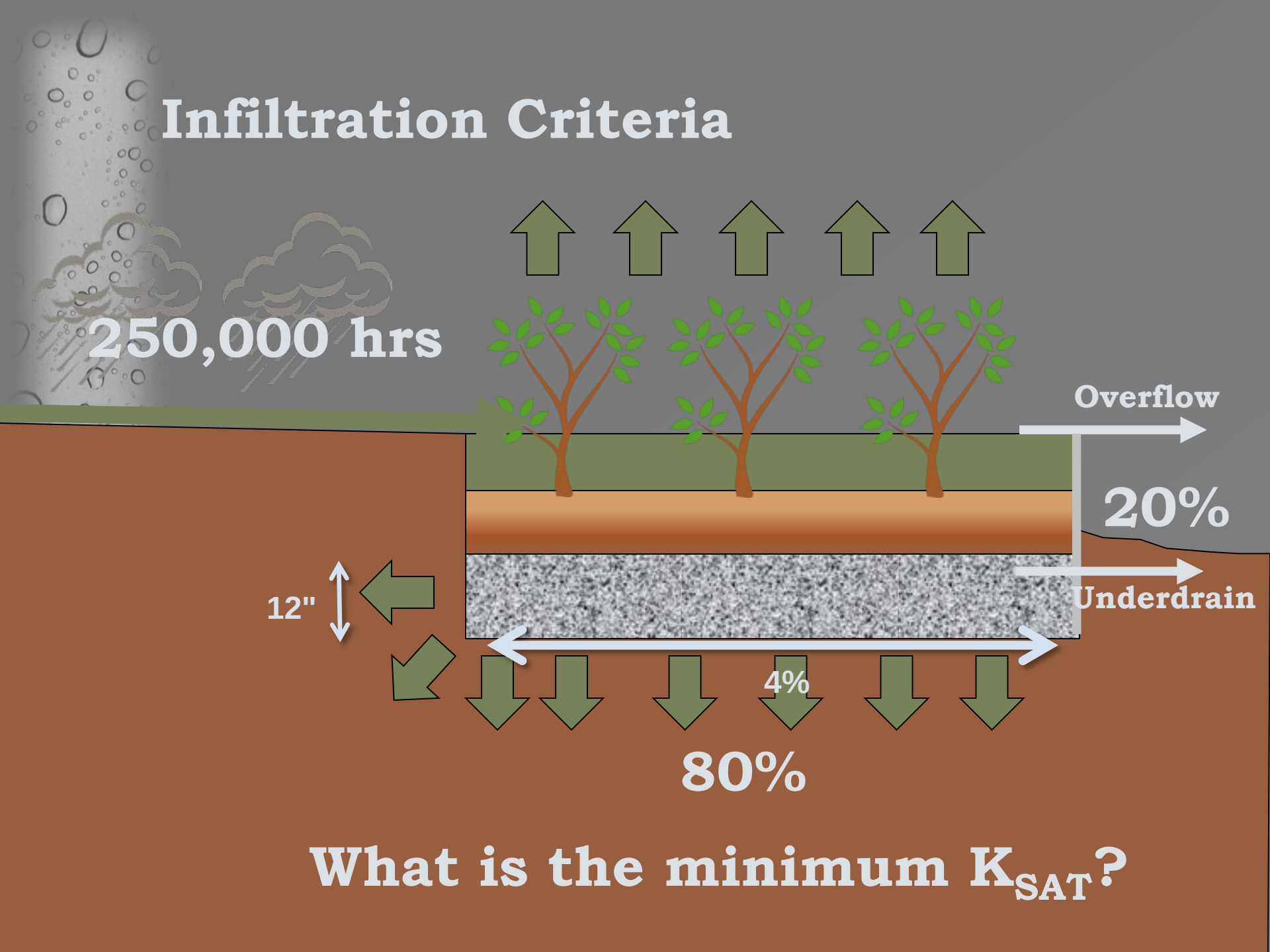
Feasibility of Infiltration and Harvesting/Reuse

