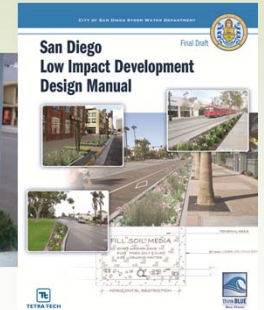
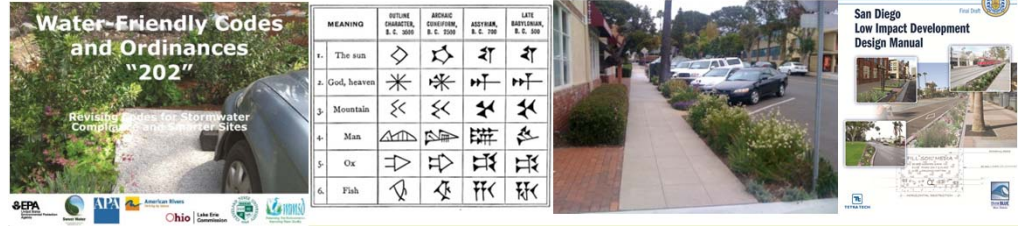


MEANING	OUTLINE DIAMETER, S. C. 3000	ARCHIC. CROSSING, S. C. 3500	ALTERNATE, S. C. 750	LEFT SIDEWALK, S. C. 800
1. The sun	◇	⊠	⊠	⊠
2. God, heaven	✳	✳	⊠	⊠
3. Mountain	⊠	⊠	⊠	⊠
4. Man	⊠	⊠	⊠	⊠
5. Ox	⊠	⊠	⊠	⊠
6. Fish	⊠	⊠	⊠	⊠



Top Ten Green Infrastructure Issues in Plans and Codes: Common Problems and Tested Solutions

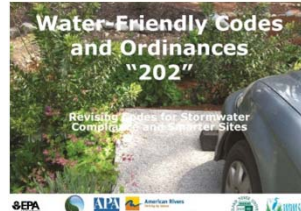
Principles:



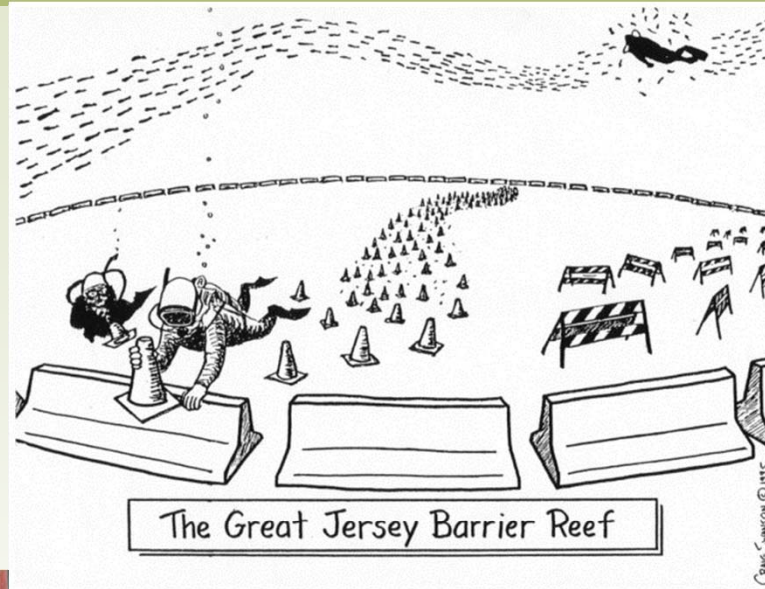
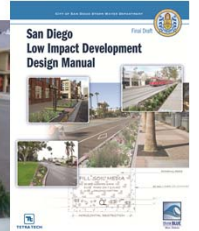
1. ALL ZONING CODES ARE THE SAME, EXCEPT WHERE THEY'RE DIFFERENT.

2. ALL ZONING CODES ARE DIFFERENT, EXCEPT WHERE THEY'RE THE SAME.

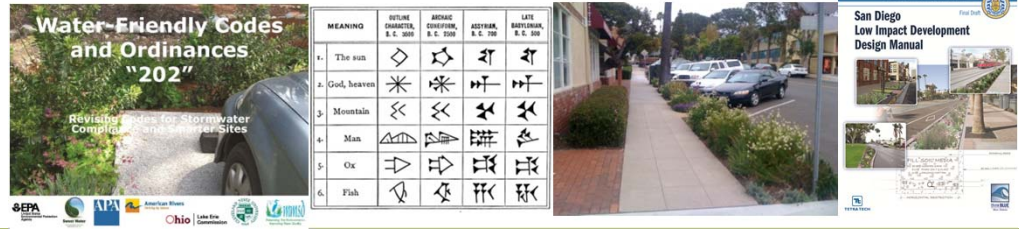
Recognizing Barriers in Zoning



MEANING	REFUSE QUARTERS, S. C. 200	ARCHIVE OFFICERS, S. C. 500	ALYFRAN, S. C. 100	LATE BIRTHDAY, S. C. 300
1. The sun	☐	☐	☐	☐
2. God, heaven	☐	☐	☐	☐
3. Mountain	☐	☐	☐	☐
4. Man	☐	☐	☐	☐
5. Ox	☐	☐	☐	☐
6. Fish	☐	☐	☐	☐

