ZONING ORDINANCE ADVISORY COMMITTEE **TUESDAY, May 14, 2024**

Planner: Lori Levy, AICP

FILE NUMBER: DCA212-008(LL) **INITIATED:** Summer 2022

TOPIC: Development Code Amendment to consider developing appropriate standards associated with impermeability, permeability, pervious and impervious surfaces, including, but not limited to definitions, paving, surfaces, materials, and applicability.

COUNCIL DISTRICT: All **CENSUS TRACTS:** All

PROPOSAL: Consideration of amending Chapters 51 and 51A of the Dallas Development Code, Sections 51A-2.102 "Definitions"; 51A-4.111 "Agricultural A(A) District" through 51A-4.117 "Manufactured Home MH(A) District"; Sections 51A-4.120 "Office Districts" through 51A-4.127 "Urban Corridor Districts"; 51A-4.507 "Neighborhood Stabilization Overlay", 51A-4.407.1 "Maximum Lot Impervious Coverage", 51A-4.803 "Site Plan Review", and related sections to consider developing appropriate standards associated with impermeability, permeability, pervious and impervious surfaces, including, but not limited to definitions, paving, surfaces, materials, and applicability.

SUMMARY: The proposed code amendments are intended to address the compatibility of impervious surfaces in the required front yard of residential districts and provided parking areas of nonresidential development and will align the Dallas Development Code with the Comprehensive Environmental & Climate Action Plan (CECAP) goal of reducing the environmental impacts of stormwater run-off, such as flooding, and the heat island effect.

STAFF RECOMMENDATION: **Approval and move onto CPC.**

CODE AMENDMENT WEBPAGE:
https://dallascityhall.com/departments/pnv/Pages/impervious-coverage-code-amendment.aspx

APPENDICES

1. Current Yard, Lot and Space Regulations for Residential Districts - Division 51A-4.110. Residential District Regulations. (amlegal.com)
2. Complete Streets Map
3. Comparison Cities
4. Heat Maps for Impervious Surfaces/Tree Canopy Coverage and other resources

BACKGROUND INFORMATION:

- On July 7, 2022, CPC authorized a code amendment initiated by Commissioners Hampton, Stanard, and Anderson to consider developing appropriate standards associated with impermeability, permeability, pervious and impervious surfaces, including, but not limited to definitions, paving, surfaces, materials, and applicability.
- On March 22, April 8, May 5, 8, and 25, June 13, 14, and 16, July 5, 2023, and March 22, 2024 PUD staff met with various internal departmental staff to get input on the impervious coverage code amendment.
- On April 27, 2023, staff had discussions with Commissioner Hampton to get an understanding of the intent of the code amendment from the Code amendment initiators. Items from those discussions, included:
    - a possible definition for maximum impervious surface stated as: The purpose of the maximum impervious surface definition is to protect surface water quality and the health and safety of residents by promoting appropriate development considerations regarding onsite permeable area, rainwater management, storm water quality control and mitigation of heat island effect;
    - maximum impervious area versus minimum permeable surfaces requirements, stormwater/rainwater management, storm water quality/control, site retention, and green infrastructure;
    - the following potential definition for impervious surface: A surface which has been covered with a layer of material so that it is highly resistant to infiltration by water;
    - Other considerations for staff to address included:
        - Buildings, driveways, garage, porches, patios, private walks, accessory building, and any other impervious surfaces constructed on the lots.
        - If highly compacted surfaces which may contribute to run-off materials such as gravel, permeable pavers, or permeable concrete are still considered impervious.
        - Define how water features (fountains, pools, etc.) are to be calculated.
- On May 25, 2023, staff conducted outreach meetings with representatives from Texas Real Estate Council (TREC) and the Dallas Builder's Association (DBA),

and it was suggested that we also reach out to representatives of both MetroTex Realtors and the Apartment Association of Greater Dallas (AAGD).

- On June 12, 2023, staff met with the directors of MetroTex Realtors and AAGD, to discuss some preliminary ideas.
- On August 1, 2023, staff presented the code amendment to ZOAC and ZOAC asked for a few additional items.
- On September 8, 2023, staff met to discuss the design standards for the parking code amendment and a decision was made to include the impervious coverage maximums for nonresidential development for provided parking areas or lots with this impervious coverage code amendment.

- Staff presented the updated proposed recommendations to representatives of TREC, DBA, and COG on April 1, 2024. Staff also met with GDPC, COG, Greater Dallas Restaurant Association, the Hotel Association of North Texas, and 24Hr Dallas on April 5, 2024 regarding the updated proposed recommendations. Representatives of the Apartment Association of Greater Dallas was unable to meet. A draft summary of the proposal was sent to the industry and professional association leaders.

- On April 22 and 23, 2024 staff conducted two public listening sessions with the same presentation to discuss and receive input on the Draft Impervious Coverage Code Amendment. A total of 28 participants attended (15 in the first session and 13 in the second session, not including staff hosts and cohosts). Staff received the following comments and questions.
    1. Consider lower percentages of maximum impervious coverage for both residential and nonresidential development.
        a. Staff explained that the maximum percentages are in line with most of the other cities researched and are meant to be effective and achievable.
    2. How does the code amendment address artificial turf?
        a. Staff explained that artificial turf that is not designed to be pervious per the 2019 Drainage Design Manual, and approved by engineering would be considered an impervious surface and would be included in the maximum impervious coverage calculation.
    3. How will the triggers (applicability) prohibit someone from slowly adding impervious surfaces over time so as not to trigger the maximum impervious coverage requirement for residential developments?
        a. Staff explained that we will inform the Development Services and Code Compliance Departments of any final ordinance approval.

Non-conformance status would begin the day the ordinance is effective. Applicability of the maximum impervious coverage percentage for the front yards of residential development will be easily seen by eyes on the street.

UPDATES:

This report contains the following revisions since the August 1, 2023 ZOAC meeting:

No longer included (in this code amendment):

1. The garage placement incentives for residential (included with the parking code amendment) and wider driveways when pervious materials are used.
2. The reduced parking requirements for residential (included in the parking code amendment).
3. Removing the 20-foot alley setback for garages for residential (included with the parking code amendment).
4. Landscaping requirements for an additional category of tree requirements for residential lots greater than one acre, updates to terminology, and improvements for implementation of landscaping regulations.

Added (in this code amendment):

1. Maximum impervious coverage for nonresidential parking areas, including applicability, measurement, base maximum impervious coverage, and incentives for additional impervious coverage.

EXISTING REGULATIONS AND POLICIES:

Current City Codes Relevant to Impervious Surface Regulations

Chapters 51 and 51A of the Dallas Development Code do not have specific limitations on maximum impervious surface or coverage like many comparison cities. However, there are some relevant and related regulations to encourage the reduction of impervious surfaces.

