

Republic of Iraq

Ministry of Higher Education & Scientific Research

Al-Mustaqbal University College

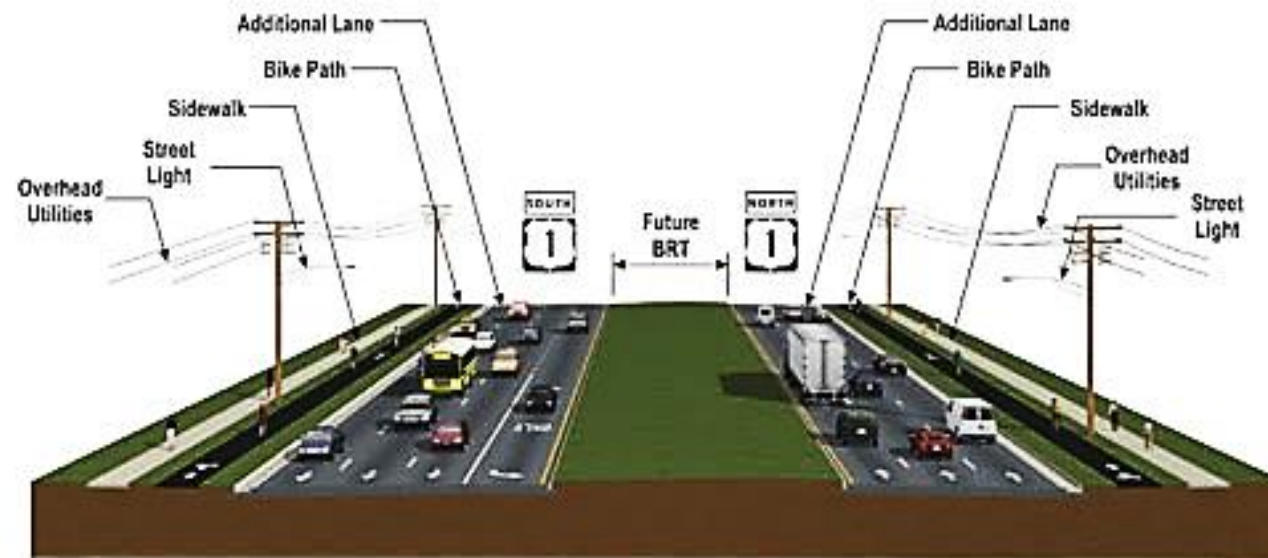
Department of Building & Construction Technology Eng.



3rd Stage

((Geometric Design of Highways Alignment))

Lecture No. (4)



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01- Cross-Section Elements

1. Surface Type:

- Asphalt concrete (Flexible pavement).



- Plan, simply reinforced & continuously reinforced concrete (Rigid pavement).



- Surface treatment for shoulders.



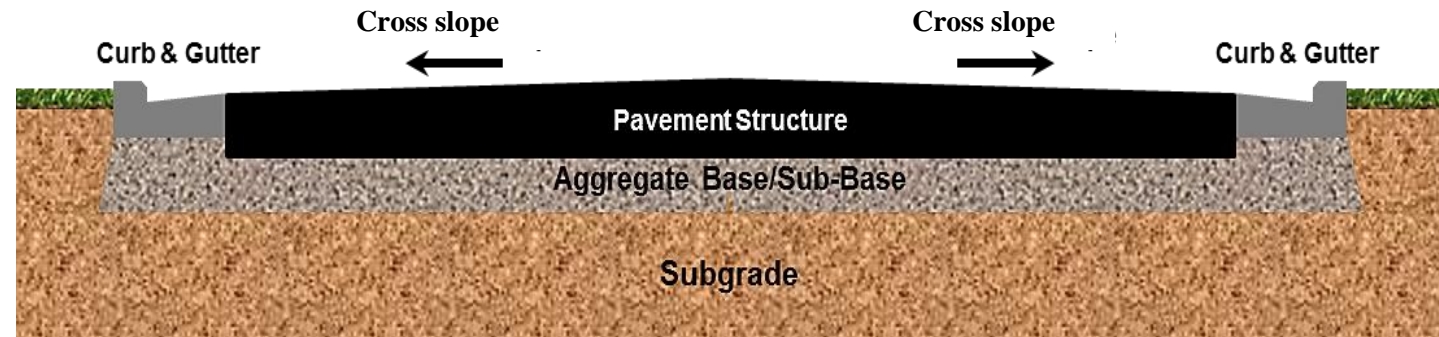
Choosing the surface type depending on (اختيار نوع السطح يعتمد على)