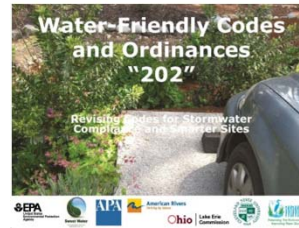


A new way of reading the code:

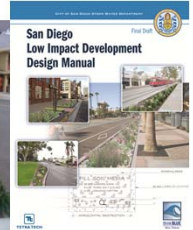


What aspects of the codes – or their administration - are **silent on, ambiguous towards, or in active conflict with LID principles?**

Spot the LID Barriers:



MEANING	EARLY QUINCEY, S. C. 1800	MIDDLE QUINCEY, S. C. 1800	LATE QUINCEY, S. C. 1800
1. The sun	☐	☐	☐
2. God, heaven	☼	☼	☼
3. Mountain	☞	☞	☞
4. Man	☞	☞	☞
5. Ox	☞	☞	☞
6. Fish	☞	☞	☞

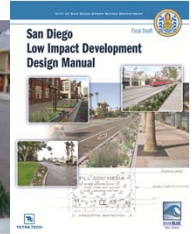


- A. Landscape and plantings. Significant trees and vegetation should be preserved in its natural state insofar as practicable.
- B. Any grade changes should be in keeping with the general appearance of neighboring developed areas. ←
- C. Landscape plantings and amenities shall be well designed with appropriate variations and shall be included as an integral enhancement of the site and, where needed, for screening purposes. ←
- D. In particular, parking areas shall be well screened by berms, plantings, or other screening methods to minimize their visual impact.
- E. Planting islands shall be used to break up larger expanses of paved parking areas. ←

A Quick “Top Ten”:



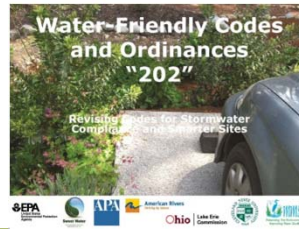
MEANING	EARLY DRAFTING, S. C. 2002	REVISED DRAFTING, S. C. 2002	FINAL DRAFTING, S. C. 2002	FINAL DRAFTING, S. C. 2002
1. The sun	☐	☐	☐	☐
2. God, heaven	☼	☼	☼	☼
3. Mountain	☶	☶	☶	☶
4. Man	☺	☺	☺	☺
5. Ox	☮	☮	☮	☮
6. Fish	☰	☰	☰	☰



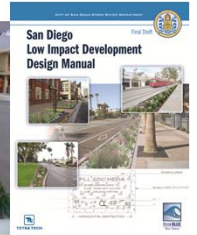
1. Yelling “Fire!”
2. A Comprehensive Plan checklist
3. Zoning with a Purpose (Statement)
4. Curbing the Curb
5. Eliminating “why bother?” provisions
6. Landscaping: Reclaiming the Edges
7. Landscaping: Points for Plants
8. Rooftops and Rain
9. Getting to the Source (Control)
10. Dealing with Discretion

***RULE OF THUMB:
ANYTHING WITH THE
WORDS “ROOF,”
“CURB,” “EDGE” OR
“TREE” NEEDS TO BE
AUDITED***

A quick “cheat sheet”

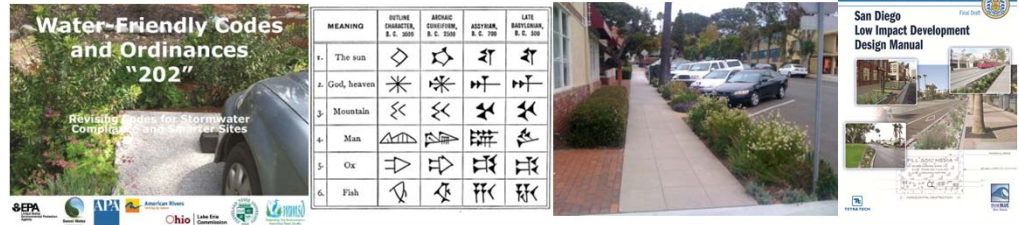


MEANING	EARLY DRAFTS, S. C. 2002	MIDDLE DRAFTS, S. C. 2008	LATE DRAFTS, S. C. 2010
1. The sun	☐	☐	☐
2. God, heaven	☼	☼	☼
3. Mountain	⋈	⋈	⋈
4. Man	♂	♂	♂
5. Ox	♂	♂	♂
6. Fish	♂	♂	♂



	Regulation/ Plan Text Amendments	Design Guidance	Review Process	People
Fire!	✓			✓
Comp Plan	✓			
Purposes	✓			
Curbs	✓	✓	✓	✓
“Why Bother?”	✓	✓	✓	✓
Landscaping: Edges	✓	✓	✓	
Landscaping: Plants	✓	✓	✓	
Rooftops	✓	✓		
Sources	✓		✓	
Discretion	✓	✓	✓	✓