- Article IV of the Dallas Development Code: Other Yard, Lot, and Space Regulations

  Although there is nothing currently in the overall Dallas Development Code to specifically define or limit permeability or impervious coverage, the Development Code regulates some features that are closely related such as front, side, and rear

yard setbacks, minimum lot area, lot width, lot depth, maximum height, maximum floor area and maximum lot coverage. The amount of impervious coverage is not considered in the calculation of lot[1] coverage[2]. Subsection (a) General provisions of Sec. 51A-4.401 Yard, Lot and Space Requirements provides that:

(1) Required front yards must be open and unobstructed except for fences and light poles 20 feet or less in height. Except as otherwise provided in this section, ordinary projections of window sills, belt courses, cornices, and other architectural features may not project more than 12 inches into the required front yard. A fireplace chimney may project up to two feet into the required front yard if its area of projection does not exceed 12 square feet. Cantilevered roof eaves and balconies may project up to five feet into the required front yard.

(2) The front yard setback is measured from the front lot line of the building site or the required right-of-way as determined by the thoroughfare plan for all thoroughfares, whichever creates the greater setback.

Per Sec. 51A-4.401(c), "A person shall not erect, alter, or convert any structure or part of a structure to cover a greater percentage of a lot than is allowed in the district regulations."

- Article X of the Dallas Development Code: Landscaping Regulations

  The landscaping regulations (Article X) of the Dallas Development Code contain parameters around what can be placed in required landscaped areas and, for all uses other than single family and duplex uses, when 2,000 square feet of impervious paving is added, landscaping requirements are triggered.

  Sec. 51A-10.126. Landscape Design Options.

  There are some design options in Article X that can be selected toward a list of required credits, such as permeable pavement and low-impact development (green infrastructure) such as rain gardens and bioswales, and open spaces maintained as athletic fields.

[1] *Lot* is defined as a building site that fronts on a public or private street, except that in the case of a planned development district, the building site may front on an access easement, and in the case of a shared access development, the building site may front on a shared access area.

[2] *Coverage* is defined as the percentage of lot area covered by a roof, floor, or other structure, except that roof eaves up to 24 inches and other ordinary building projections up to 12 inches are excluded.

- *Special Districts*

  Additionally, some planned development districts may have limits for impervious surfaces or modifications to landscaping requirements and some conservation districts have some varying limitations on impervious surfaces.

  The following Conservation Districts have standards associated with impervious surfaces:

  Vickery Place, Kessler Park, Belmont Addition, and M-Streets – Greenland Hills require front yards to be no more than 30 percent impervious surface.

  Edgemont Park requires impervious surfaces in the front yard to be no more than 20 percent of the front yard, but excludes the driveway.

  M-Streets – East requires front yards to be paved or hardscaped no more than 50 percent. Parkways may not be paved or hardscaped except for curb cuts and sidewalk extensions.

  Rawlins requires front yards to be paved or covered with hardscape, mulch or dirt no more than 25 percent. A maximum of 50 percent of the front yard may be covered with flower beds.

  Most of the conservation districts (Lakewood, Hollywood Santa Monica, M-Streets Greenland Hills, M-Streets – East, Northern Hills, Edgemont Park, Stevens Park, and Rawlins) have requirements for driveway width, location, the number of curb cuts, and location of the garage and access.

  Several of the districts (Lakewood, North Cliff, Belmont Addition, Vickery Place, and Rawlins) also allow some pervious materials of brick or stone for driveways. M-Streets -East allows ribbon driveways.

- *Neighborhood Stabilization Overlays*

  The following Neighborhood Stabilization Overlays have garage placement standards which reduce impervious surfaces in the front yard:

  Northhaven Estates and Cedar Oaks require the residential garage location to be to the rear with no restrictions on access locations for the rear garage. Greenland Hills, Lakewood North Ridge Estates, and Vanderbilt Marquita require both the location of the residential garage to be in the rear and restrict access to the garage to be from either the front or side lot line. Vanderbilt Marquita does make an exception to garage access location with no restrictions for lots abutting Abrams

Rd. or Hillside Drive. Street views for these Neighborhood Conservation Districts show that these requirements are effective in largely reducing the impervious area within the front yards.

- *Stormwater Drainage Utility Fees*

  For city-wide codes, the most relevant requirements for impervious coverage in the Dallas City Code currently is in Chapter 2, Article XXVIII, Stormwater Drainage Utility, which specifies how stormwater fees should be calculated on water bills and is based on the amount of impervious surface on a lot.

- *Section R332 Green Building Program for Residential Development*

  The International Building Code has some requirements for impervious coverage in R322.5 Prescriptive requirements for stormwater that apply only to new development for residential lots. The requirement states that for all proposed projects, lots must be designed so that at least 70 percent of the built environment, not including any area under a roof, is permeable or designed to capture water runoff for infiltration onsite.

  Areas that may be counted toward the 70 percent requirement include:

  1. Vegetative landscape such as grass, trees and shrubs.

  2. Permeable paving, installed by an experienced professional. Permeable paving must include porous above-ground materials, such as open pavers and engineered products, and a 6-inch porous sub-base. The base layer must be designed to ensure proper drainage from the home.

  3. Permeable surfaces that are designed to direct all runoff toward an appropriate permanent infiltration feature such as a vegetated swale, onsite rain garden or rainwater cistern.

- *Section 408.2 Green Building Program for Nonresidential Development*

  There are pervious cover requirements in the Green Building Code (GBC) for hardscape material for new construction and additions over 400 square feet for nonresidential development. Hardscape material is required to be at least 50% of one or any combination of the following options:

  1. Site hardscape materials (Initial solar reflectance of not less than .30 in accordance with ASTM E 1918 or ASTM C 1549).
  2. Shading by structures.

3. Shading by trees or pervious pavement and permeable unit pavement. Pervious and permeable concrete pavements and concrete paving without added color or stain are exempted from the initial solar reflectance requirement.

There are also requirements for cool (reflective) roofs in the GBC that apply to any new structure with a roof, including covered parking greater than 400 square feet. The GBC requires at least 75 percent of roofing material to meet a specified number based on the roof slope that includes an option for vegetative roofs for buildings in order to meet those requirements along with an option for roofing material meeting a specified number for solar reflectivity and thermal emittance.

Resident Concerns for Residential Development

One document that spurred CPC's decision to initiate a hearing on this subject originated from a Dallas resident. The document described concerns about stormwater runoff, flooding, the heat island effect, and compatibility issues concerning existing residential development. Although the issues that were described pertain mainly to residential development and the Dallas Development Code does not have requirements regarding impervious surface coverage, the recommendations for this subject focus on both residential districts, and residential development, and nonresidential districts, and nonresidential development.

Photo Credits: Dallas Resident

KEY FINDINGS FROM THE GREEN (STORMWATER) INFRASTRUCTURE STUDY FOR URBAN FLOOD RESILIENCE

In 2021, the Green Stormwater Infrastructure Study for Urban Flood Resilience[3] was completed and provided to the City of Dallas. The analysis was conducted by The Nature Conservancy and Texas A&M Agrilife Extension in collaboration with the City of Dallas and the Trust for Public Land, funded by Lyda Hill Philanthropies.