Analysis and Documentation for Stormwater Control Plans

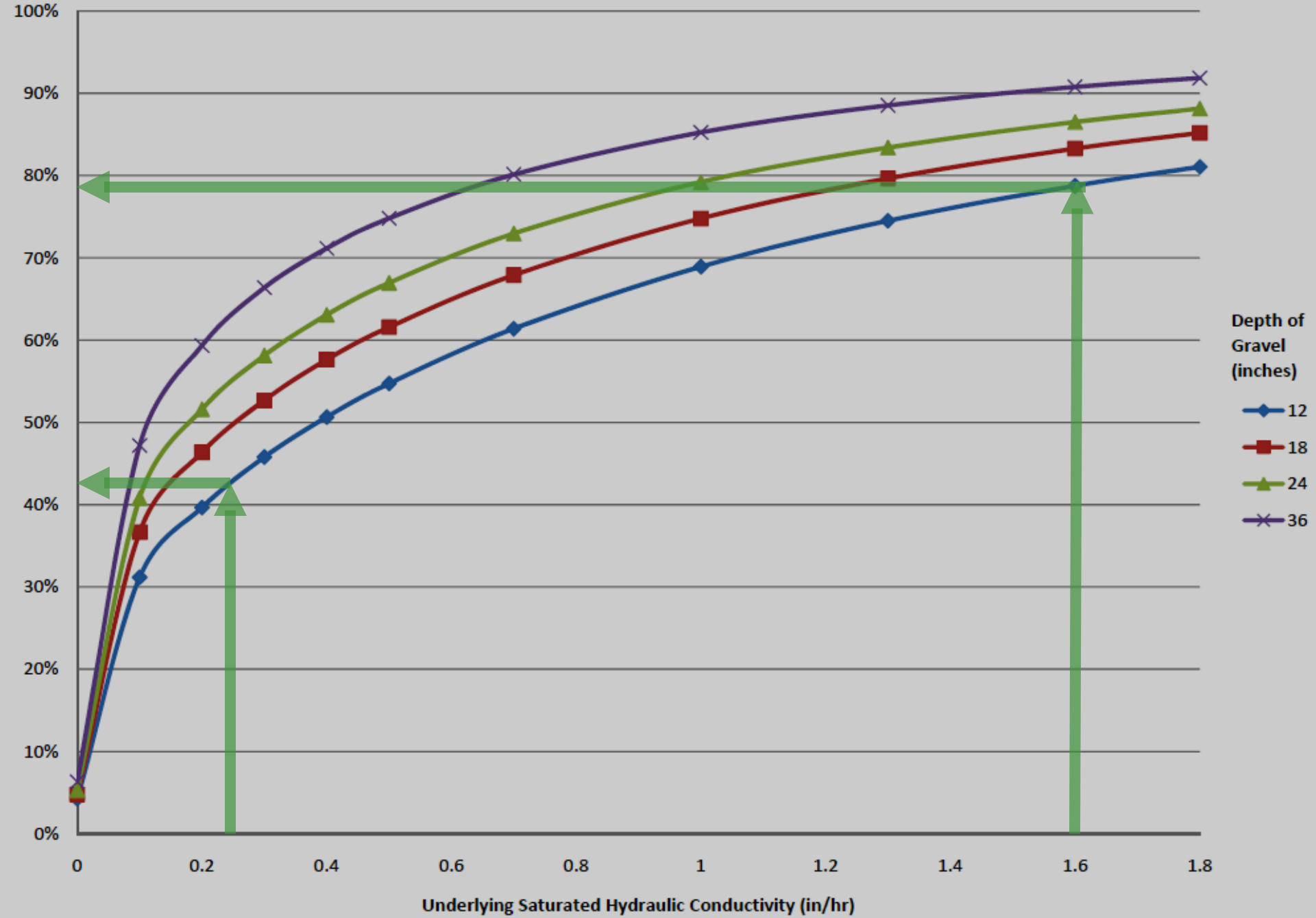
DAN CLOAK ENVIRONMENTAL CONSULTING

Infiltration Criteria



What is the minimum K_{SAT}?