1. Yelling "Fire!"

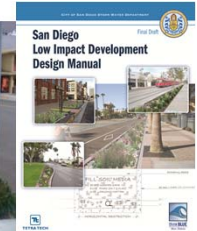


- Fire protection standards can be a significant impediment to LID:
 - Roadway widths...intersection dimensions...cul-de-sac radii...pavement up to buildings for equipment set-up...pavement type & depth requirements
 - Review discretion & process: public safety usually trumps healthier stormwater management
- Solutions:
 - PUT THE PROBLEMS ON THE TABLE in very concrete (ouch) ways
 - ALTERNATIVES & EXAMPLES

Fire Protection Strategies:



MEANING	REPLACEMENT S.E. 2002	REPLACEMENT S.E. 2002	REPLACEMENT S.E. 2002	REPLACEMENT S.E. 2002
1. The sun	☐	☐	☐	☐
2. God, heaven	☼	☼	☼	☼
3. Mountain	⚡	⚡	⚡	⚡
4. Man	♂	♂	♂	♂
5. Ox	♂	♂	♂	♂
6. Fish	♂	♂	♂	♂



- Respect the need, and offer strategies that meet it
- **Enlist the help of product manufacturers – they are often great at talking with fire protection departments!
- Narrower streets will be a negotiation with public works/streets and public safety.

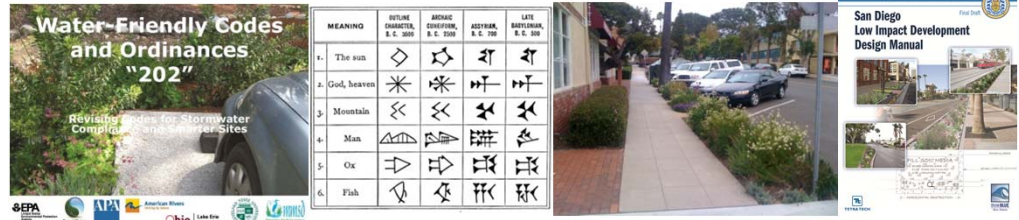


Photo from NDS Products

SAMPLE LANGUAGE:

“Areas of the site required for fire protection access [shall/may] be surfaced with permeable pavers using the specification in Figure X [or an equivalent] [at the discretion of the Fire Chief/City Engineer].”

2. A Comp Plan Checklist:

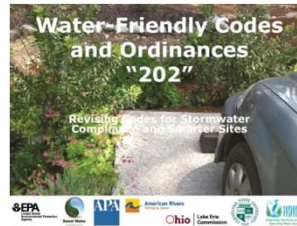


1. Fully incorporate sustainable hydrology principles into plan goals and objectives
2. Make water part of the vision for a community's spaces and neighborhoods
3. Clearly explain how water infrastructure systems relate to growth, function...and permits.
4. Acknowledge zoning-related barriers to LID
5. Promote landscaping standards focused on sustainable hydrology and ecological function
6. Encourage mapping and special projects with strategies for improving watershed function

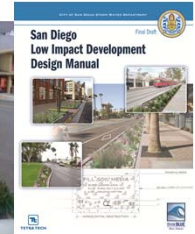
Does your Plan reflect:

1. An understanding of watershed functions?
2. A desire to see LID in your landscapes and spaces?

3. Zoning with a Purpose (Statement)



MEANING	BEFORE ORDINANCE S. C. 2002	BEFORE ORDINANCE S. C. 2002	AFTER ORDINANCE S. C. 2002	AFTER ORDINANCE S. C. 2002	LATE ADDITIONAL S. C. 2002
1. The sun	☐	☐	☐	☐	☐
2. God, heaven	☼	☼	☼	☼	☼
3. Mountain	⋈	⋈	⋈	⋈	⋈
4. Man	♂	♂	♂	♂	♂
5. Ox	♂	♂	♂	♂	♂
6. Fish	♂	♂	♂	♂	♂



San Diego Municipal Code
(11-2009)

Chapter 14: General Regulation

Article 2: General Development Regulations

Division 4: Landscape Regulations

(Added 12-9-1997 by O-18451 N.S.; effective 1-1-2000.)

§142.0401 Purpose of Landscape Regulations

The purpose of these regulations is to minimize the erosion of slopes and disturbed lands through revegetation; to conserve energy by the provision of shade trees over *streets*, sidewalks, parking areas, and other paving; to conserve water through low-water-using planting and irrigation design; to reduce the risk of fire through site design and the management of flammable vegetation ; and to improve the appearance of the built environment by increasing the quality and quantity of landscaping visible from *public rights-of-way*, private streets, and adjacent properties, with the emphasis on landscaping as viewed from *public rights-of-way*.

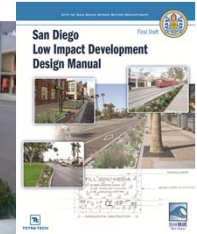
(Added 12-9-1997 by O-18451 N.S.; effective 1-1-2000.)

Everything BUT water quality (aaaaargh).

