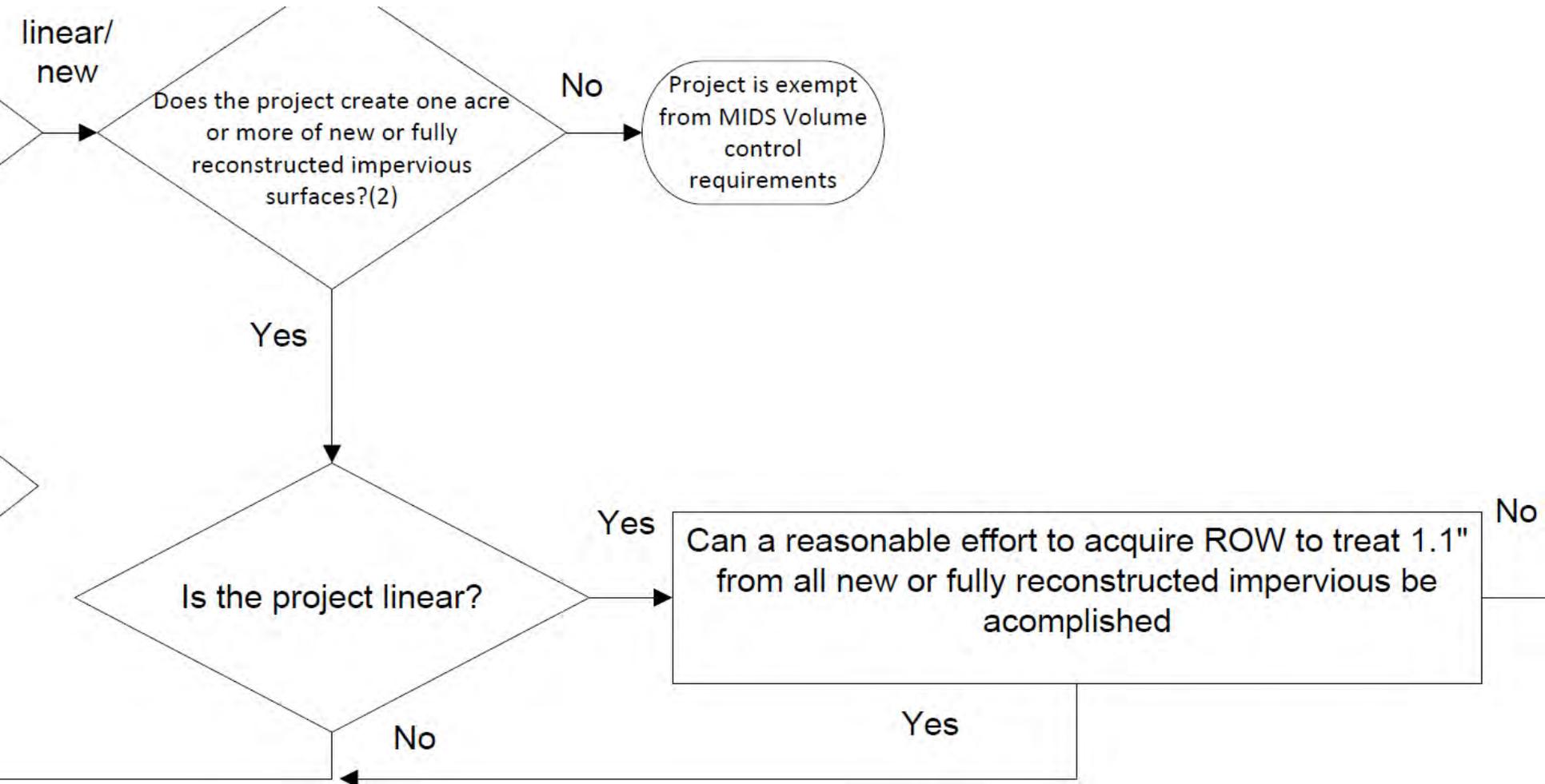




# Linear and Redevelopment: MIDS Design Sequence Flow Chart

MIDS Work Group

April 19, 2013



DW to treat 1.1"  
impervious be

No

Is FTO  
Alternative No.  
1 feasible?

No

Is FTO  
Alternative No. 2  
feasible?

Yes

Yes

No

Select Flexible Treatment Option (FTO) Alternative No. 1  
Provide documentation of offsite runoff to project area  
Provide documentation of lack of right-of-way.

