

**400 Series**

**Mapping and Regulations**

Visual 400-1

1

**400 Series**

- Activity 410 – Flood Hazard Mapping
- Activity 420 – Open Space Preservation
- Activity 430 – Higher Regulatory Standards
- Activity 440 – Flood Data Maintenance
- Activity 450 – Stormwater Management

Visual 400-2

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**400 Series**

400 Series – Part 1

- Section 401 – Special Flood Related Hazards
- Section 402 – Impact Adjustment
- Activity 410 – Flood Hazard Mapping
- Activity 420 – Open Space Preservation

Visual 400-3

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**401 – Special Flood Related Hazards**

*Manual Page 400-3*

Special Flood Related Hazards


To encourage communities to address these hazards, the CRS provides credit throughout the CRS Coordinator’s Manual for preserving open space and regulating new development in areas subject to seven special flood-related hazards.

Visual 400-4

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401 – Special Flood-Related Hazards  
*Manual Page 400-3*

Uncertain flow paths  
Closed basin lakes




FEMA NIFPCRS Visual 400-5

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401 – Special Flood-Related Hazards  
*Manual Page 400-3*

Ice jams  
Land subsidence




FEMA NIFPCRS Visual 400-6

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401 – Special Flood-Related Hazards  
*Manual Page 400-3*

Mudflows




FEMA NIFPCRS Visual 400-7

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401 – Special Flood-Related Hazards  
*Manual Page 400-3*

Coastal erosion  
Tsunamis



FEMA NIFPCRS Visual 400-8

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### 402 – Impact Adjustment for Areas

Manual Page 400-4

Impact adjustment: how much of the flood problem is covered by the activity?

- ✓ 400 Series: How much of the SFHA is affected?
- ✓ Need an impact adjustment ratio: percentage of the SFHA affected by the activity
- ✓ Example for open space:
 
$$rOSP = \frac{aOSP}{aSFHA}$$
- ✓ Need an Impact Adjustment Map

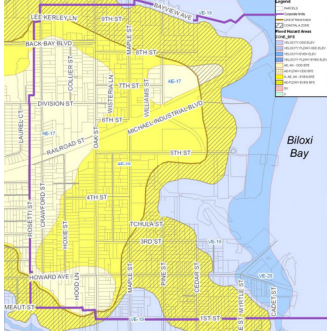
FEMA NFPICRS Visual 400-9

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### 402 – Impact Adjustment for Areas

Manual Pages 400-8 – 9

Step 1. Start with a base map that shows the SFHA



FEMA NFPICRS Visual 400-10

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### 402 – Impact Adjustment for Areas

Manual Pages 400-8 – 9

Step 2. Exclude areas not part of impact adjustment

1. Open water > 10 acres

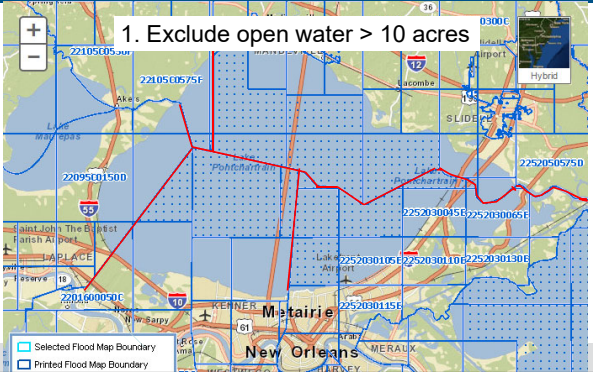
FEMA NFPICRS Visual 400-11

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### 402 – Impact Adjustment for Areas