Better... but room for improvement



MEANING	EARLY DRAFTS, S. C. 2002	REVISED DRAFTS, S. C. 2002	FINAL DRAFTS, S. C. 2002	LATE DRAFTS, S. C. 2002
1. The sun	☐	☐	☐	☐
2. God, heaven	☼	☼	☼	☼
3. Mountain	⚡	⚡	⚡	⚡
4. Man	⚡	⚡	⚡	⚡
5. Ox	⚡	⚡	⚡	⚡
6. Fish	⚡	⚡	⚡	⚡



CHAPTER 3

Establishment and Purpose of Districts and District Boundaries

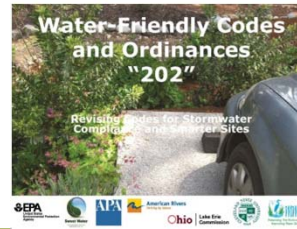
10-3-1: INTENT

The following zoning districts are hereby established for the Village of Glen Ellyn, Illinois. For the interpretation of this Code, the zoning districts have been formulated to realize the general purposes as set forth in Section 10-1-2 of this Code. In addition, the specific purpose of each zoning district shall be as follows:

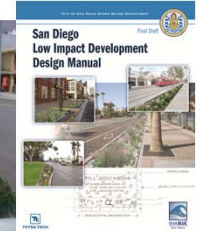
- (A) **CR Conservation/Recreation District:** The CR District is designed to preserve the existing open space area or protect natural resources; a second purpose is that of protecting the public health, safety, comfort and welfare; and, thirdly, reducing financial burdens imposed on the community and its individuals by restricting the use of those areas which may be subject to periodic flooding or which constitute water retention or re-charge areas;

****Make the use of LID and landscapes to improve water quality and hydrology an EXPLICIT INTENT and PURPOSE of your zoning! (please!)**

4. Curbing the Curb



MEANING	REFINE QUARTERLY S. C. 200	ADJUST QUARTERLY S. C. 200	ADJUST S. C. 200	LATE BUDGETING S. C. 200
1. The sun	☐	☐	☐	☐
2. God, heaven	☼	☼	☼	☼
3. Mountain	⚡	⚡	⚡	⚡
4. Man	♂	♂	♂	♂
5. Ox	♂	♂	♂	♂
6. Fish	♂	♂	♂	♂



The word “CURB” is EVERYWHERE in municipal codes!

“A continuous concrete curb of at least 3 inches in height shall be provided around all parking lot landscaped areas.”

“Parking meters shall be placed six (6) inches from the curb.”

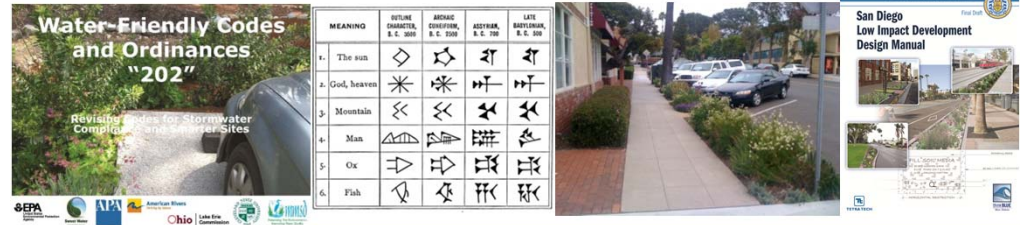
“Front yard setbacks shall be measured from the curb to the building line.”

King Curb!



**In the latter case, your zoning administrator could say “Unless the road has a curb we can’t establish conformance with the setbacks.”*

Basic solution #1

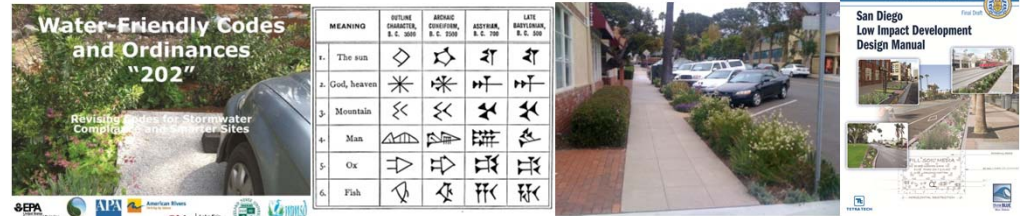


- Landscaping Requirements. Section 17-11-0302 of the Chicago Landscape Ordinance requires a minimum seven-foot landscaped setback to provide screening along the perimeter of off-street parking lots and other vehicular use areas greater than 1200 square feet facing the public way. Landscape setbacks and other peripheral green areas are usually defined by a barrier curb. **Wheel stops or breaks in the barrier curb may be provided in order to allow for drainage into peripheral green areas designed to accommodate the stormwater discharge directed to them.**

Chicago Street and Site Plan Design Standards, April 2007; page 34

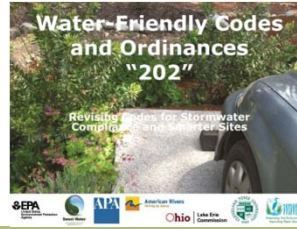
AND...don't forget to fix your landscape standards, zoning, street specs, and parking ordinance, too, all of which probably require barrier curbs

Basic solution #2

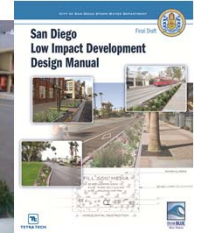


“Front yard setback measurements shall be calculated from the building line to the curb or closest edge of the traveled way...”

