City Council Discussion

Artificial Turf & Drainage Standards

Purpose

Direction requested as large area artificial turf installations are increasing.

Priorities:

1. Drainage & Environmental Impact
2. Lot Coverage & Turf Location
3. Installation Standards, Permitting & Inspection

1. Drainage & Environmental Impact

Topic	Key Considerations	Questions for Council
Runoff & Water Quality	Turf may increase lateral runoff; base materials affect infiltration; adjacent drainage ditches are sensitive; TCEQ MS4 standards.	Should turf be treated as fully impervious, quasi-impervious, or conditional?
Erosion	Turf can reduce soil erosion but may concentrate water at edges or drainage inlets.	Should barriers/edging be required near ditches?
Heat Effects	Surface temps 40–70°F higher than natural grass; may stress nearby vegetation.	Should installations be limited in exposed areas?
Elevation Changes / Grading	Turf installation often modifies yard grade; may impact neighboring properties' drainage.	Should engineered grading plans be required for new turf?
Soil Health & Oxygen Exchange	Turf blocks gas exchange; reduces soil activity; may affect adjacent trees.	Should tree protection zones be mandated?
Tree Health	Turf near roots may cause decline via compaction, heat, or blocked water.	Should turf be prohibited within critical root zones?

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction, and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator, Zone 15. The **horizontal datum** was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit their website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by the Harris Galveston Area Council and was revised and enhanced by Harris County.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

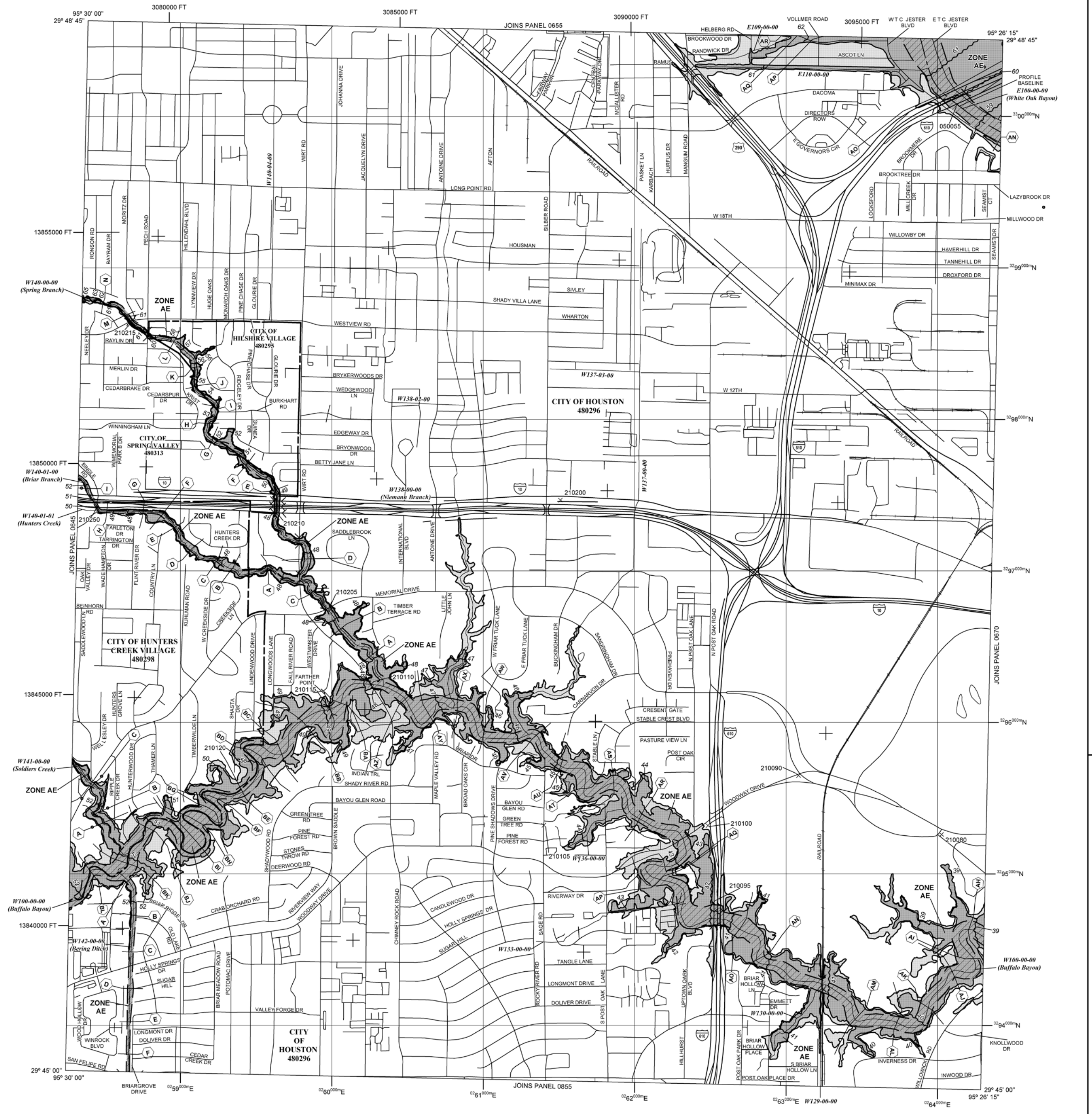
For information on available products associated with this FIRM visit the **FEMA Map Service Center** (MSC) website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have **questions about this map**, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange (FMIX) at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

Vertical Datum Adjustment due to subsidence is the 2001 adjustment.