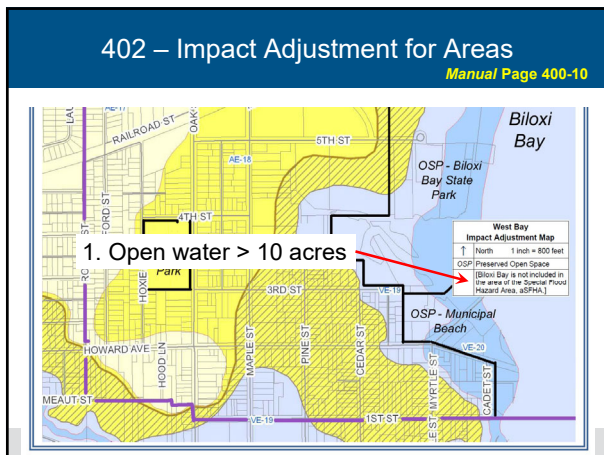
Manual Page 400-4

1. Exclude open water > 10 acres

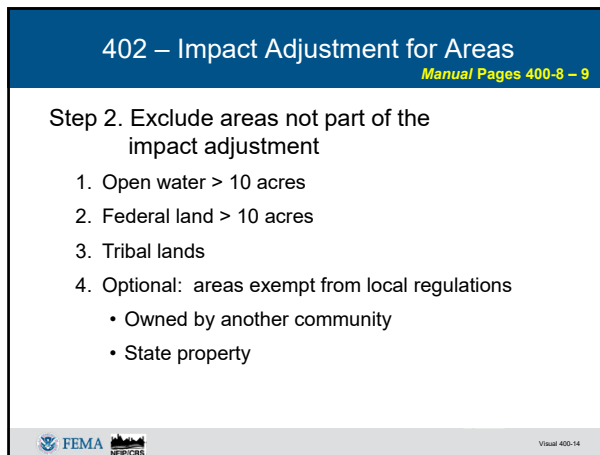


FEMA NFPICRS Visual 400-11

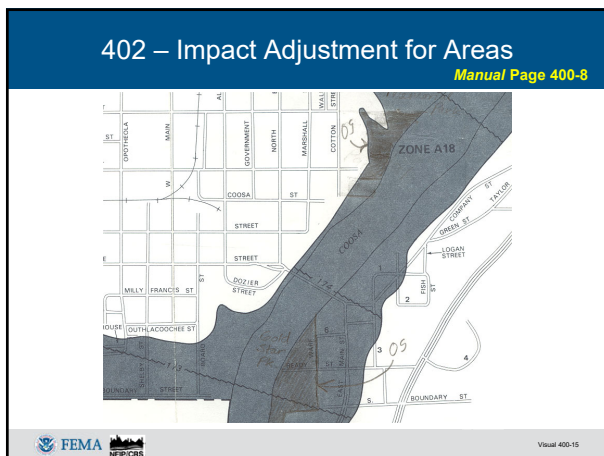
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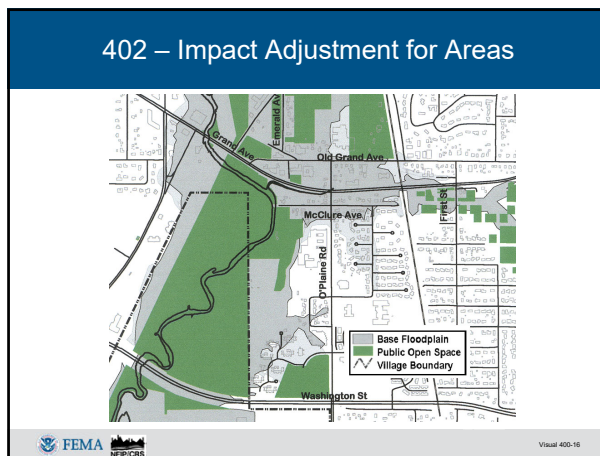
13



14



15



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### 402 – Impact Adjustment for Areas

Manual Page 400-11

**Step 3. Mark each area to be credited**

Visual 400-17

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### 402 – Impact Adjustment for Areas

Manual Pages 400-11 – 12

403.e. Calculating areas

- ✓ Calculations do not have to be super accurate
  - GIS is easiest, if you have it
  - Known property dimensions
  - Grid square technique
- ✓ All measurements in acres

Visual 400-18

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### 402 – Impact Adjustment for Areas

Manual Pages 400-11 – 12

Impact Adjustment

How much of the floodplain is impacted by the element?

$r$  (ratio) =  $\frac{\text{area covered by the element}}{\text{area of the SFHA}}$

$r_{OSP} = \frac{a_{OSP}}{a_{SFHA}}$  = ratio of open space in the SFHA

Credit is points times ratio

$c_{OSP} = OSP \times r_{OSP}$

Visual 400-19

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### 402 – Impact Adjustment for Areas

Manual Page 400-7

Table 403-1. Impact adjustment maps.

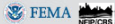
Activity	Affected Elements	Denominator	Optional Minimum
410 (Floodplain Mapping)	NS, SR, HSS, FWS	aSFT	0.10
	OSP, DR, NFOS, LZ	aSFHA	none
420 (Open Space Preservation)	OSI	aSFHA	0.10
	NSP	total length of shoreline	0.10
430 (Higher Regulatory Standards)	DL, FRB, FDN, CSI, LSI, PCF, ENL, OH3	aSFHA	0.10
	CAZ	aSFHA	0.5 / 0.1
440 (Flood Data Maintenance)	AMD	aSFHA	0.10
450 (Stormwater Management)	SMR, WMP	area of the watershed	0.15
540 (Drainage System Maintenance)	CDR, PGM, CIP	number of drainage components	0.10
	SBM	number of storage basins	0.10
610 (Flood Warning and Response)	FTR, EWD, FRO	number of buildings in the SFHA (bSF)	none

Visual 400-20

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402 – Impact Adjustment for Areas

Questions?

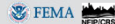


Visual 405-21

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402 – Impact Adjustment for Areas

Poll Questions

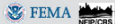
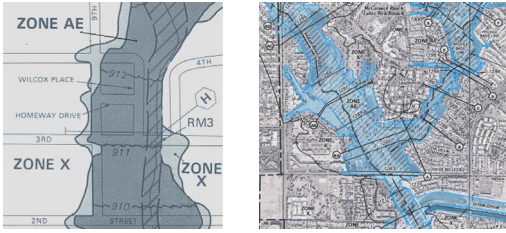


Visual 405-22

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410 – Floodplain Mapping

410 Floodplain Mapping



Visual 405-23

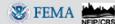
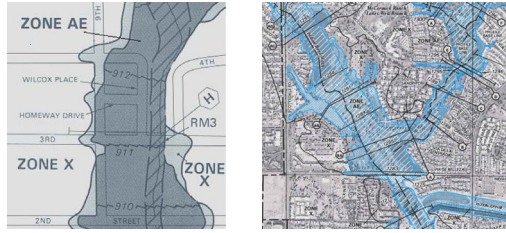
23