This enables the zoning administrator to measure things, which makes the zoning administrator happy!



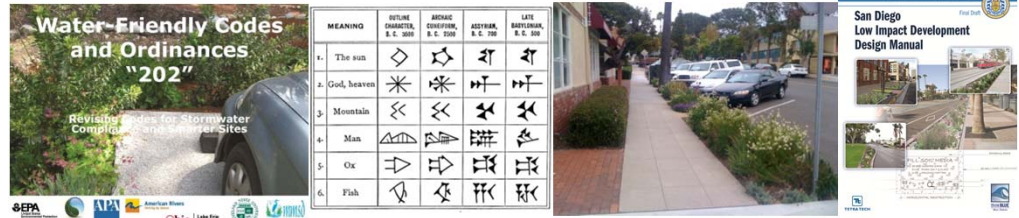
MEANING	1974/82 UNIFORM S. C. 300	1984/86 UNIFORM S. C. 300	1997/98 UNIFORM S. C. 300	2001/02 UNIFORM S. C. 300
1. The sun	☐	☐	☐	☐
2. God, heaven	☼	☼	☼	☼
3. Mountain	⚡	⚡	⚡	⚡
4. Man	♂	♂	♂	♂
5. Ox	♂	♂	♂	♂
6. Fish	♂	♂	♂	♂



A PRIORITY for any audit:

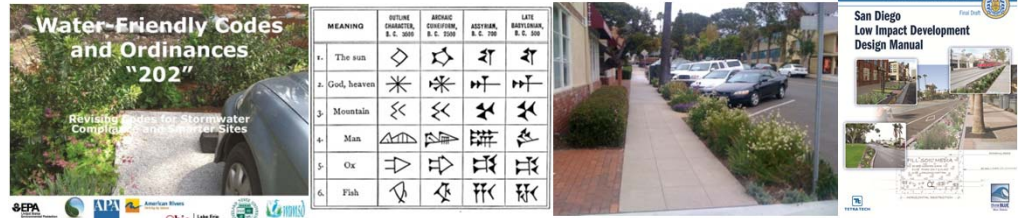
“WHY BOTHER?” PROVISIONS

5. Eliminating “Why Bother” Provisions



- Must assume D (low infiltration) soil for sizing LID facilities – *even with a soils report that says it's A soil!*
- Must assume all parking surfaces will be impervious for purposes of calculating runoff volume – *even if permeable surfaces are used.*
- Landscaped buffer strips must be surrounded by a curb no less than five (5) inches in height – *with no waiver for breaks, or use as stormwater management measures.*
- One tree must be planted within thirty (30) feet of every surface parking space – *making underground infiltration impossible.*

"Why Bother?" Uncertainty



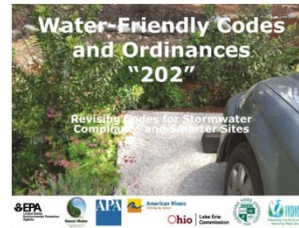
VII. VARIANCES and ALTERNATIVE PRACTICES

The SWCD may grant a variance to the technical requirements of this Policy or approve an alternative practice provided surface and ground water quality is protected and runoff quantity and flow adverse impacts are prevented to an extent equal or greater than the technical requirements included in this Policy.

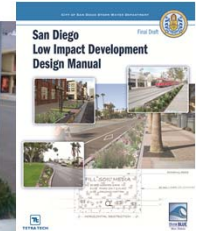
Good luck with that.

(NOTE: It is the proposed plan preparer's responsibility to obtain approval from any other regulatory agencies/units of government of the proposed variance and/or alternative practice.)

Finding & Eliminating “Why Bothers”

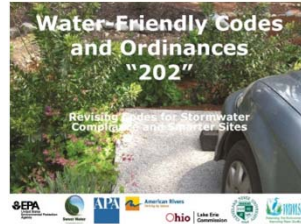


MEANING	REFUSE QUARTERS, S. C. 300	ARCHIVE QUARTERS, S. C. 300	ADDITION, S. C. 300	LATE QUARTERS, S. C. 300
1. The sun	☐	☐	☐	☐
2. God, heaven	☼	☼	☼	☼
3. Mountain	☶	☶	☶	☶
4. Man	☺	☺	☺	☺
5. Ox	☮	☮	☮	☮
6. Fish	☵	☵	☵	☵