- Applied stresses (الاجهادات المسلطة)
- Environmental conditions (الظروف المناخية المحيطة)
- Available materials (المواد المتوفرة)
- Common practice (الخبرة المكتسبة)
- Cost (الكلفة)

2. Cross Slope:

0.01 – 0.03 "high type surface"

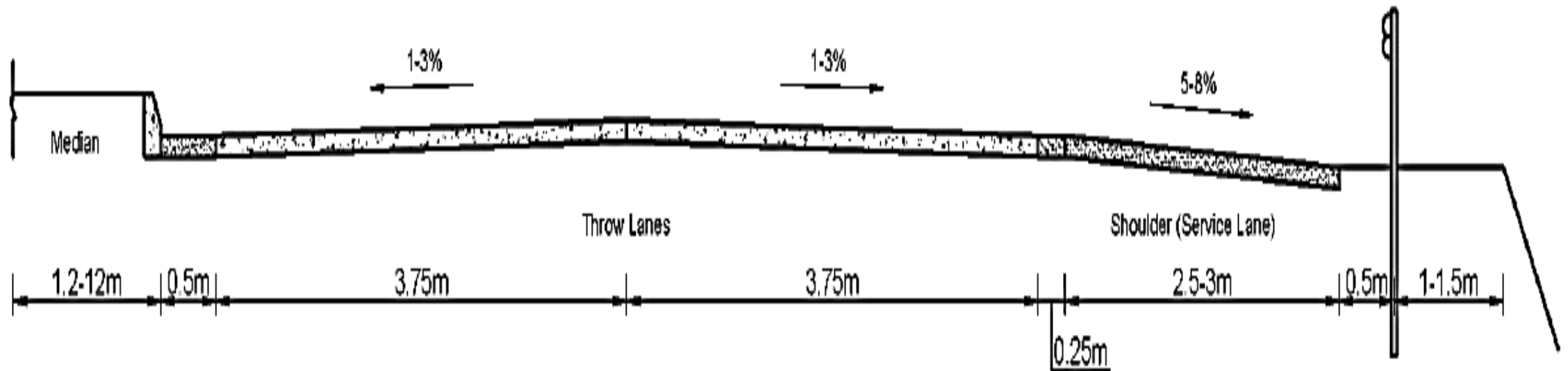
0.08 "low type surface" for shoulders



3. Lane Width:

- Standard = 3.65 m
- In practice = 3.75 m
- (+0.25m (at shoulders) & +0.5m (at median if barrier curb is found)).

Where +0.25m & 0.50m marginal strips.



4. Shoulders: - Surface treatment

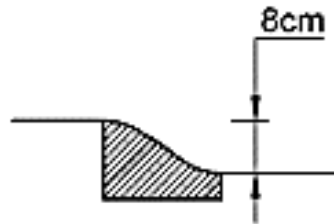
- Width = 2.5 - 3.0 m

- Cross-slop = 5 - 8% = 0.05 - 0.08

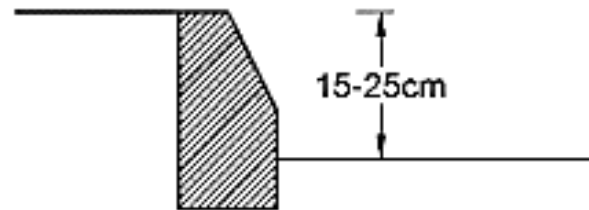


5. Curbs:

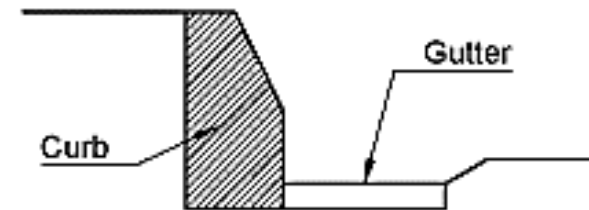
- Barrier (for pedestrian) (لا يمكن اجتيازه بالمركبات)
- Mountable (يمكن اجتيازه بالمركبات)
- Curb & Gutter (أنواع من الأرصفة تحوي نظام تصريف)