410 – Floodplain Mapping

*Manual Page 410-2*

410 Floodplain Mapping

Objective: improve the quality of the mapping used to regulate floodplain development




Visual 405-24

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### 410 – Floodplain Mapping

**Activity 410 – Flood Hazard Mapping Elements:**

- a. New study (NS)
- b. Leverage (LEV)
- c. State review (SR)
- d. Higher study standards (HSS)
- e. More restrictive floodway standards (FWS)
- f. Mapping of special flood-related hazard area (MAPSH)

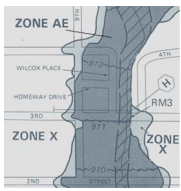
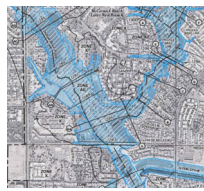

Visual 400-25


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### 410 – Floodplain Mapping

**Credit is for:**

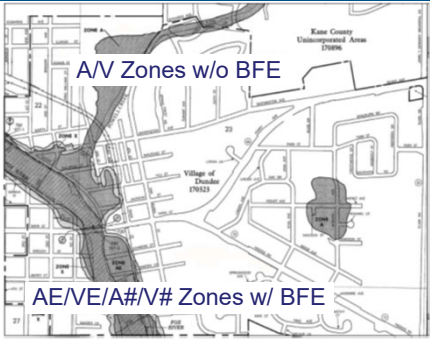
- ✓ Using data not provided by FEMA,
- ✓ Data prepared to a higher study standard, and/or
- ✓ Sharing in the cost of a Flood Insurance Study


Visual 400-26

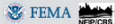
26

### 410 – Floodplain Mapping



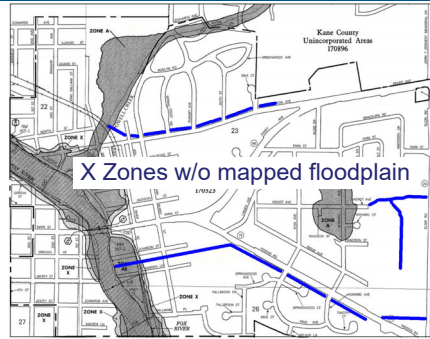
A/V Zones w/o BFE

AE/VE/A#/V# Zones w/ BFE

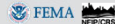

Visual 400-27

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### 410 – Floodplain Mapping



X Zones w/o mapped floodplain



Visual 400-28

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**410 – Floodplain Mapping**  
*Manual Pages 410-7 – 8*

**411.b Activity Credit Criteria**

- (1) All studies and data must be displayed on a map
- (2) Must use the map/data in floodplain regulations
- (3) Study technique must be FEMA-approved or approved by the CRS technical reviewer
- (4) If study affects a length of stream/shoreline  
→ must submit to FEMA to revise the FIRM  
(It's OK if FEMA does not use it)



Visual 400-29


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**410 – Floodplain Mapping**  
*Manual Pages 410-8 – 10*

**412.a New Studies (NS)**

**Studies not credited**

- ✓ Minimum NFIP requirements
  - Developments greater than 50 lots or 5 acres
  - "Obtain, review and reasonably utilize" available data
  - No-rise or max 1 foot cumulative rise certificate
- ✓ Not adopted for regulatory purposes
- ✓ No engineering study or new map
- ✓ New BFE lower than BFE on the FIRM



Visual 400-30

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**410 – Floodplain Mapping**  
*Manual Page 410-11*


**412.a New Studies (NS)**

**New BFE lower than BFE on the FIRM**

If AE/VE Zone on the FIRM and the BFE goes down SFHA → X Zone rates

- No mandatory purchase requirement
- No duplicate CRS credit

If no BFE on the FIRM or the BFE goes up → CRS credit



Visual 400-31

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**410 – Floodplain Mapping**  
*Manual Page 410-11*

NS = as shown in the following table, based on the study scope and the original FIRM zone, not to exceed the maximum of 350 points for this element

Study Scope	Original FIRM Zone		
	B, C, D, or X	A or V	AE, VE, A#
1. Delineation or redelineation of an approximate A or V Zone	70	60	-
2. a. Flood elevations for a site at time of development	120	95	60
b. Flood elevations and floodway for a site at time of development	160	125	80
3. New profile or length of shoreline, base flood elevations/depths in AH and AO Zones.	260	205	130
4. New profile with floodway, length of shoreline with coastal velocity zone delineation, or converting coastal A Zones to V Zones	350	270	175

Visual 400-32

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**410 – Floodplain Mapping**  
Manual Pages 410-14 – 15


**412.b Leverage (LEV)**

LEV = 0, if the study was fully funded by FEMA

LEV =  $\frac{\text{Non-FEMA share of the study cost}}{\text{Total cost of the study}}$

LEV = the total of the following:

- (a) 0.27, if a better topographic map was contributed to the study effort
- (b) 0.22, if other contributions were made to the study effort



Visual 400-33

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**410 – Floodplain Mapping**  
Manual Pages 410-16 – 17

**412.c State review (SR)**

Some states already have review procedures that are eligible for SR credit

**New Jersey**—Full credit for riverine studies, partial for coastal,

**Indiana**—Full credit for riverine studies, partial for coastal,

**Michigan**—Full credit for riverine studies, partial for coastal,

**Minnesota**—Full credit for all studies,

**Wisconsin**—Full credit for all studies,

**Illinois**—The northeast portion of the state receives full credit for river and partial for coastal, the rest of the state receives partial credit.