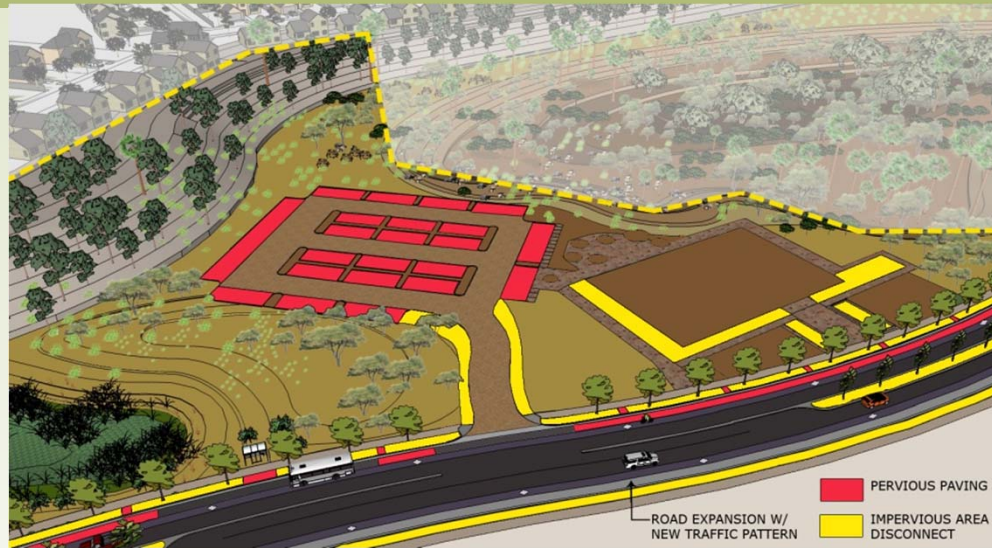
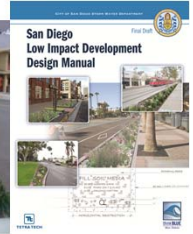


- Must assume D soil for sizing LID facilities – *Allow for a geotech/soils report, affirmatively, to size facilities!*
- Must assume all parking surfaces will be impervious for purposes of calculating runoff volume – *Reduce required volume when permeable materials are used!*
- Landscaped buffer strips must be surrounded by a curb no less than five (5) inches in height – *provide for curb breaks & rework landscaping standards!*
- One tree must be planted within thirty (30) feet of every surface parking space – *reconsider tree spacing if underground infiltration is proposed!*

6. Landscape: Reclaiming the Edges



MEANING	REFUSE DISCARDS, S.C. 200	AVIARY, S.C. 200	ADULTS, S.C. 200	LATE DISCARDS, S.C. 200
1. The sun	☐	☐	☐	☐
2. God, heaven	☐	☐	☐	☐
3. Mountain	☐	☐	☐	☐
4. Man	☐	☐	☐	☐
5. Ox	☐	☐	☐	☐
6. Fish	☐	☐	☐	☐



How do you "reclaim the edge" when you have to meet these:

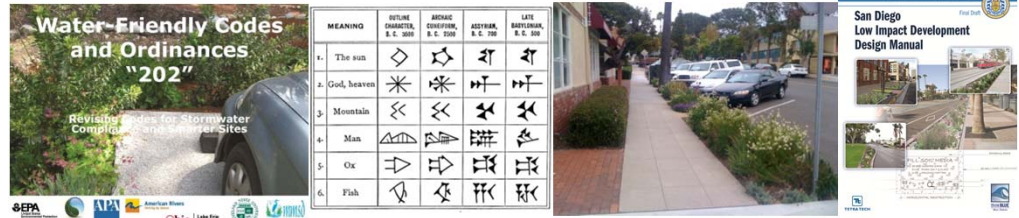
"A buffer strip of dense evergreens a minimum of five (5) feet in width shall be planted along the property line."

"All parking lot islands shall be surrounded by a minimum five (5) inch continuous curb."

"A landscaped area shall be planted along the principal public roadway frontage and shall be graded to visually screen the parking area from the public right-of-way."



Remember: LID Needs the Edges!

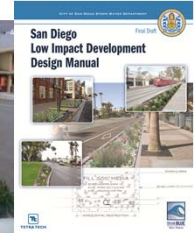


- “Grading and edge treatments of [parking areas/developments/lots] shall allow storm water inflow where areas are designed as LID storm water management features. In such cases, where adequate screening is provided from plantings, fences or walls, berming and curbs shall not be required.”
- “Landscaped strips shall be suitably landscaped with a mixture of shrubs, trees and ground cover, which are encouraged to incorporate xeriscaping and to function as LID storm water management areas shrubs, trees, and ornamental groundcover.”

7. Landscaping: Points for Plants!



MEANING	REFUSE QUARTERS, S.C. 300	ARCHE GARDEN, S.C. 500	ARTWORK, S.C. 700	LATE BLOSSOMING, S.C. 800
1. The sun	☐	☐	☐	☐
2. God, heaven	☐	☐	☐	☐
3. Mountain	☐	☐	☐	☐
4. Man	☐	☐	☐	☐
5. Ox	☐	☐	☐	☐
6. Fish	☐	☐	☐	☐



San Diego Municipal Code
(11-2009)

Chapter 14: General Regulations

Table 142-04D
Vehicle Use Area Requirements

Size of Proposed Vehicular Use Area	Planting Area Required ^{(1), (2), (4)}		Plant Points Required ^{(1), (2)}		Tree Distribution Requirement ⁽¹⁾
	Street yard	Outside the street yard	Street yard	Outside the street yard	
Less than 6,000 square feet	40 Square Feet per Tree	40 Square Feet per Tree	0.05 points	0.05 points	1 tree within 30 feet of each parking space ⁽³⁾
6,000 square feet or greater	5% of vehicular use area located in the street yard	3% of vehicular use area located outside the street yard	0.05 points	0.03 points	1 tree within 30 feet of each parking space ⁽³⁾

Footnotes to Table 142-04D

§154.0401(c-d) All edges of parking areas shall be landscaped with a 5-foot landscaping buffer. Surface parking lots with more than two rows of parking shall include 5-foot-wide landscaping islands between rows. Canopied trees of low water consumption shall be placed within this landscaped strip. One tree of a minimum 24-inch box or 15 gallon size shall be required per 2,000 SF of parking area.