The goal of the study was to identify where in Dallas green (stormwater) infrastructure techniques and engineered plant and soil systems that mimic and allow for nature-based solutions that help to enhance and support stormwater management to address urban flooding while factoring in cost, capacity, and future impacts of climate change.

Findings from the analysis revealed substantial and cost-effective opportunities for green infrastructure to enhance urban flood management, especially in areas where existing man-made channelized systems are undersized for capacity to effectively handle both two-year and extreme 10 and 100-year storm events. These findings are summarized from the study below.

- Results of climate change will be an average increase in the number of system hotspots (+26%) and area of challenged watersheds (+30%) compared to current conditions for the three return period storms studied.
- Several cost-effective opportunities have been implemented in Green (Stormwater) Infrastructure to improve stormwater management in Dallas, particularly in vulnerable watersheds, such as Joe's Creek, Cedar Creek, Five-Mile Creek, and White Rock Creek Watersheds.
- Overflows modeled for all storms show a 17% to 31% reduction and delayed peak flows which can reduce aerial flooding, as well as creek flows, and overbank flooding using Green (stormwater) infrastructure.
- Green (stormwater) infrastructure was found to be 77% less costly than upgrading existing gray (man-made) infrastructure alone, to meet modeled overflows, and a combination of green and gray provides the maximum cost-effective benefits.
- Bioretention areas—particularly in parking lots—represent the "biggest bang for the buck," of the systems studied with the most widely available siting opportunities.

[3] Green Stormwater Infrastructure for Urban Resilience: Executive Summary Executive Summary

- Rain gardens and cisterns, as well as bioretention areas in parks and planting strips, also offer substantial opportunities for distributed benefits.

- Green (stormwater) infrastructure practices combined with additional "greening" interventions—can support community health and resilience within the City of Dallas, by reducing urban heat island impacts, improving ecological function, enhancing urban flood management, and improving water quality.

ALIGNMENT WITH CITY-WIDE PLANS AND POLICIES:

Data from the Dallas Council adopted Comprehensive Environmental Climate Action Plan (CECAP), the Environmental Protection Agency (EPA), and the heat maps attached in the Appendices from the Trust for Public Lands, show that impervious surfaces exacerbate flooding due to lack of adequate infiltration of water into the soil from rainfall, runoff, and stormwater, and also contribute to hotter temperatures from the heat island effect. The heat island effect is the result of urbanized areas experiencing higher temperatures than outlying areas caused by heat from the sun that is absorbed and re-emitted more than natural environments or landscapes, such as forests and water bodies due to structures such as buildings and infrastructure, such as roads, bridges, and parking lots[4].

The code amendment to address the lack of requirements for impervious coverage will align the Dallas Development Code with the Comprehensive Environmental & Climate Action Plan (CECAP) goal of reducing the environmental impacts of stormwater runoff, such as flooding, and the heat island effect by reducing stormwater runoff that contributes to flooding and the heat island effect and with several City-wide goals and objectives in ForwardDallas Comprehensive Plan (2006), Draft ForwardDallas Comprehensive Land Use Plan 2.0, and the Complete Streets Design Manual, as amended.

ForwardDallas Comprehensive Plan (2006)

- ✓ Protection of riparian areas and drainage systems

DRAFT ForwardDallas Comprehensive Land Use Plan 2.0

Theme Connection - Environmental Justice + Sustainability

- ✓ Theme Goal: Actively and equitably protect communities from the effects of environmental hazards, while enhancing environmental quality through proactive protection, conservation, and sustainable practices in both natural and built environments.

[4] Heat Island Effect | US EPA.

- Objective 1: Support Citywide Environmental Justice (EJ) Goals
- Objective 2: Mitigate Negative Environmental Impacts from New Development
- Objective 3: Support the Environmental Protection of Key Natural Assets

Urban Design Element - Green + Open Space

- ✓ Integrate shade trees to expand the urban forest and improve neighborhood character.
- ✓ Reduce irrigation and increase green infrastructure for drainage and flooding by climate aware design of buildings, roofs, and open space.
- ✓ Incorporate green infrastructure elements such as channels of absorptive landscaping, permeable pavement, and green roofs to mitigate urban flooding and heat island effects.

Environmental Justice + Sustainability Implementation

- ✓ Action Step 5: Update the Development Code to reduce the percentage of impervious surface areas, where appropriate.
- ✓ Action Step 7: Update Development Code to incorporate green infrastructure practices into land use planning and development, such as rain gardens, green roofs, permeable pavements, bioswales, and vegetated swales, providing incentives where possible.

CECAP

- ✓ Goal 5: Dallas Protects Its Water Resources And Its Communities From Flooding And Drought
- ✓ Goal 6: Dallas Protects And Enhances Its Ecosystems, Trees, And Green Spaces That In Turn Improve Public Health
- ✓ Goal 8: All Dallas Communities Breathe Clean Air

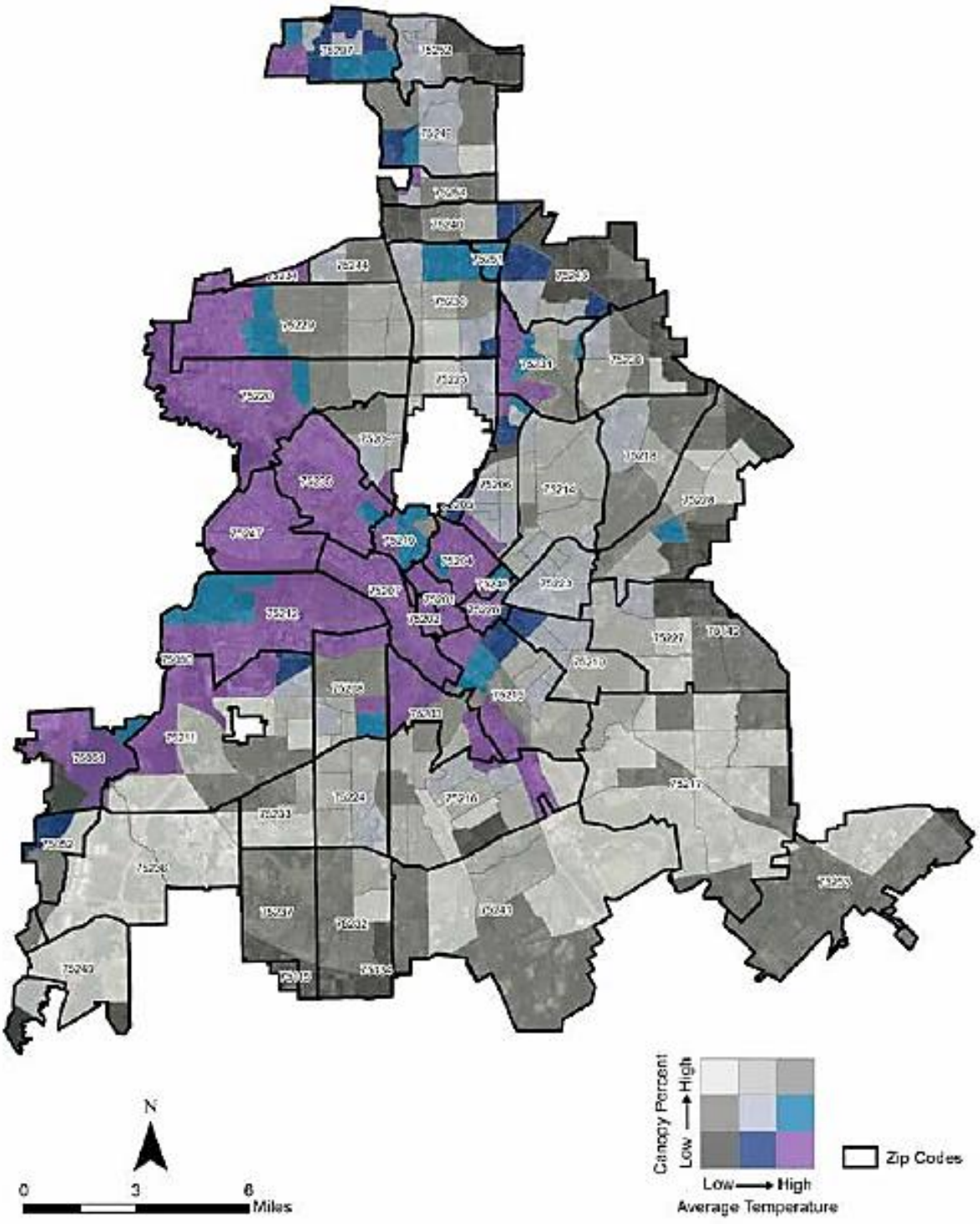
COMPLETE STREETS DESIGN MANUAL, AS AMENDED