Benchmarks shown on this map were provided by either Harris County or the National Geodetic Survey. To obtain elevation, description, and location information for benchmarks provided by Harris County, please contact the Permits Office of the Public Infrastructure Department at (713) 956-3000 or visit their website at http://www.eng.hctx.net/permits. For information regarding the benchmarks provided by the National Geodetic Survey, please see note above.

Some bridges and other structures shown on the detailed studied streams are not labeled. See corresponding flood profile for appropriate name.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	Floodplain boundary
	Floodway boundary
	Zone D Boundary
	CBRS and OPA Boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 - - - 23	Transect line
	Culvert, Flume, Penstock or Aqueduct
	Road or Railroad Bridge
	Footbridge
97° 07' 30", 32° 22' 30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
$^{42}76^{000m}$E	1000-meter Universal Transverse Mercator grid values, zone 15
600000 FT	5000-foot grid ticks: Texas State Plane coordinate system, zone South Central (FIPSZONE 4204), Lambert Conformal Conic Projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index.

EFFECTIVE DATE OF COUNTYWIDE FLOOD
INSURANCE RATE MAP PANEL
SEPTEMBER 28, 1990

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
SEPTEMBER 30, 1992
NOVEMBER 6, 1996
APRIL 20, 2000
JUNE 18, 2007
OCTOBER 16, 2013
JUNE 9, 2014

For accompanying Reasons for Revision, refer to the Notice to Flood Insurance Study Users page in the Flood Insurance Study report.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

PANEL 0665M

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

HARRIS COUNTY, TEXAS AND INCORPORATED AREAS

PANEL 665 OF 1150

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HILSHIRE VILLAGE, CITY OF	480295	0665	M
HOUSTON, CITY OF	480296	0665	M
HUNTERS CREEK VILLAGE, CITY OF	480298	0665	M
SPRING VALLEY, CITY OF	480313	0665	M

Notice: This map was reissued on June 25, 2014 to make a correction. This version replaces any previous versions. See the Notice-to-User Letter that accompanied this correction for details.

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
48201C0665M

MAP REVISED
JUNE 9, 2014

Federal Emergency Management Agency

2. Lot Coverage & Turf Location

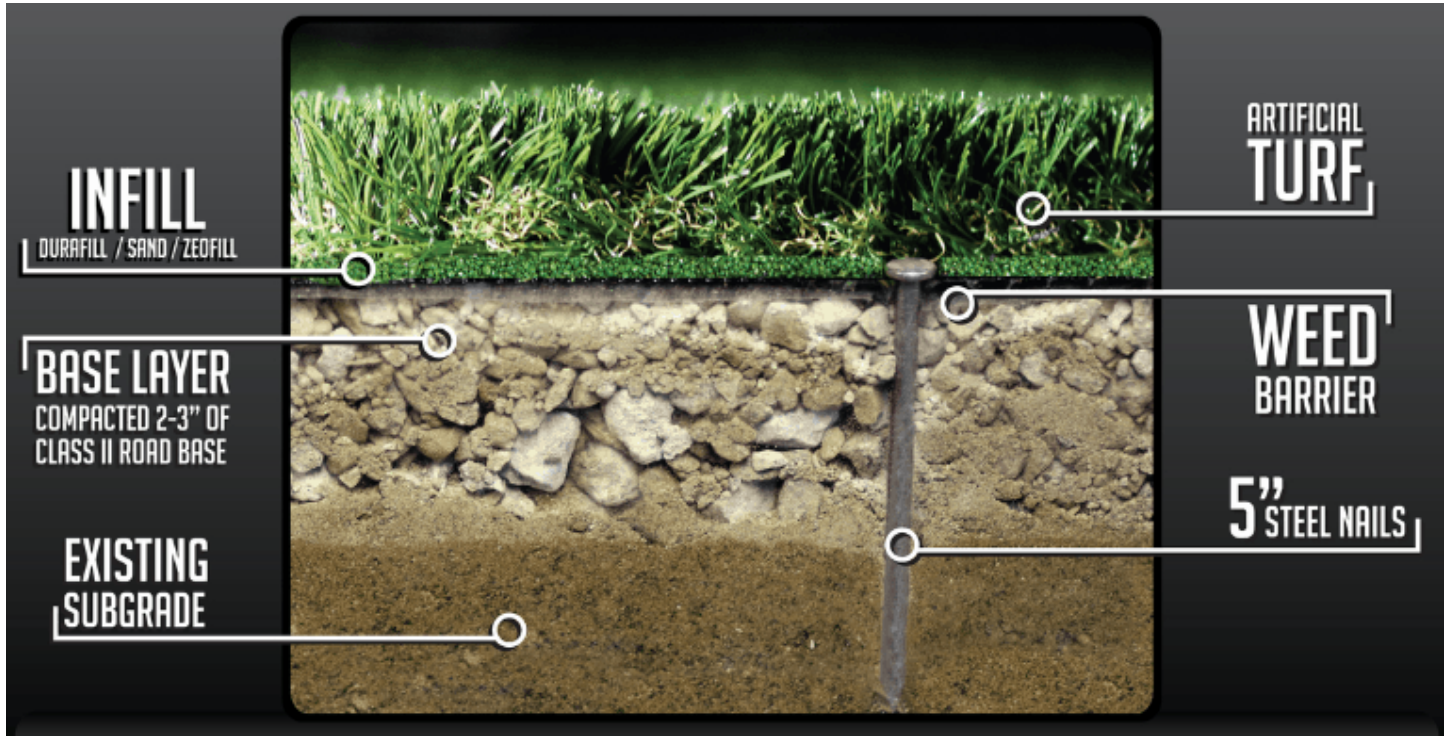
Topic	Key Considerations	Questions for Council
Impervious / Conditional Impervious	Artificial turf often behaves like impervious surface due to weed barrier base layer.	Should turf count fully toward impervious lot coverage?
Weed Barrier	Permeability affect infiltration and runoff.	Should specific barrier materials be mandated?
Front Yard / Back Yard	Majority of Council favored turf behind front building line.	Should front yard turf be restricted or allowed only with conditions?
ROW / Adjacent Drainage	Turf cannot go into ROW; runoff must be contained.	Should edging/barriers be required for ROW-adjacent turf?