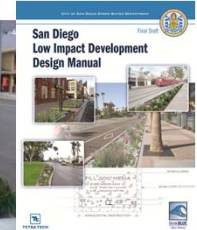
**** If you meet this standard, there will be NO SPACE ON THE SITE for LID! The stormwater will have to go to jail!**

Solutions: Seattle

"Green Factor" approach



MEANING	REFUSE QUINCY, S. C. 2002	ARCATA GUYTON, S. C. 2008	JEFFERSON, S. C. 2008	LATE BOSTON, S. C. 200
1. The sun	☐	☐	☐	☐
2. God, heaven	☼	☼	☼	☼
3. Mountain	☞	☞	☞	☞
4. Man	☺	☺	☺	☺
5. Ox	☛	☛	☛	☛
6. Fish	☞	☞	☞	☞



Simple points-based landscape requirement with easy-to-use calculator

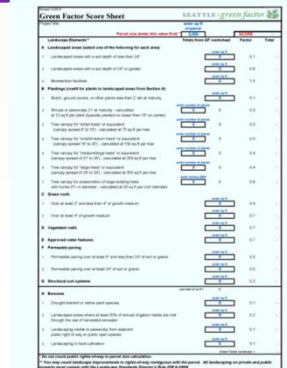
Incentives built into point system: larger plants, permeable paving, green roofs, vegetated walls, layering of vegetation in public ROW, food cultivation, native and drought-tolerant plants, rainwater harvesting.

One of a very few zoning approaches that can be copied easily across jurisdictions

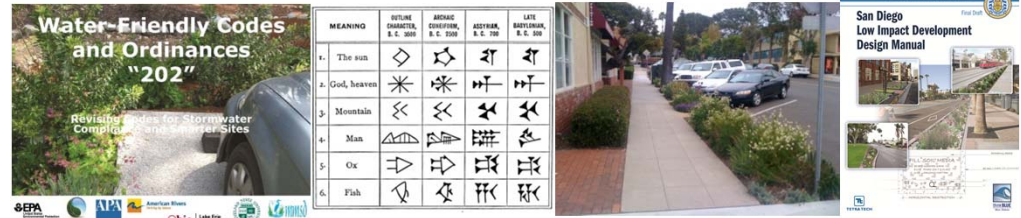
<http://www.seattle.gov/dpd/Permits/GreenFactor/Overview/>

WHAT MATTERS:

LID MEASURES MUST "COUNT" TOWARDS THE TOTAL LANDSCAPING REQUIREMENT - AREA, NUMBER OF PLANTS, SPECIES, VALUE, "POINTS" - FOR THE SITE!!!



8. Rooftops and Rain



How do you install rainwater harvesting or a green roof if:

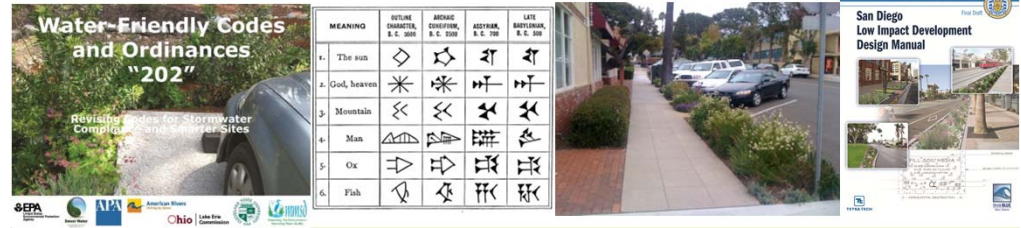
(f) Roofs as a design element.

(i) Design Districts 1 and 2. For one-story structures, the minimum and maximum slope of a pitched roof shall be 8 on 12 and 12 on 12, respectively. For structures of two (2) or more stories, the minimum and maximum slope of a pitched roof shall be 5 on 12 and 12 on 12, respectively.



DESIGN REVIEW STANDARDS
MUST PROVIDE AFFIRMATIVE
SUPPORT FOR LID AND WATER
HARVESTING SYSTEMS!

9. Getting to the Source (Control)

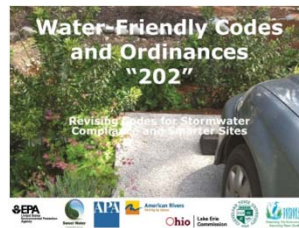


- All dumpster and composter areas shall be fully fenced and screened with opaque fencing and lockable gates extending to within 6 inches of the finished ground elevation.
- In no case shall dumpsters or composters be located within a required stream or wetland buffer.
- Dumpster and refuse storage areas shall be contained with curbing and graded so as to prevent the drainage or discharge of storm water into the public storm drain system.
- A connection to the sanitary sewer system may be provided at the discretion of the City Engineer, subject to the provisions of the sewer ordinance.