- ✓ Include environmentally sustainable solutions
- ✓ Reduce impervious setbacks and frontage

Addressing the lack of impervious coverage requirement will also help to provide more equity in Dallas as many disadvantaged or low-income areas are more prone to flooding and less shade from the excessive heat as shown in Figure 15 below from the Urban Forest Masterplan. City of Dallas 2021 Urban Forest Master Plan.pdf (dallascityhall.com)

Figure 15. Areas of high average temperatures and low tree canopy cover
Areas shaded in purple and blue are those that have low to moderate tree canopy cover and moderate to high average temperatures. Trees can reduce temperatures by up to 15°F in Dallas.

Data Sources: Texas Trees Foundation Urban Heat Island Management Study (2017) and Urban Tree Canopy Assessment Update (2019)



STAFF SUMMARY OF RECOMMENDATIONS

1. SEC. 51A-2.102. Definitions

A. Add the following definitions:

i. IMPERVIOUS COVERAGE means a percentage of area that is covered by impervious surface.

ii. IMPERVIOUS SURFACE means a surface that prevents or impedes water from recharging groundwater. This condition can be caused by a structure, paving, pavers, compacted soil or gravel or other feature that forms a barrier between precipitation and the earth's surface.

B. Amend the following definition by adding, “Lot” and renumbering:

i. ~~(26)~~(XX) LOT COVERAGE means the percentage of lot area covered by a roof, floor, or other structure, except that roof eaves up to 24 inches and other ordinary building projections up to 12 inches are excluded.

2. Division 51A-4.110. District Regulations. Adding Maximum Impervious Coverage percentage for all districts to the Yard, lot and space regulations as described in this report (40% for residential uses in the required front yard, except that agricultural is 30%. For nonresidential surface parking areas, 60% when abutting parkway streets and 80% elsewhere, with bonuses as described later in this report).

3. SEC. 51A-4.407.1. Maximum Impervious Coverage

A. Applicability.

i. Applicable to lots developed with residential uses when the cumulative area is increased more than 200 square feet in the required front yard.

ii. Applicable to lots developed with nonresidential uses when the cumulative area of impervious coverage increases by more than 2,000 square feet within a 24-month period.

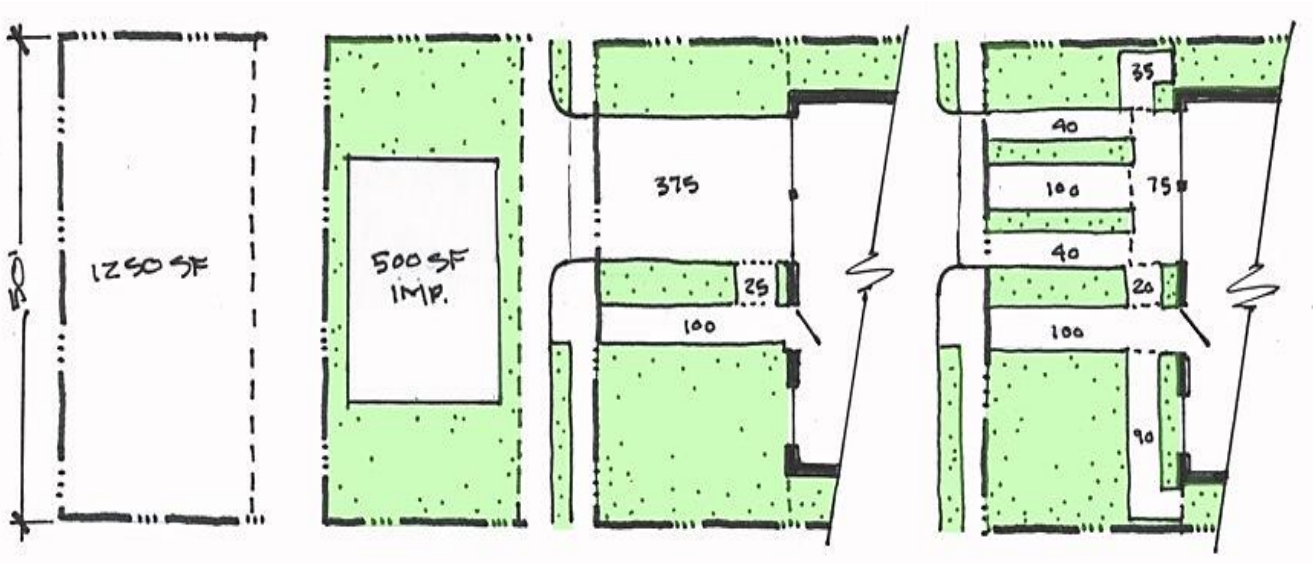
B. General provisions.

i. Sites containing residential uses.

a. Single family, duplex and multifamily district maximum impervious coverage for residential uses are measured as a percentage of the required front yard area that is covered by impervious surfaces and all other districts (TH, CH) are measured as a percentage of area between the street-facing façade and the right-of-way line that is covered by impervious surfaces.

1. A base maximum impervious coverage of 30 percent will be applied to the required front yard for the A(A) Agricultural District since the lots have larger, 50' front yards and a base maximum impervious coverage of 40 percent will be applied for all other residential districts.