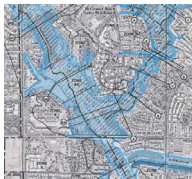
Visual 400-34

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**410 – Floodplain Mapping**  
Manual Pages 410-18 – 19

**412.d Higher study standards (HSS)**

- Factor of safety
- Future conditions hydrology (land use changes)
- Future conditions hydrology (climate)
- Mapping BFE + FRB



Visual 400-35

35

**410 – Floodplain Mapping**  
Manual Pages 410-18 – 19

HSS = as shown in the following table, based on the study scope and the original FIRM zone. Credit is cumulative for each applicable higher study standard (credit criterion (2)), not to exceed the maximum of 200 points for this element

Study scope	Original FIRM Zone			Max per Study
	B, C, D, or X	A or V	AE, VE, A#, V#	
1. Delineation of an approximate A Zone	25	15	–	75
2. Flood elevations for a site at time of development	40	25	20	110
3. New profile or length of shoreline	100	75	50	200

Visual 400-36

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**410 – Floodplain Mapping**  
Manual Page 410-21 – 23

**412.e More restrictive floodway standard (FWS)**

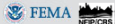
FWS = 140, if the floodway delineation was based on less than 0.11 feet of rise in the base flood elevation, OR

FWS = 105, if the allowable rise was from 0.11 to 0.25 feet, OR

FWS = 60, if the allowable rise was from 0.26 to 0.50 feet, OR

FWS = 30, if the allowable rise was from 0.51 to 0.99 feet

60: CO, MT, NJ  
105: IN  
160: IL, MI, MN, WI



 Visual 400-37


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**410 – Floodplain Mapping**  
Manual Page 410-24

**412.f Mapping for special flood-related hazards (MAPSH)**

Uncertain flow paths	Closed basin lakes
Mudflow hazards	Coastal erosion
Ice jams	Land subsidence
	Tsunamis

 Visual 400-38

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**410 – Floodplain Mapping**  
Manual Pages 410-29 – 30


**414 Credit Calculation**

MAP#1 = ((NS#1 x LEV#1) + SR#1 + HSS#1 + FWS#1) x rMAP#1  
= ((350 x 1.00) + 0 + 100 + 0) x 0.35  
= 450 x 0.35 = 57.50

MAP#2 = ((NS#2 x LEV#2) + SR#2 + HSS#2 + FWS#2) x rMAP#2  
= ((95 x 1.00) + 0 + 25 + 140) x 0.19  
= 260 x 0.19 = 49.4

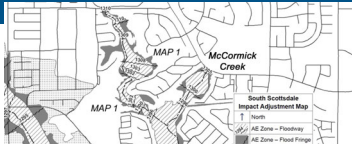
c410 = ΣMAPi + MAPSH  
= MAP#1 + MAP#2 + MAPSH  
= 157.50 + 49.40 + 0 + 0 = 206.90



 Visual 400-39

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**410 – Floodplain Mapping**

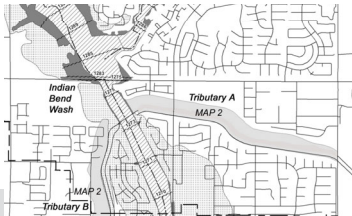


McCormick Creek  
MAP 1


South Shoreline  
Impact Adjustment Map  
North

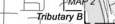
AE Zone - Floodway  
AE Zone - Flood Fringe

**Questions?**



Indian Bend Wash  
Tributary A  
Tributary B  
MAP 2

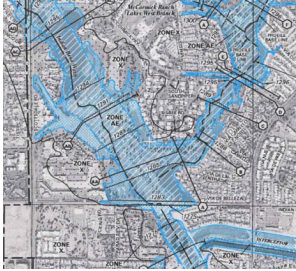


 Visual 400-40

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### 410 – Floodplain Mapping

Poll Questions



FEMA NFP/CRS Visual 400-41

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### 420 – Open Space Preservation

*Manual Page 420-2*

Objectives:

- (1) Prevent flood damage by keeping floodprone lands free of development, and
- (2) Protect and enhance the natural functions of floodplains.



FEMA NFP/CRS Visual 400-42

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### 420 – Open Space Preservation

*Manual Page 420-4*

Activity 420 – Open Space Preservation

Elements:

- a. Open space preservation (OSP)
- b. Deed restrictions (DR)
- c. Natural functions open space (NFOS)
- d. Special flood-related hazards open space (SHOS)
- e. Coastal erosion open space (CEOS)
- f. Open space incentives (OSI)
- g. Low-density zoning (LZ)
- h. Natural shoreline protection (NSP)

FEMA NFP/CRS Visual 400-43

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### 420 – Open Space Preservation

*Manual Page 420-4*

422.a Open space preservation (OSP)

Credit criteria

- (1) Parcel must be in the regulatory floodplain SFHA + areas regulated in the X Zone



FEMA NFP/CRS Visual 400-44

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420 – Open Space Preservation *Manual Page 420-4*

(2) Parcel must be “open space”  
“Open space” = no buildings, storage, or filling

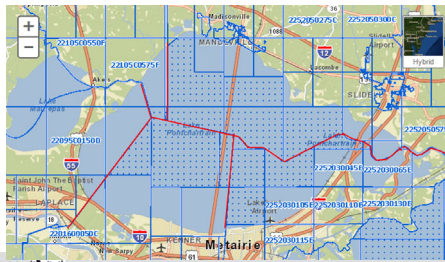


FEMA NFPICRS Visual 400-45

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420 – Open Space Preservation *Manual Page 420-4*

“Open space” does not include  
(a) Parcels not counted in the impact adjustment map  
(open bodies of water, federal land, etc..)