Figure E-5: % Captured by Gravel Depth, 100% Imperviousness, Martinez



Treatment

Infiltration/
Evapotranspiration
•
Harvesting /Reuse

Biotreatment
(Bioretention)

High-Rate Biofilter
•
Vault-Based Filter

Screening for Adequate Demand

1. Identify and list sub-areas of site from which runoff could feasibly be captured
2. Calculate demand for toilet flushing
3. Compare demand to drawdown required to use 80% of average annual runoff.
   - Toilet flushing
   - Landscape Irrigation
   - Other uses

Required Demand

30+ years of hourly runoff from one acre

Overflow (20% of total)

50,000 gallons storage (for example, about 25' diameter x 14' high)

Reuse (80% of total)

Table 4-3 on page 41	
Rain Gauge	Min. Demand (gal/day/acre)
Berkeley	5900
Brentwood	4200
Martinez	5900
Dublin	4100

Select Roofs or other Surfaces

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- "List specific impervious areas from which runoff might be feasibly captured or stored.
- All contiguous roof areas 10,000 SF and greater must be listed."

Default Toilet Flushing Use

Land Use Type	*User Unit*	*User Unit Factor (Optional—use project-specific data if available)*	*Daily Use/Unit (gal./day/ user unit)**
Residential	Resident	2.8 residents/ dwelling unit	8.6
Office or Retail	Employee (non-visitor)	200 SF/ employee	6.9
Schools	Employee (does not include students)	50 SF/ employee	33.9
Industrial Uses (not including process water)	Employee (non-visitor)		5.4

**Or use project-specific data*

Mixed Use Development

A	B	C	D	E	F	G	H	I	J
Area	SF	Acres	Uses and User Units	Toilet and Urinal Usage (gal/day)	Water Use per Acre	Req'd Demand per Acre	F>G?	Adjacentpervious area ≥ 2.5 × "B"?	Other Use ≥ "G"?
B-1	**21000**	**0.48**	**77 DUs + 9000 SF Retail**	**1854 + 310 = 2164**	**4508**	**5900**	**No**	**No**	**No**

77 DUs × 2.8 residents/DU × 8.6 gal/day/resident = 1854 gal/day

9000 SF retail ÷ 200 SF/employee × 6.9 gal/day/employee = 310 gal/day

A	B	C	D	E	F	G	H	I	J
Area	SF	Acres	Uses and User Units	Toilet and Urinal Usage (gal/day)	Water Use per Acre	Req'd Demand per Acre	F>G?	Adjacentp ervious area ≥ 2.5 × "B"?	Other Use ≥ "G"?
All	**41102**	**0.94**	**23 DUs**	**554**	**589**	**5900**	**No**	**No**	**No**
Bldgs	**18975**	**0.44**	**23 DUs**	**554**	**1271**	**5900**	**No**	**No**	**No**
Bldg A	**4125**	**0.09**	**23 DUs**	**554**	**5850**	**5900**	**No**	**No**	**No**

23 DUs x 2.8 residents/DU
x 8.6 gal/day/resident
= 553.8 gal/day

554 gal/day ÷ .94 acres
= 589 gal/day/acre

Harvesting and Use Conundrum

- Larger tributary area and lower use
  - Frequent overflow during wet periods
  - Best for water conservation
- Small tributary area and high use
  - Uses a larger proportion of water collected
  - Best for disposal
  - Not cost-efficient

Harvesting with Bioretention

Regulatory Status

- MRP Adopted October 2009
- Submittal May 1, 2011
- Implementation to October 2014
- Report on Reuse Implementation due December 1, 2013
  - Discussion of criteria employed
  - Barriers to implementation and strategies for overcoming barriers
  - Proposed changes to criteria and rationale
  - Updated guidance