Example of 40% Maximum Impervious Coverage
(R-7.5 District 50' wide lot and 25' front yard setback)



Drawing: Don Raines, Planning & Urban Design

a. Nonresidential uses (schools, churches, etc.) will be subject to the impervious coverage for nonresidential districts (see the next section).
b. Maximum impervious coverage requirements in a planned development, historic, or conservation district are controlled by the planned development, historic, or conservation district regulations.

2. Additional maximum impervious coverage percentage may be available for lots in residential districts that do not abut parkway streets with specified incentives:

a. Up to 10% additional maximum impervious coverage percentage may be allowed in the required front yard with the following design standards:

1. Green Infrastructure techniques such as rain gardens and bioswales designed per the Drainage Design Manual, as amended or additional trees where not required.



Photos from L to R: SF home with green infrastructure (rain gardens) in the front yard; SF home with trees in the front yard; SF home with rain garden and pervious pavers in the front yard
Photo on the left courtesy of Don Raines, Planning & Urban Design; Google Maps

b. A maximum of 5% additional impervious coverage may be allowed in the required front yard for each of the following features (up to a combined total of 10%):

1. All-weather and drainable material (pervious paving) as approved per the Drainage Design Manual, as amended.



Photos from L to R: Townhomes with brick pavers; SF homes with pervious and impervious paving in the front yard.
Photo credits: Don Raines, Planning & Urban Design

2. Water collection techniques, including but not limited to rain barrels.

https://www.bobvila.com/articles/best-rain-barrels/

c. The board (BDA) may grant a special exception to the impervious coverage requirements to consider unique situations that the proposed code amendments do not cover when the special exception will not be contrary to the public interest and will not adversely affect neighboring properties.

ii. Sites containing nonresidential developments.

A. Measurement.

i. Maximum impervious coverage for sites containing nonresidential developments is measured as a percentage of impervious surfaces used in off-street surface parking areas.

ii. Pedestrian paths, drive aisles, maneuvering, handicap or accessible areas or landscape buffer areas where immediately adjacent to such parking and loading areas that are located within the off-street parking area are included in the calculation.

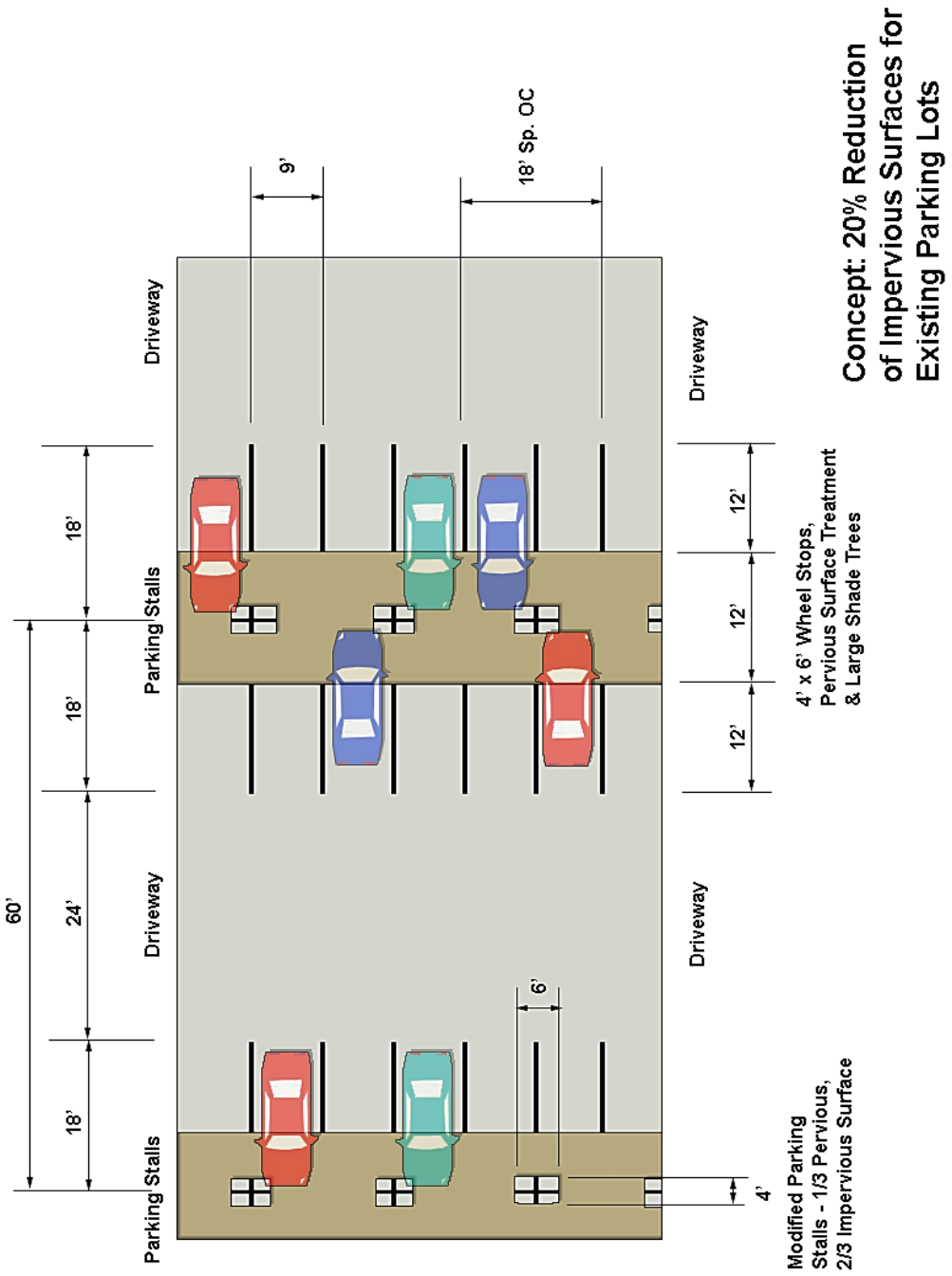
iii. Parking structures (garages) and underground parking is exempted from impervious coverage.

B. Maximum Impervious Coverage.

i. A base maximum impervious coverage percentage will be applied for off-street surface parking areas for nonresidential developments as follows:

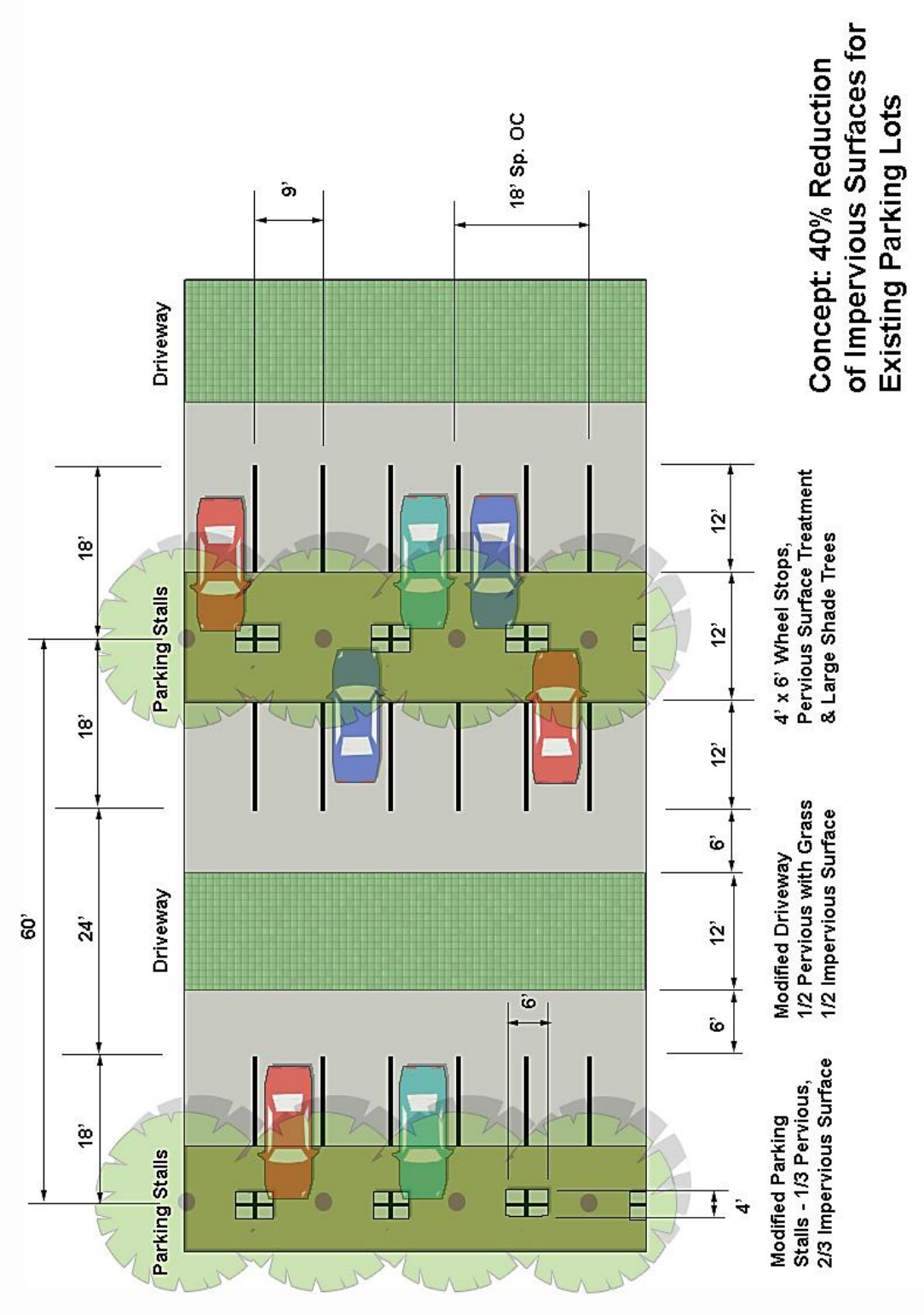
1. 80% for all off-street surface parking areas for nonresidential developments, except those lots abutting parkway streets.

Example of 80% Maximum Impervious Parking Areas



2. 60% for all off-street surface parking areas abutting parkway streets.

Example of 60% Maximum Impervious Parking Areas
Drawing: Don Raines, PUD, City of Dallas



C. Additional maximum impervious coverage percentage available for off-street surface parking areas for nonresidential developments with specified incentives and exemptions as follows:

i. Additional maximum impervious coverage percentage up to 10% (for a total of 90%) may be allowed for off-street surface parking areas in nonresidential developments.

ii. Lots that abut parkway streets are not eligible for additional impervious coverage.

iii. Up to a cumulative 10% additional maximum impervious coverage percentage may be approved with the incorporation of the following surfaces and greening factors (listed as 1-5 on the following page).

iv. A maximum additional five percent impervious coverage is allowed for any one of the following features for a maximum total of 10 percent (listed as 6-9 on the following page):

a. Water management techniques, including but not limited to diverted downspouts and rain barrels that capture and recycle water used in off-street surface parking areas for landscaping or cisterns for stormwater storage that are designed and approved per the Drainage Design Manual, as amended.

b. Use of all-weather and drainable material (pervious paving), other than hot-mix asphalt or concrete, which is approved by the building official for off-street parking surfaces including pedestrian pathways whether required or not required for off-street parking areas. Surfaces are required to be contained so sediment and materials are not discharged off the site and are maintained in good condition.

c. Reflective, light-colored cool paving for off-street surface parking areas and pedestrian pathways whether required or not required.

d. Other techniques or methods that effectively reduce stormwater runoff or the heat island effect while maximizing health and equity co-benefits as determined by the director or designee.

List of all surfaces and greening factor incentives

1. Green infrastructure (bioswales, raingardens) within all off-street surface parking areas.
2. Plantings abutting all off-street parking areas.
3. Solar PV trees, solar off-street parking surface coating, or solar farms in parking areas.
4. When located within the interior of the site, off-street parking areas including pedestrian pathways whether required or not with approved all-weather and drainable (pervious) materials as approved and designed per the drainage design manual, as amended.
5. Multi-use parking as green space for surface parking areas that can serve as parking when not in use or other method, such as an athletic field.
6. Off-street parking areas, including pedestrian pathways, whether required or not with approved all-weather and drainable (pervious) materials as approved and designed per the drainage design manual, as amended.
7. Water management to recycle and conserve water in all off-street surface parking areas to water off-street landscaping within parking areas.
8. Cool pavement, or light-colored paving for off-street surface parking area and pedestrian pathways (whether required or not required).
9. Other techniques or methods that reduce stormwater runoff or the heat island effect as determined by the director or designee.

iv. The board (BDA) may grant a special exception to the impervious coverage requirements to consider unique situations that the proposed code amendments do not cover when the special exception will not be contrary to the public interest and will not adversely affect neighboring properties.

(See photo examples of these incentives on the following pages).

1. Green Infrastructure (bioswales, raingardens)

Photos from L to R: Bioswale and trees in parking lot, bioswale inlet in parking lot, bioswale in parking lot



2. Plantings abutting all off-street surface parking areas

Photos from L to R: Evergreen hedges abutting sidewalk, berm with evergreen hedges and trees, medium trees shading sidewalk



3. Solar PV trees, solar coatings, or solar farms

Photos from L to R: Solar trees with EV charging, solar road coating, solar farm



4. Within interior of the site, all-weather and drainable (pervious) materials

Photos from L to R: Pervious parking areas Audelia and Walnut Hill, Pervious parking areas and bioswale, pervious turf block parking



5. Multiuse w/ occasional use as off-street parking overflow

Photos from L to R: Pervious overflow parking areas as green space for special events

6. All-weather and drainable (pervious) materials, including pedestrian paths

Photos from L to R: Pea gravel, a mix of pervious pedestrian paths, turf block

7. Water management to recycle and conserve water for landscaping use

Photos from L to R: Cisterns, overland flow, disconnected downspouts

8. Cool pavement, or light-colored paving

Photos from L to R: Cool sealed paving, light pervious, white painted pavers with light paving