FEMA NFPICRS Visual 400-46

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420 – Open Space Preservation *Manual Page 420-4*

“Open space” does not include  
(b) Areas with impervious surfaces




FEMA NFPICRS Visual 400-47

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420 – Open Space Preservation *Manual Page 420-4*

“Open space” does not include  
(c) Areas with buildings on them



FEMA NFPICRS Visual 400-48

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420 – Open Space Preservation *Manual Page 420-5*

“Open space” does not include  
(d) Where fill, storage, or other encroachments are allowed



FEMA NFPICRS Visual 400-49

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420 – Open Space Preservation *Manual Page 420-5*

“Open space” does not include  
(e) Streets, railroad, levee, linear rights of way, etc..



FEMA NFPICRS Visual 400-50

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420 – Open Space Preservation *Manual Page 420-5*

“Open space” does not include  
(e) Streets, railroad, levee, linear rights of way, etc..  
Including ditch or channel rights of way



FEMA NFPICRS Visual 400-51

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420 – Open Space Preservation *Manual Page 420-5*

“Open space” does not include  
(e) Streets, railroad, levee, linear rights of way, etc..  
Exception: waterside greenways



FEMA NFPICRS Visual 400-52

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**420 – Open Space Preservation**  
Manual Page 420-5

“Open space” does not include  
(f) Land not intended to be preserved as open space



FEMA NFPICRS Visual 400-53

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**420 – Open Space Preservation**  
Manual Page 420-6

(3) Parcel must be preserved as “open space”  
(a) Publicly owned land, city park, beach, school field, etc.



FEMA NFPICRS Visual 400-54

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**420 – Open Space Preservation**  
Manual Page 420-6

(3) Parcel must be preserved as “open space”  
(b) Private wildlife or nature preserve, church camp, scout camp, hunting club, non-profit golf course



FEMA NFPICRS Visual 400-55

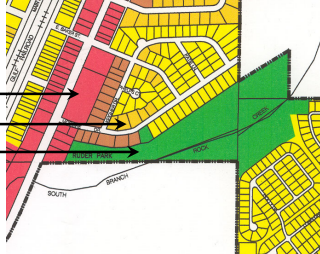
55

**420 – Open Space Preservation**  
Manual Page 420-6

(3) Parcel must be preserved as “open space”  
(c) Prohibitory development regulations (no buildings, filling or storage)

Zoning Districts

- Commercial
- Single Family Res.
- Conservation



FEMA NFPICRS Visual 400-56

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## 420 – Open Space Preservation

Manual Page 420-8

**Credit Points**

OSP = 1,450 points, based on the amount of the SFHA that is preserved as open space


**Impact Adjustment**

OSP credit is adjusted based on the ratio of preserved open space areas in the regulatory floodplain to the area of the SFHA. Section 403 has additional information on impact adjustments for areas. The areas qualifying for OSP need to be marked on an impact adjustment map.

$$rOSP = \frac{aOSP}{aSFHA}$$

where

- aOSP = the size of the area(s) preserved as open space (OSP) in the regulatory floodplain, and
- aSFHA = the size of the community's SFHA shown on its FIRM

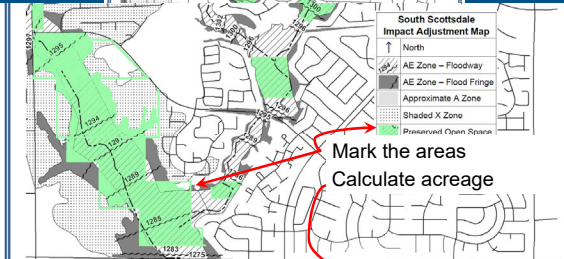


Visual 400-57

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## 420 – Open Space Preservation

Manual Pages 420-9 – 10



**Mark the areas  
Calculate acreage**

Preserved Open Spaces	Credit	Size (acres)
Indian Bend Wash Parks	OSP	143.2
South Scottsdale Country Club	OSP, DR	55.3
Undeveloped floodway parcels	OSP	44.4
Total areas preserved as open space	aOSP	242.9
Vacant areas subject to incentives	OSI4, OSI5	88.7



Visual 400-57


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## 420 – Open Space Preservation

Manual Pages 420-8 – 10

Calculate the acreage – Prepare a table of parcels and areas

Open Space Parcel Areas						
Parcel(s)	Parcel Owner	Land Use	Total Parcel Acres	Acres in the Regulatory Floodplain (OSP)	Acres Deed Restricted (DR)	Acres of Natural Functions Open Space (NFOS)
City Parks	City	Public Parks	236.0	143.2		
Country Club	Indian Bend Wash Country Club	Golf Course	73.0	55.3	55.3	
Indian Bend Wash Floodway	Private	Residential/undeveloped	8.7	8.7		
McCormick Creek Floodway	Private	Residential/undeveloped	35.7	35.7		
<b>Totals:</b>				<b>aOSP = 242.9</b>	<b>aDR = 55.3</b>	<b>aNFOS = 0.0</b>