for Mountable



for Barrier



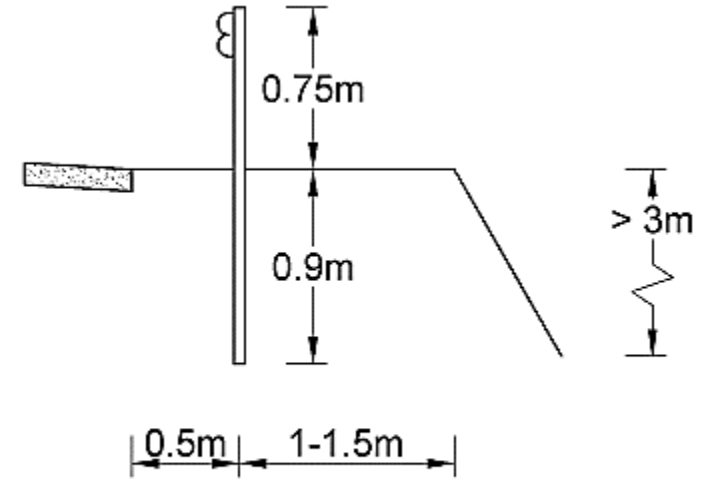
Curb & Gutter



6. Guard rail (by sheet and column):

Used at hazardous points:

- at high fill $> 3.0\text{m}$
- steep grades (انحدار شديد)
- sharp curvature (انحناء شديد)
- sudden change in alignment
- restricted sight (foggy) (مناطق الرؤية المقيدة) (ضبابي)
- near rivers and lakes $< 10 - 15\text{m}$



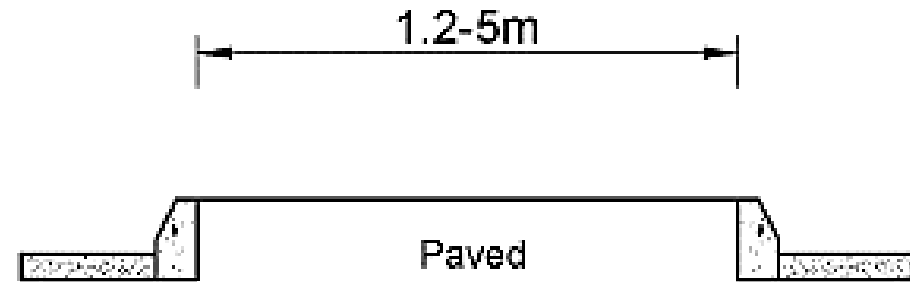
Spacing = 2.4m (C/C)



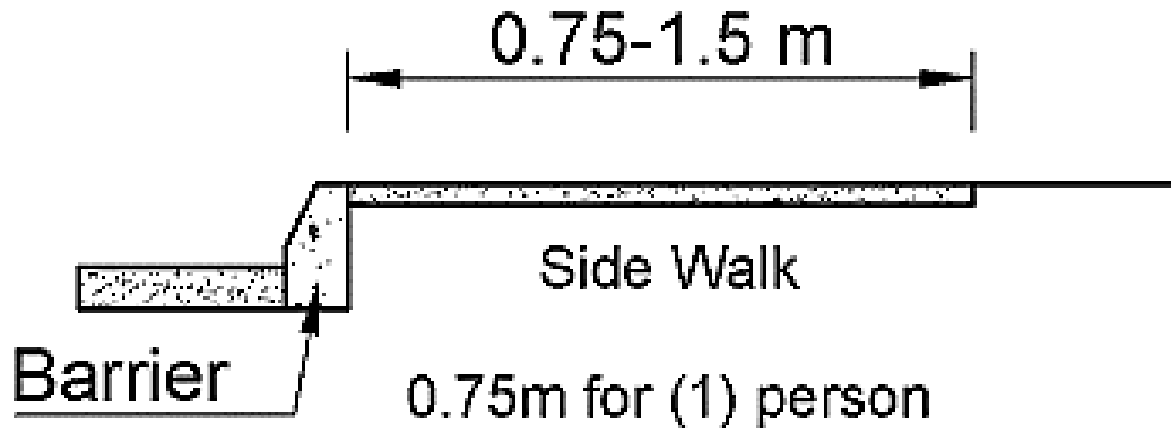
7. Median:

For:

- Separating opposite flow
- Future expansion



8. Side walk: (طريق المشاة)



9. Side slope:

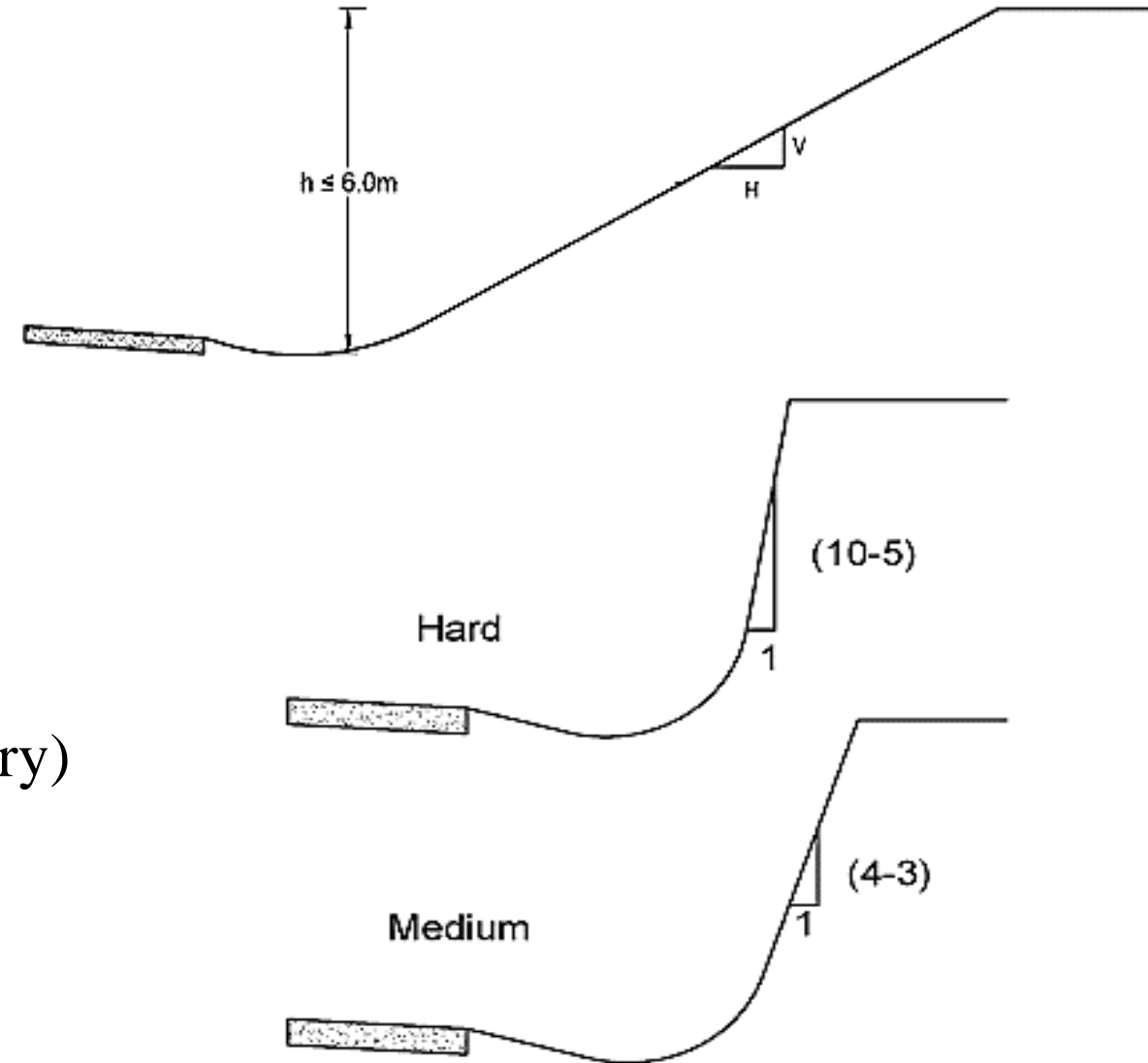
a. Cut slop:

- For normal soil (clay, silt, sand), & $h \leq 6.0$ m:

H:V = 2:1,, 4:1 (favorable 4:1)

- For normal soil, & $h > 6.0$ m:

(has to be design according to slop stability theory)

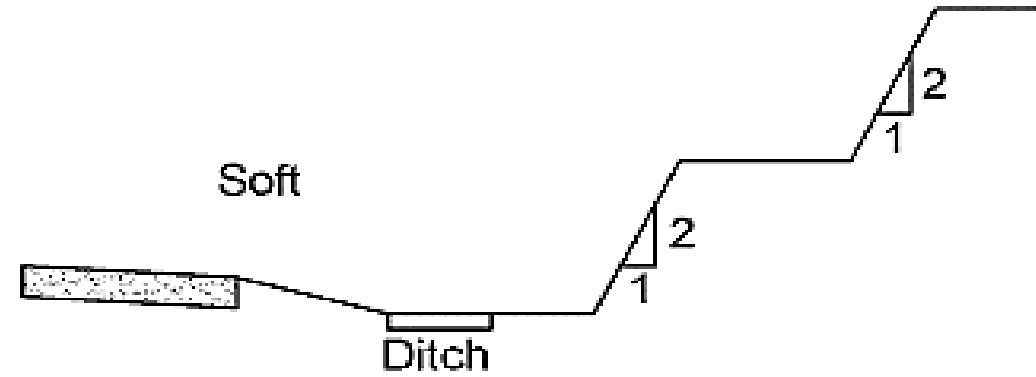


- For rocky soil:

Hard (H:V) = 1:10 ... 1:5

Medium (H:V) = 1:4 ... 1:3

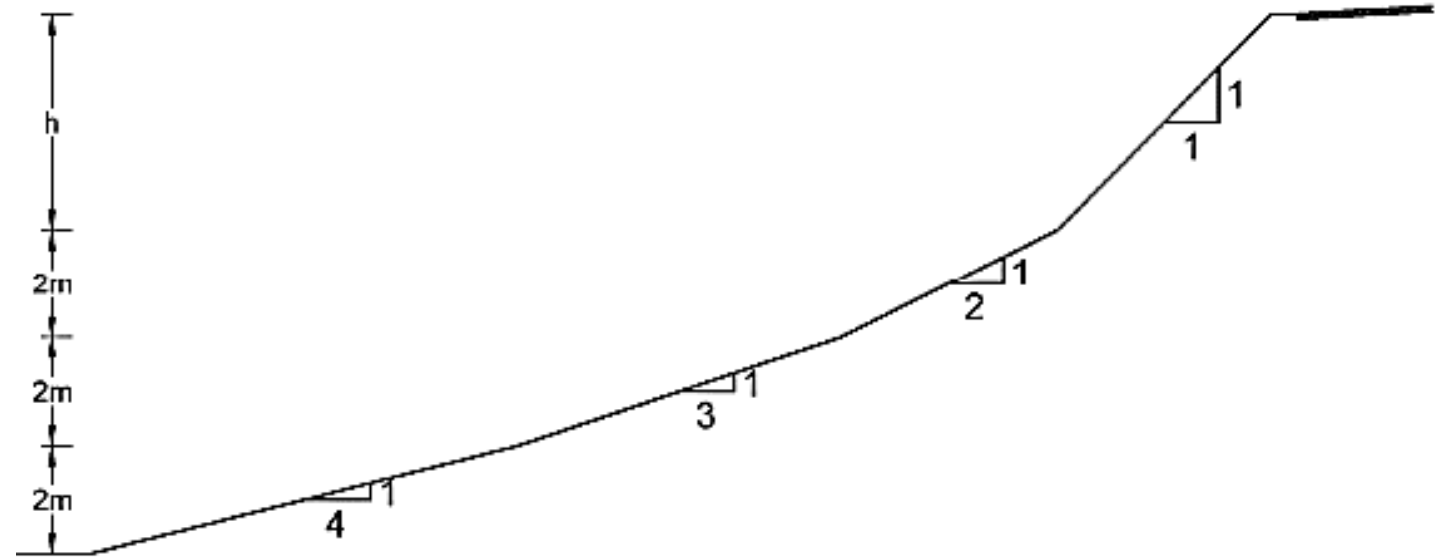
Sift (H:V) = 1:2 with steps

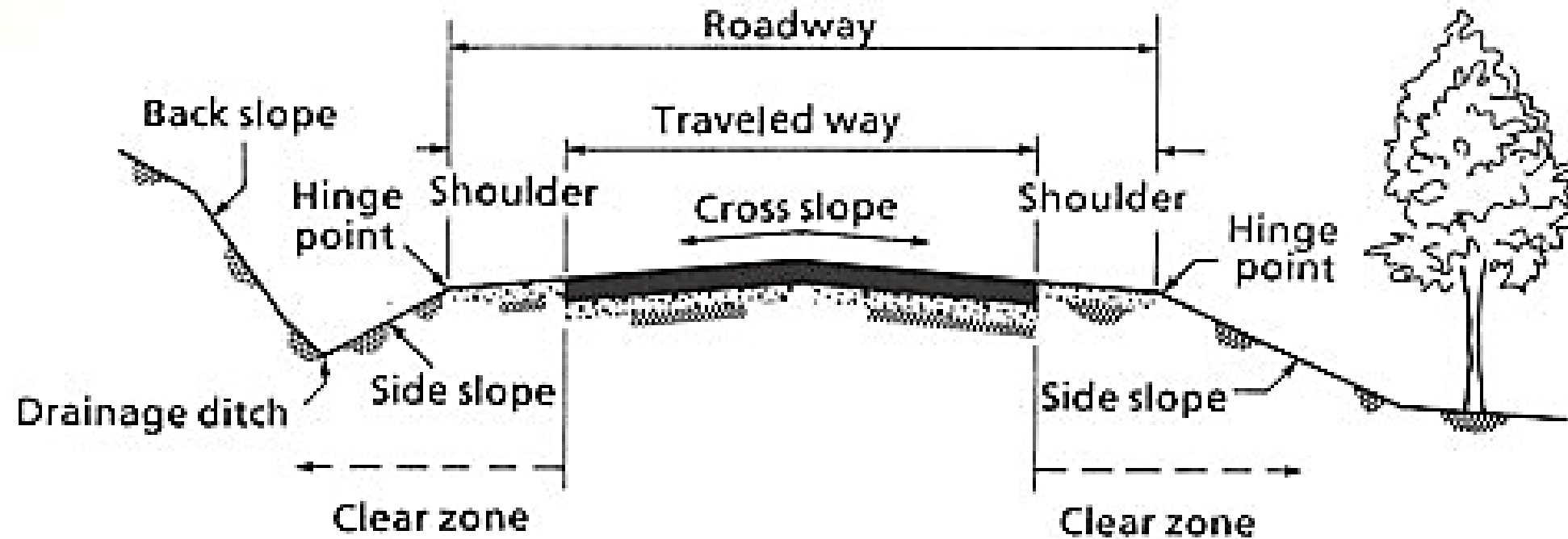


b. Fill slop:

أول ستة أمتار بالميل المبين بالشكل،

والمتبقى (h) بالميل (1:1)