9. Other techniques or methods that reduce stormwater runoff or the heat island effect

Photos from L to R: Vegetated canopy, blue (cistern) canopy, PV or shaded walkways through parking areas

Photo Credits:

1. Smart Surface Guidebook Final 0727.pdf
2. Google Maps; Tucson shaded sidewalk courtesy of ZOAC member Rieves
3. Smart Surface Guidebook Final 0727.pdf
4. Audelia and Walnut Hill photo courtesy of David Nevarez, City of Dallas; Smart Surface Guidebook Final 0727.pdf
5. 06_GGGChapter3.pdf (coastalgadnr.org), Parking / Overflow (grassguard.biz)
6. Pea gravel parking photo courtesy of Sarah May, City of Dallas; Google Maps; Smart Surface Guidebook Final 0727.pdf
7. Smart Surface Guidebook Final 0727.pdf ; 2_1_12_new_commercial_landscaping_handout_hollon.pdf (austintexas.gov)
8. Smart Surface Guidebook Final 0727.pdf
9. https://www.velopa.com/project-solution/structura-shelter-with-sedum-roof/#lg=1&slide=1, Smart Surface Guidebook Final 0727.pd

4. SEC 51A-4.507. Neighborhood Stabilization Overlay (NSO) Options for Residential Districts

A. Adding language to 51A-4.507(e)(2) Neighborhood Stabilization Overlay, to allow a neighborhood to consider a more or less restrictive maximum impervious coverage percentage for the front yard.

5. SEC 51A-10.101. Definitions. Landscape And Tree Conservation Regulations of Article X.

A. Revising several definitions from Article X to align with new definitions in Article 1.

B. Clarifying that compacted soil will be considered impervious surface.

6. SEC 51A-4.803. Site Plan Review.

A. Revising several terms from the Development Impact Review section of when a site plan is required and site plan requisites to align with the new definitions in Article 1.

7. SEC 51A-4.127. Urban Corridor Districts.

A. Removing the permeable surface area requirement under the Yard, lot, and space regulations for urban corridor districts so that the new regulations in Article 1 apply.

STAFF ANALYSIS

1. Definition

In determining an appropriate definition for impervious coverage, staff considered permeability[5] and other sections of the Dallas Development Code for potential conflicts and applicability with respect to zoning. Staff considered the potential definitions from stakeholder input as well as the following definitions as contained in Sec. 2-168. Definitions; Stormwater Drainage Utility Rates; Exemptions; Incentives for Residential-Benefitted Properties; Billing And Collection Procedures Of Article XXVIII. Stormwater Drainage Utility.

> (6) IMPERVIOUS AREA means any surface that prevents or substantially impedes the natural infiltration of stormwater into the ground, and includes, but is not limited to, roads, parking areas, buildings, patios, sheds, driveways, sidewalks, and surfaces made of asphalt, concrete, and roofing materials.
>
> (8) STORMWATER means rainfall runoff, snow or ice melt runoff, or surface runoff and drainage.

Staff also reviewed regulations on impervious surface limitations found within several conservation districts. However, since these definitions were inconsistent between varying conservation districts and because conservation district staff expressed difficulties in interpreting those standards, none were used as a basis for this recommendation.

Staff reviewed the zoning definitions of impervious area or coverage of the comparison cities and found the term varied significantly nationwide. The terms used for the definition vary widely from Impervious Cover, Impervious Surface, Lot and Impervious Surface Coverage, Impermeable Coverage, Permeable Surface, and Nonpermeable. Regarding which exact term to use in this report, staff has been using the term “impervious coverage” but is open to other terms comparison cities have used.

Since soil conditions are also critical to recharging groundwater and for healthy landscapes, it is important to include soil compaction as a condition in the definition that impacts or impedes the ability to recharge groundwater. Natural grass, ground cover, and other plant materials are organic surfaces that allow natural percolation or infiltration of rainfall, and surface runoff while synthetic turf, and pervious pavement - in most

[5] Permeability is a physical property of soil and is defined as the rate of water movement through interconnected pores within soil or rock. Permeability describes how fast or easily water can move from one point to another underground Porosity and Permeability Definition & Overview | What Is Soil Porosity? - Video & Lesson Transcript | Study.com

applications - do not allow a natural infiltration rate of rainfall or runoff due to soil compaction[6].

Soil compaction is the artificial and mechanical process of decreasing the volume of the soil rapidly by the expulsion of air voids in the soil resulting in the increase in density, thereby reducing the rate of water movement through the soil to increase the strength of the soil for development. Soil compaction is to the detriment of vegetation and living organisms.

2. Applying Maximum Impervious Coverage to Residential Front Yards

By addressing impervious coverage requirements in the required front yard, it limits the amount of impervious paving and will allow homeowners and builders more flexibility in providing more useable space to fit their needs and lifestyles, such as front porches, and gardens that foster a sense of community and add more eyes on the street to possibly deter crime.

Staff researched a total of 23 cities (Addison, Arlington, Austin, College Station, Duncanville, El Paso, Frisco, Ft. Worth, Houston, Lancaster, Richardson, Rockville, San Antonio, San Jose, University Park and Georgetown) of which seven are index cities (Atlanta, Baltimore, Boston, Minneapolis, San Diego, San Francisco, and Seattle) for regulations pertaining to impervious coverage or area. 16 of the 23 comparison cities that staff researched limit impervious paving or hardscape areas with a specific percentage that is required within front yards of residential districts and impervious paving or hardscape limits for nonresidential districts in the zoning regulations in order to address these climate impacts in urbanized areas.

Of the 23 cities that staff researched, only Baltimore limits the impervious area both within the front and rear yards for row houses in the residential districts.

Since there are already other ordinances in place that prohibit a property from diverting stormwater onto an adjacent property that can address the rear and side yards, staff recommends the impervious coverage requirements on residential properties be limited to required front yards.

Additionally, restricting the required front yard and not the entire lot or other yards will afford homeowners the flexibility to use their backyards and property to fit their needs. Finally, only limiting impervious surfaces in the required front yard will facilitate implementation and compliance with these requirements since it is relatively easy to visually observe and calculate by knowing the lot width and multiplying that by the

[6] Compaction of Soil: Definition, Principle and Effect | Soil Engineering (soilmanagementindia.com)

required setback and then focusing on the area calculation of paving/hardscape surface within that area.

3. Impervious Coverage Percentage for Residential Districts

Based on our research, staff recommends a base maximum with a conservative maximum impervious area that includes no environmental design standards and an increased allowance that can be approved administratively when environmental design standards are implemented to incentivize environmental, sustainable design. Initial maximums recommended is 30 percent for the Agricultural district since the minimum front yard setback is 50 feet and the lots tend to be wider and more rural, and 40 percent for the remaining residential districts (R(A), D(A), MF(A), MH(A), TH(A) and CH districts).