3. Installation Standards, Permitting & Inspection

Topic	Key Considerations	Questions for Council
Permit Requirement	All new or modified turf installations require permits.	Should a permit threshold be based on % of lot covered?
Inspections & Documentation	Photos, grading, drainage verification, tree protection.	How often should inspections be required?
Grandfathering	Pre-existing turf can be maintained or replaced like-for-like.	Should grandfathering include changes in material or configuration?
Materials & Weed Barrier	UV-stabilized turf, permeable base, no plastic sheeting.	Should base material specifications be mandatory?
Elevation / Grading Changes	Base compaction may change yard slope.	Should engineered grading be required for any turf >X sq. ft.?

Typical Turf Installation

- A standard residential artificial turf installation usually includes:
  - Excavation of existing grass/topsoil (varies widely)
  - Compacted base material (crushed stone or decomposed granite)
  - Leveling sand
  - Turf material
  - Infill



Location

Option A

Behind Front Building Line Only

- Turf permitted only behind the front build line
- Preserves traditional streetscape appearance
- Protects adjacent city r-o-w

Option B

Limited Front Yard Allowance

- Turf allowed forward of building line if coverage limits are met
- More flexibility for homeowners
- Requires clearer enforcement standards

Option C

No Location Restriction

- Turf treated like other yard surfaces
- Most flexible
- Least control over streetscape consistency

Impervious Coverage

Option A

Fully Impervious

- Turf counts toward impervious coverage
- Most conservative drainage approach

Option B

Conditionally Impervious

- Turf treated as impervious unless engineered to drain
- Encourages higher installation standards

Option C

Not Impervious

- Turf excluded from impervious calculations
- Most flexible for lot coverage

Examples of Turf Regulations

City	Regulatory Focus	Source Link
Frisco, TX	Single-Family – allowed in backyards and side yards, no other regulations. Urban Living, Multi-Family & Playgrounds requires a formal permit process with submittal of detailed installation plans, base layer specifications, and drainage/runoff calculations.	Frisco ECode360
Highland Park, TX	Requires a permit. Turf is generally restricted in areas visible from the street. Installation standards rely on manufacturer's specifications, but prohibits nylon and plastic blades and backing. Clarifies that positive drainage is required, and no runoff to neighbors is allowed. Ordinance requires maintenance, damaged and worn areas be repaired/removed/replaced.	Highland ECode360
Dallas, TX	Prohibits artificial turf from counting toward required landscape plantings. Ordinance requires planting area requirements for trees, citing "open soil" area based on the size of the tree.	Dallas AmLegal
Leander, TX	Limits use of synthetic turf; not permitted as a substitute for required vegetation.	Leander Municode
Murphy, TX	Banned synthetic turf in areas visible from the street. Grandfathered existing installations.	Murphy ECode360
Piney Point, TX	Ordinances do not address turf; however, permit packet includes lot coverage calculations indicating some percentage of impermeability as well as requiring an engineered drainage plan.	Piney Point Turf Permit Application
Bunker Hill, TX	Allows for turf to be considered a permeable surface so long as installation is inspected and meets the City/manufacturer's criteria. Turf is not allowed in the front yard and shall not be visible from any street.	Bunker Hill Municode
Spring Valley, TX	No language found.	
Hedwig Village, TX	No language found.	
Hunters Creek, TX	No language found.	