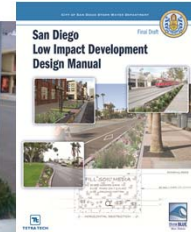


Does your code include standards & REVIEW-PHASE CHECKS to ensure proper source control, especially if the use could produce something funky?

“Well, it’s not in our post-construction MS4 requirements...”



MEANING	EARLY ORDINANCE, S. C. 1900	MIDDLE ORDINANCE, S. C. 1900	LATE ORDINANCE, S. C. 1900	LATE ORDINANCE, S. C. 1900
1. The sun	☐	☐	☐	☐
2. God, heaven	☼	☼	☼	☼
3. Mountain	⚡	⚡	⚡	⚡
4. Man	♂	♂	♂	♂
5. Ox	♂	♂	♂	♂
6. Fish	♂	♂	♂	♂



This is a CRUCIAL piece of managing illicit discharges – preventing them in the first place!

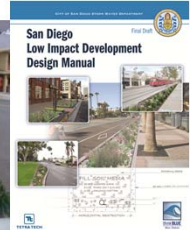
“Any exterior areas where commercial trucks or other vehicles other than passenger cars are proposed to be stored, maintained or washed must be clearly specified on the site plan. Details for the collection, treatment and discharge of wash water or runoff from maintenance areas to the sanitary sewer system must be provided and require the approval of the Wastewater Superintendent pursuant to the Sewer Ordinance. In no case shall any such area be located or designed in such a manner as to enable the discharge of storm or wash water runoff into any storm drain, wetland, surface water or buffer.”



10. Dealing with Discretion



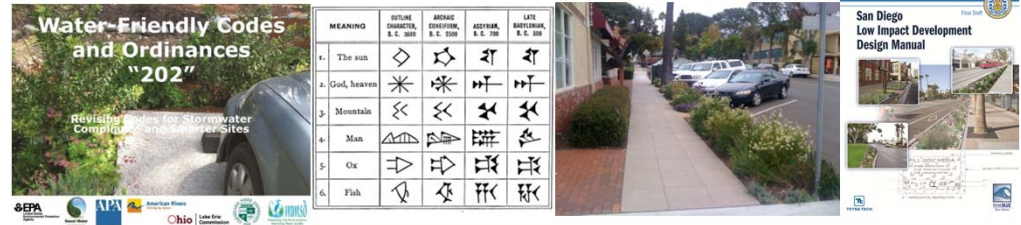
MEANING	REFUSE QUARTERS, S. C. 500	REFUSE QUARTERS, S. C. 500	REFUSE QUARTERS, S. C. 500	REFUSE QUARTERS, S. C. 500
1. The sun	☐	☐	☐	☐
2. God, heaven	☼	☼	☼	☼
3. Mountain	⚡	⚡	⚡	⚡
4. Man	♂	♂	♂	♂
5. Ox	♂	♂	♂	♂
6. Fish	♂	♂	♂	♂



“ All Parking spaces, parking areas, loading areas, and driveways shall be surfaced with asphaltic concrete at least 2 inches in depth **or its equivalent as determined by the City Engineer according to accepted engineering practices**, except that vehicles and equipment permitted to be stored in accordance with Chapter 14, Article 2, Division 11 (outdoor Storage, Display and Activity Regulations) may be placed on permeable surface.”

- What’s “equivalent”?
- What’s an “accepted engineering practice”?
- Who’s the City Engineer?!

TWO APPROACHES:



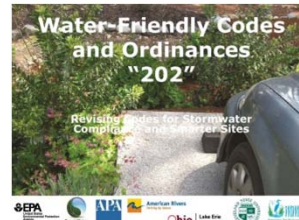
Adopting GUIDANCE: LID Design Manuals

- Provides flexibility, but makes clear statement of intent to use LID
- Often a “kinder, gentler” way to introduce these techniques, especially to engineers/DPWs
- Usually still allow some discretion or wiggle room to use conventional techniques

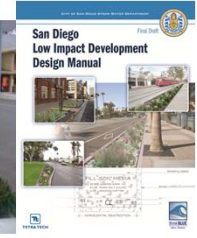
Adopting STANDARDS: Alternative or Green Street Standards

- Makes it CRYSTAL CLEAR what’s allowable
- Takes uncertainty out
- Can become as inflexible as the originals, especially if design standards, products, or regulations change

And while not likely to be on David Letterman, it's a good start.



MEANING	BEFORE DRAFTING S. C. 2002	AFTER DRAFTING S. C. 2002	AFTER S. C. 2002	LATE DRAFTING S. C. 2002
1. The sun	☐	☐	☐	☐
2. God, heaven	☼	☼	☼	☼
3. Mountain	⚡	⚡	⚡	⚡
4. Man	♂	♂	♂	♂
5. Ox	♂	♂	♂	♂
6. Fish	♂	♂	♂	♂



1. Yelling "Fire!"
2. A Comprehensive Plan checklist
3. Zoning with a Purpose (Statement)
4. Curbing the Curb
5. Eliminating "why bother?" provisions
6. Landscaping: Reclaiming the Edges
7. Landscaping: Points for Plants
8. Rooftops and Rain
9. Getting to the Source (Control)
10. Dealing with Discretion