Visual 400-59

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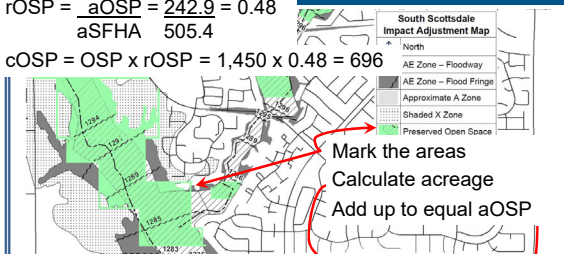
## 420 – Open Space Preservation

Manual Pages 420-9 – 10

aOSP = 242.9  
aSFHA = 504.4


$$rOSP = \frac{aOSP}{aSFHA} = \frac{242.9}{505.4} = 0.48$$

cOSP = OSP x rOSP = 1,450 x 0.48 = 696



**Mark the areas  
Calculate acreage  
Add up to equal aOSP**

Preserved Open Spaces	Credit	Size (acres)
Indian Bend Wash Parks	OSP	143.2
South Scottsdale Country Club	OSP, DR	55.3
Undeveloped floodway parcels	OSP	44.4
Total areas preserved as open space	aOSP	242.9
Vacant areas subject to incentives	OSI4, OSI5	88.7



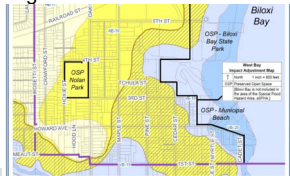
Visual 400-57

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**420 – Open Space Preservation**  
Manual Pages 420-10 – 11

**Documentation**

- (a) Map and list of all parcels to be credited
- (b) Documentation that each parcel will be preserved
- (c) If credit for prohibitory regulations – the regulations
- (d) If outside the SFHA – the regulations for the area
- (e) Impact adjustment map



Visual 400-41

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**420 – Open Space Preservation**

What if the community sold a park?



Visual 400-62

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**420 – Open Space Preservation**  
Manual Page 420-11

**422.b Deed restrictions (DR)**  
Extra credit to guarantee parcel stays open

DEED

This Deed is made on *June 23, 1993* *G21A64* *vide book to*

BETWEEN TOWNSHIP OF WAYNE IN THE COUNTY OF PASSAIC, a municipal corporation of the State of New Jersey, whose post office address is 475 Valley Road, Wayne, New Jersey, referred to as the Grantor.

AND ALGIRDAS BREIMER and IRMGARD BREIMER, his wife, whose address is 78 Hobson Avenue, Wayne, New Jersey, referred to as the Grantee,

Transfer of Ownership. The Grantor grants and conveys (transfers ownership of) the property described below to the Grantee. This transfer is made for the sum of TWO THOUSAND ONE HUNDRED DOLLARS (\$2,100.00). The Grantor acknowledges receipt of this money.

Tax Map Reference. (N.J.S.A. 46:15-2.1) Municipality of Wayne Block No. 19 Lot No. 34 Account No.

Visual 400-43

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**420 – Open Space Preservation**  
Manual Page 420-11


**422.b Deed restrictions (DR)**

- (1) Parcel must qualify for OSP
- (2) Deed restriction must cover:
  - A. No new buildings may be allowed on the property,
  - B. The restriction runs with the land, and
  - C. The restriction cannot be changed by a future owner

This conveyance is conditioned upon the acquisition by an adjoining property owner so as to preclude the creation of a non-conforming lot, and this parcel shall become part and parcel of said adjoining lot. The acquisition of this lot is not to be utilized in conjunction with a subdivision, and no building will be constructed on said lot. Said restrictions shall be deemed to run with the land.

This conveyance is subject to all restrictions, terms, conditions and facts as of record.

Promises by Grantor. The Grantor promises that the Grantor has done no act to encumber the property. This promise is called a "covenant as to grantor's..."



Visual 400-43

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### 420 – Open Space Preservation

Manual Page 420-11

All FEMA grants require a deed restriction  
 Many park and conservation grants require one

Visual 400-45

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### 420 – Open Space Preservation

Manual Pages 420-8 – 10

Open Space Parcel Areas						
Parcel(s)	Parcel Owner	Land Use	Total Parcel Acres	Acres in the Regulatory Floodplain (OSP)	Acres Deed Restricted (DR)	Acres of Natural Functions Open Space (NFOS)
City Parks	City	Public Parks	236.0	143.2		
Country Club	Indian Bend Wash Country Club	Golf Course	73.0	55.3	55.3	
Indian Bend Wash Floodway	Private	Residential/undeveloped	8.7	8.7		
McCormick Creek Floodway	Private	Residential/undeveloped	35.7	35.7		
<b>Totals:</b>				<b>aOSP = 242.9</b>	<b>aDR = 55.3</b>	<b>aNFOS = 0.0</b>

Visual 400-66

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### 420 – Open Space Preservation

Manual Page 420-13

422.c Natural functions open space (NFOS)  
 Open space in its natural state provides more benefits:

- Flood storage
- Reduced sedimentation
- Water quality
- Aquifer recharge
- Richer soils
- Biodiversity
- Habitat

Visual 400-47

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### 420 – Open Space Preservation

Manual Page 420-14

422.c Natural functions open space (NFOS)  
 Credit criteria:

1. All NFOS(1 – 4)
  - (a) OSP credit
  - (b) NFOS1 is a prerequisite for the others
  - (c) Is managed to stay in its natural state
  - (d) Plot on impact adjustment map

Visual 400-68

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### 420 – Open Space Preservation

Manual Page 420-14


NFOS1 Parcel in its natural state



Examples:

- Areas not built on
- Restored to natural state
- Designated by recognized program

Not credited:

- Scenic designation
- Recreational areas
- Clear cutting allowed
- Dune/beach nourishment



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### 420 – Open Space Preservation

Manual Page 420-5

NFOS2 – Parcel in a natural functions protection plan  
NFOS3 – Parcel is critical habitat


HABITAT CONSERVATION PLAN

A PLAN FOR THE PROTECTION OF SEA TURTLES AND ANASTASIA ISLAND BEACH MICE ON THE BEACHES OF ST. JOHNS COUNTY, FLORIDA





Prepared for:  
U.S. FISH AND WILDLIFE SERVICE

SALMON HABITAT PROTECTION AND RESTORATION STRATEGY



WRIA-10  
Puyallup Watershed  
WRIA-12  
Chambers/Clover Creek Watershed

March, 2008







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### 420 – Open Space Preservation

Manual Page 420-15

NFOS4 – Parcel in a designated open space corridor



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### 420 – Open Space Preservation

Manual Pages 420-17 – 18

NFOS Documentation

(1) Report or  
(2) Letter or form signed by a professional

August 7, 2002

Insurance Services Office, Inc.  
2201 North Gordon Street  
Plant City, Florida 33563

Attention: Mr. David Klick, CFM



Re: Open Space Preservation

Dear Mr. Klick:

As the founder and director of the Suncoast Seabird Sanctuary hospital in the United States, I fully support Indian She Recreation Area. This nature refuge provides a valuable ha

This nature park and its surrounding area is a natural, prinf

Natural Floodplain Functions Form	
<b>Property name:</b>	Pattaway County Park
<b>Property location:</b>	1 mile northeast of Frenchfort, on the Pattaway River
<b>Reason for the letter or award:</b>	Pattaway Park was created in 1954 in order to protect the area from the logging logging industry. The area has never been developed or farmed.
<b>Number of acres available for the form:</b>	It lies at the headwaters of the Pattaway River and consists of bottomlands, swines, white oak forest interspersed with marsh and meadows. It is a stop on the Mississippi Flyway for migrating birds. It is a stop on the Mississippi Flyway for migrating birds. It is a stop on the Mississippi Flyway for migrating birds. It is a stop on the Mississippi Flyway for migrating birds.
<b>Signature:</b>	The park is a nature center houses a variety of exhibits, nature displays, maps, photographic slides, and a research library. The Nature Center also offers a variety of nature-oriented programs for families and adults such as bird walks and restoration programs.
<b>Signature:</b>	Jonathan Richards, ASLA
<b>Signature:</b>	Jonathan Richards
<b>Degree or other qualifications:</b>	Bachelor of Arts from Wall State University in landscape architecture, 1990. Registered landscape architect. Planner and then Director of natural area programs for DeSoto County since 1998.

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### 420 – Open Space Preservation

Manual Page 420-19

422.d Special flood-related hazards open space (SHOS)

Provides credit for open space preservation in areas subject to special flood-related hazards.

- Uncertain flow paths
- Closed basin lakes
- Ice jams
- Land subsidence
- Mudflows
- Tsunamis




Visual 405-73

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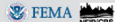
### 420 – Open Space Preservation

Manual Pages 420-23 – 24

422.3 Open space incentives (OSI)

Credit criteria

OSI 1	Set aside all of the floodplain as open space	250
OSI 2	Provide a building site for each lot on high ground	150
OSI 3	Do OSI 2 "to the extent possible"	65
OSI 4	TDRs, etc.. to encourage staying out of the floodplain	70
OSI 5	Allow cluster development through PUDs	25
OSI 6	Tax incentives to keep land open	25
OSI 7	Land use plan recommends open space	10


Visual 405-74

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### 420 – Open Space Preservation

Manual Page 420-26

OSI documentation

- ✓ Ordinance language
- ✓ Site plans/final plats

11.179 Failure to Adhere to Approved Plan, Setback Conditions, or Controls with Special Development Schedule. Failure to comply with approved setbacks or other development rules, conditions of approval, or other development standards, shall constitute a violation of this ordinance as prescribed in Article 11.

**CONDOMINIUMS**

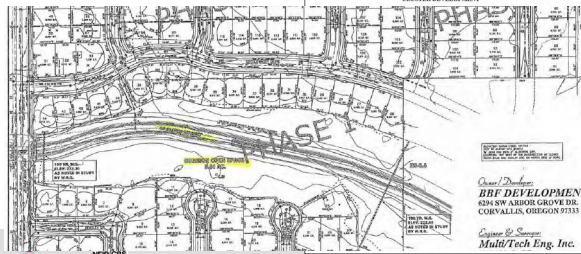
11.180 Definition: A condominium is a building, or group of buildings, in which units are individually owned, and the common, common areas and facilities are owned by all of the unit owners on a proportional, undivided basis.