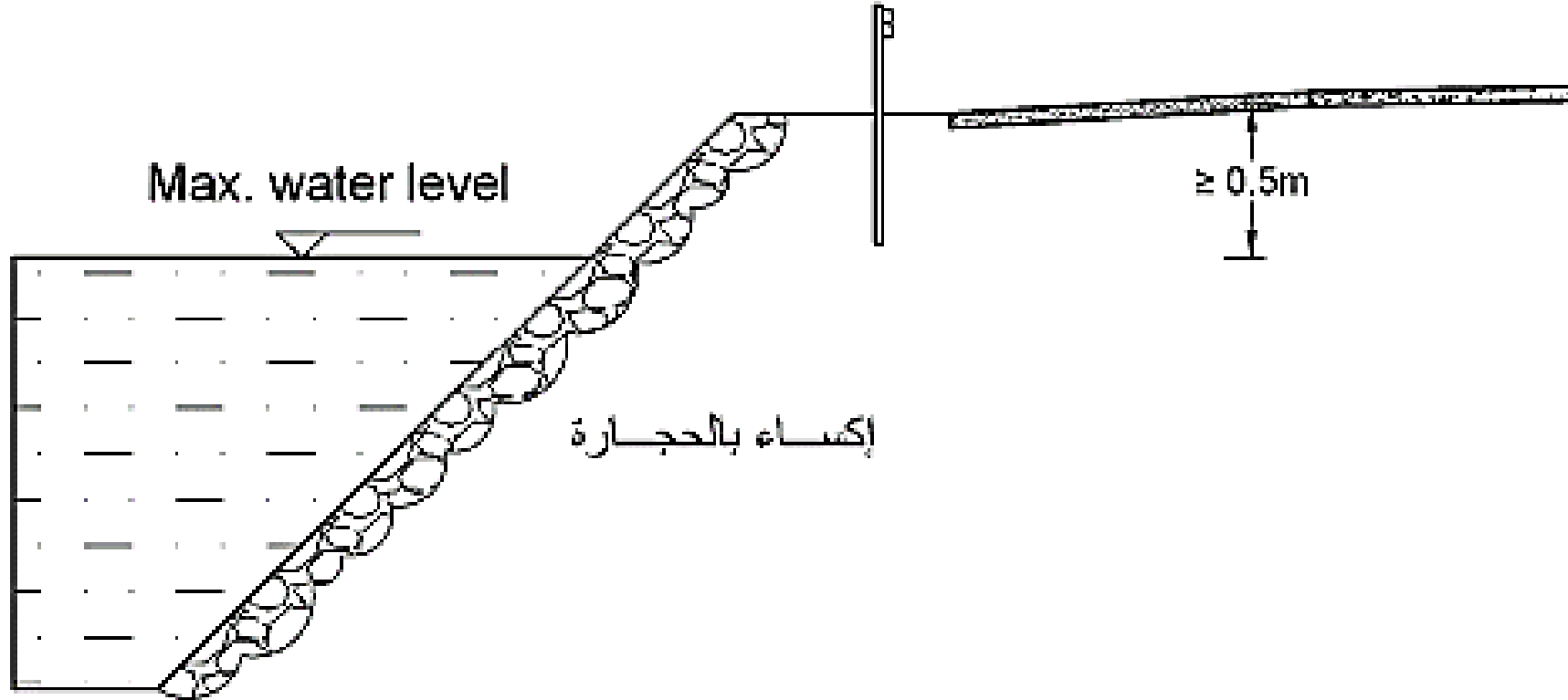




Hinge Point Point where the slope rate changes.

Clear Zone That area along the side of the traveled way including the shoulder that is available for recovery of an errant vehicle.

Note: In case of water surface beside the road, the details will be as shown in the fig. below:



10. Vertical clearance:

- For roads = min. 5.20m
- For railway = min. 6.50m
- For walkway = min. 2.50m
- For main rivers = min. 6.50m
- For other rivers = min. 3.50m
- For high tension lines = min. 8.8 -10m



11. Right of way (محرمات الطريق) ≥ 80 m

Freeway ≈ 200 m

Highway ≈ 100 m

Used for: future expansion (التوسع), safety (الامان), and maintenance (الصيانة).