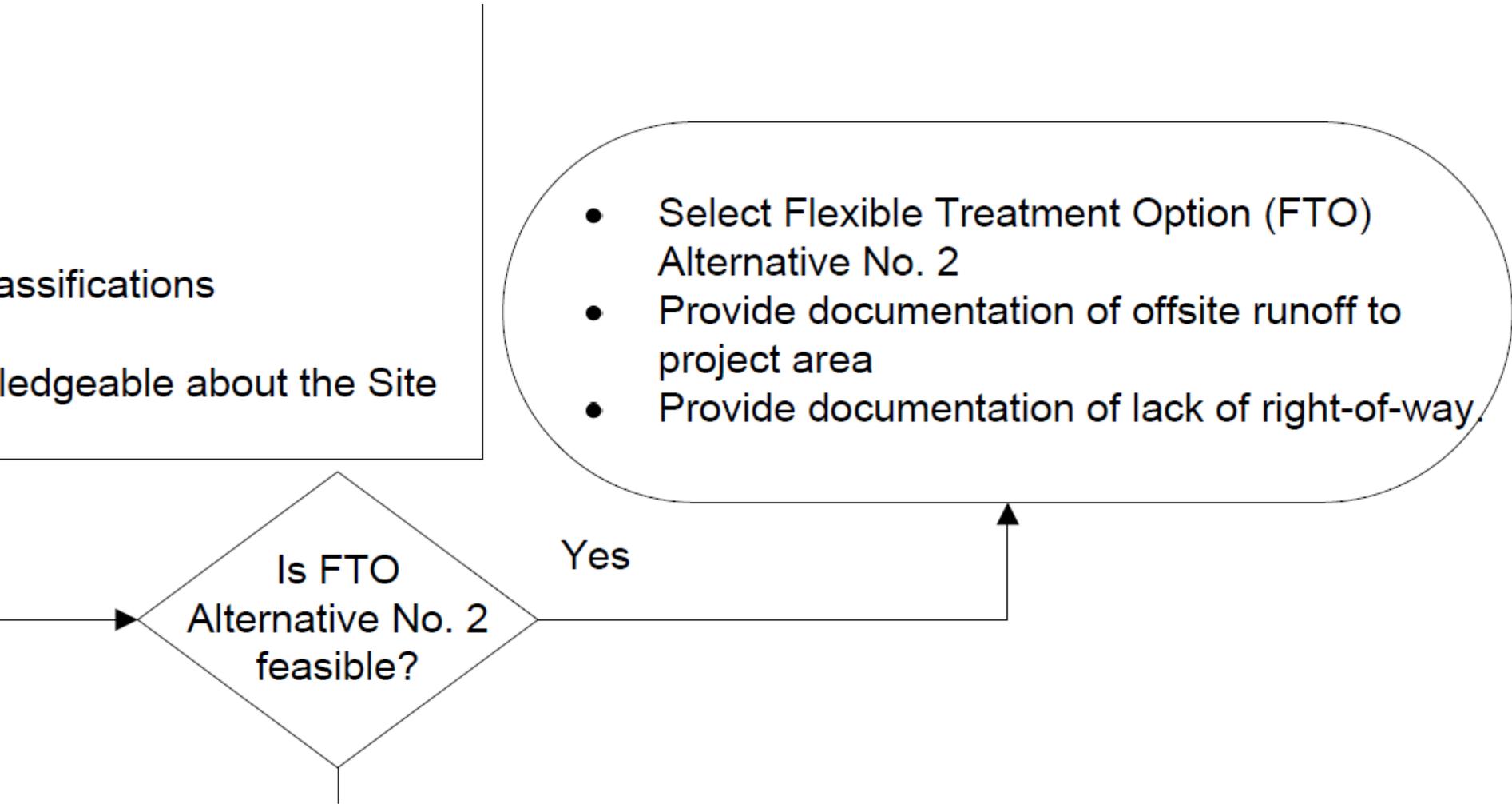
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ledgeable about the Site

- Select Flexible Treatment Option (FTO) Alternative No. 2
- Provide documentation of offsite runoff to project area
- Provide documentation of lack of right-of-way.

Is FTO  
Alternative No. 2  
feasible?

Yes



Is FTO  
Alternative No. 2  
feasible?

Yes

No

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