11.180 Display: A proposal for new construction of a condominium is reviewed through the planned development process. A proposal for conversion of existing units into condominiums is reviewed through the conditional use process in accordance with Planned Development requirements. All condominium proposals must meet the appropriate requirements of ORS Chapter 91B.

**CLUSTER DEVELOPMENT**

11.181 Definition: A cluster development is a building, or group of buildings, in which units are individually owned, and the common, common areas and facilities are owned by all of the unit owners on a proportional, undivided basis.

11.181 Display: A proposal for new construction of a cluster development is reviewed through the planned development process. A proposal for conversion of existing units into cluster development is reviewed through the conditional use process in accordance with Planned Development requirements. All cluster development proposals must meet the appropriate requirements of ORS Chapter 91B.




Visual 405-75

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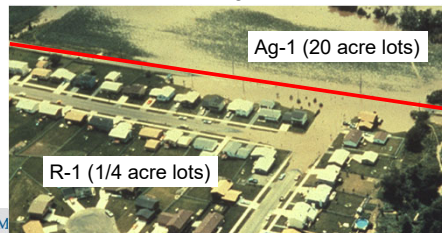
### 420 – Open Space Preservation


Manual Pages 420-26 – 27

422.f Low density zoning (LZ)

Credit criteria

- (1) Zoning ordinance with densities for different zones
- (2) Area affected not receiving OSP credit



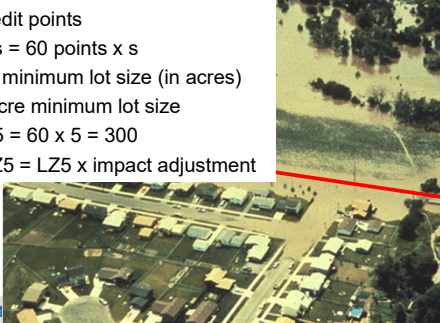

Visual 405-76

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**420 – Open Space Preservation**  
Manual Page 420-28

422.f Low density zoning (LZ)

Credit points  
 $LZs = 60 \text{ points} \times s$   
 $s = \text{minimum lot size (in acres)}$   
 5 acre minimum lot size  
 $LZ5 = 60 \times 5 = 300$   
 $cLZ5 = LZ5 \times \text{impact adjustment}$



FEMA NFP/CRS Visual 400-77

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**420 – Open Space Preservation**  
Manual Page 420-28

Is this a naturally functioning stream?



Is this a naturally functioning shoreline?




FEMA NFP/CRS Visual 400-78

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**420 – Open Space Preservation**  
Manual Page 420-28

422.g Natural shoreline protection (NSP)  
 Encourages preservation/protection of natural shorelines  
 (May mean less protection of property along shoreline)




FEMA NFP/CRS Visual 400-79

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**420 – Open Space Preservation**  
Manual Pages 420-28 – 29

422.g Natural shoreline protection (NSP)

- ✓ Regulations on private property
- ✓ Policy for public lands
- ✓ Programs that restore channels or shorelines



FEMA NFP/CRS Visual 400-80



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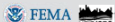

### 420 – Open Space Preservation

*Manual Page 420-29*

**Credit criteria**

- Channels: no rip rap, dredging, filling, removal of vegetation
- Ocean shores: no dune alterations, beach nourishment, seawalls, jetties

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### 420 – Open Space Preservation

**Cumulative credit**

OSP + DR + NFOS + SHOS + NSP






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### 420 – Open Space Preservation

*Manual Page 420-31*

**423 Credit Calculation**



$$c420 = (OSP \times rOSP) + (DR \times rDR) + cNFOS + cSHOS + cCEOS + cOSI + cLZ + (NSP \times rNSP), \text{ where}$$

$$cNFOS = (NFOS1 \times rNFOS1) + (NFOS2 \times rNFOS2) + (NFOS3 \times rNFOS3) + (NFOS4 \times rNFOS4), \text{ and}$$

$$cOSI = (OSI1 \times rOSI1) + (OSI2 \times rOSI2) + (OSI3 \times rOSI3) + (OSI4 \times rOSI4) + (OSI5 \times rOSI5) + (OSI6 \times rOSI6) + OSI7, \text{ and}$$


$$cLZ = LZ\#s \times rLZ\#s$$

(Let ISO do it)


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
### 420 – Open Space Preservation

**Verification** 

**Two part review**

1. Office review of the 10 largest sites + a sample
  - ✓ OSP/DR/NFOS: owner documentation
  - ✓ OSP/OS/LZ/NSP: regulations and permits
2. Field check of sites
  - ✓ Check of aerial photos



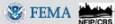



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## 400 – Mapping and Regulations

**Summary**


- 401 Special flood-related hazards
- 402 Impact adjustments for areas
- 420 Open Space Preservation
  - Preserving open space – OSP, DR, SHOS
  - Encouraging open space – OSI, LZ
  - Protecting natural floodplain functions
    - NFOS, NSP

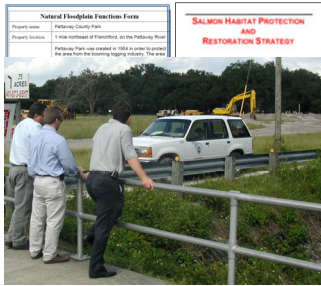

Visual 400-85

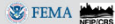
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## 420 – Open Space Preservation

**Questions?**








Visual 400-86

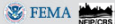
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## 420 – Open Space Preservation

**Poll Questions**






Visual 400-87

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