4. Incentivizing Design Standards for Residential Districts

Staff recommends incentivizing improved environmental design by allowing additional impervious coverage up to an additional maximum 10 percent in a residential district when the site is not abutting a parkway street, as shown on the map and referenced in the Complete Streets Design Manual, as amended, and incorporates green infrastructure techniques or pervious driveways as described in the summary recommendations above. No options for the additional 10 percent for lots abutting parkway streets will provide additional protection for those street types identified as needing additional stormwater considerations due to the proximity to the vulnerable watersheds with respect to flooding.

Staff does not recommend additional impervious coverage percentage for sites located abutting parkway streets since the parkway streets have been classified as streets that follow environmentally, vulnerable flood-prone areas and watersheds in Dallas[7]. See a copy of the Complete Streets Vision Map for Parkway Streets in the Appendices attached.

Incentivizing desired sustainable, green infrastructure design standards for additional percentages of impervious coverage will help the homeowners and builders to achieve the impervious coverage limitations, provide some flexibility in designing the layout on the lot, and helps the City achieve the desired sustainable pervious solutions toward CECAP and other important City goals.

Incentivizing green infrastructure will provide homeowners and builders some flexibility in having other impervious structures or elements in the required front yard such as porches or pedestrian pathways, and additional room for trees, and gardens while still allowing the City to achieve the desired percentage of impervious coverage in the required front yard. Green infrastructure techniques, such as rain gardens, bioswales, and pervious (all-

[7] https://dallascityhall.com/departments/pnv/DCH%20Documents/DCS_ADOPTED_Jan272016.pdf.

weather and drainable) paving, such as grass crete or turf block pavers help the homeowners and the City to achieve the desired infiltration of rainwater into the soil while allowing creativity, beauty and potential habitat for the homeowner to enjoy and help maintain the balance of nature.

5. Neighborhood Stabilization Overlay (NSO) Options for Residential Districts

Section 51A-4.507 Neighborhood Stabilization Overlay regulates neighborhood-specific yard, lot, and space requirements of single family neighborhoods to help ensure compatibility of existing neighborhoods with respect to character, stability, and livability. The NSO is an overlay district that adds additional requirements to the base zoning district, such as R-7.5 (A) residential district that controls development on the residential lots within an existing neighborhood, as specified by a particular approved NSO ordinance. Those additional requirements per Sec. 51A-4.507 can include front yard setback, side yard setback, garage location, placement, and connection, and height as outlined in that section. Per Sec. 51A-4.507 (e)(2) Neighborhood stabilization overlay, only the range of the front yard setback of the underlying or base zoning may be considered in the NSO and may be greater or lesser than the front yard setback of the underlying zoning district. This range must be within the same distance of the required underlying zoning district and the median of the existing single family structures within that block face[8].

At least one of the metroplex cities, Lancaster, allows additional requirements for special districts, such as their Neighborhood Preservation Overlay, similar to a Dallas NSO to include lot coverage, driveway, curbs, and sidewalks, garage entrance location, and landscaping as well as lot size, and front yard, and side yards.

While our impervious coverage limitation of 40 percent for required front yards as prescribed in this code amendment would apply to residential developments, a particular neighborhood with an NSO may find it necessary or desirable to have a more or less restrictive percentage of impervious coverage in the front yard. It is recommended to include an amendment to the Neighborhood Stabilization Overlay options to include a lesser or greater percentage of impervious coverage. This may be particularly important if the range of the required front yard setback is modified through the NSO as well.

Since this is a new standard, no conflicting standards would apply to existing NSOs.

6. Staff Recommendations to Apply Maximum Impervious Coverage for Nonresidential Parking Areas

[8] SEC. 51A-4.507. NEIGHBORHOOD STABILIZATION OVERLAY. (amlegal.com)

Staff recommends adding a standard for impervious coverage for off-street surface parking areas for nonresidential development which is intended to reduce stormwater runoff that contributes to flooding, the heat island effect, and the degradation of water quality. Since there are no universal impervious coverage standards for nonresidential development, but there are existing lot coverage by building standards, nonresidential developments have parking areas that often have large expanses of impervious surfaces that largely contribute to the stormwater runoff. Therefore, staff recommends that the impervious coverage requirements for nonresidential properties be applied to nonresidential off-street surface parking areas. The proposed standards allow nonresidential development to mitigate the effects of stormwater runoff and still allow flexibility with site design by utilizing the impervious coverage incentives to parking areas.

Staff also recommends a reduced impervious coverage for off-street surface parking areas for nonresidential developments for lots abutting parkway streets, per the Complete Streets Design Manual, as amended since those are the most vulnerable, flood-prone areas that need further protection.

Of the six cities that require maximum percentages of impervious area of lots for nonresidential districts, University Park limits impervious coverage of the lot to 90 percent for all nonresidential districts, Addison limits it to 80 percent for most of the commercial districts, 90 percent for industrial districts, and variable percentages for other nonresidential districts. Austin limits impervious areas to 80 percent for the general office, neighborhood commercial, and industrial districts, and variable for other nonresidential districts. Georgetown limits impervious areas to 70 percent for all nonresidential districts of lots over 5 acres, and 70 percent for the commercial, public facilities, and mixed-use downtown districts for lots less than 5 acres, 75 percent for the office district, and 85 percent for the industrial districts, and no impervious limitations for the business park districts of lots less than 5 acres. For nonresidential lots that are located over the Edwards Aquifer Recharge or Contributing Zones, and less than 5 acres are limited to 70 percent, while lots over 5 acres are limited to 70 percent for the first 5 acres, and 55 percent for the remaining acreage.

Although, 4 cities (Atlanta, Baltimore, Fort Worth, Houston) do not have specified maximum percentages for impervious area for nonresidential districts, they do have other regulations that limit the parking areas and parking lots to 90 percent impervious surfaces. For example, Atlanta and Baltimore require 10 percent of the parking lot area to be landscaped areas. Fort Worth requires an additional buffer yard or setback for the expansion of any parking area. Houston prohibits parking, driveways or any other auto-related uses such as access to a drive-through window in the Walkable Places and TOD districts. One city (Frisco) requires that nonresidential lots have at least 10 percent of useable open space.

Staff's recommendation of a conservative base standard of no more than 80 percent impervious coverage for nonresidential parking areas and 60 percent for parking areas for lots abutting parkway streets is in line with most other comparable, metroplex and index cities researched and is demonstrated with staff's drawings that it can be achievable with minimal modifications to parking areas while providing flexibility for the remainder of the lot.

7. Applying Maximum Impervious Coverage to Off-Street Surface Parking Areas in Nonresidential Developments

Staff recommends applying the maximum impervious coverage for nonresidential developments for off-street surface parking areas of sites including pedestrian paths, drive aisles, maneuvering, handicap or accessible areas or landscape buffer areas where immediately adjacent to such parking and loading areas that are located within the off-street parking area. Parking structures (garages) and underground parking is exempted from impervious coverage.

8. Incentivizing Sustainable Solutions for Pervious Surfaces for Nonresidential Developments

The Dallas Development Code currently has minimal design standards or environmental design standards for nonresidential developments, including parking areas. There are currently no requirements or incentives in the Dallas Development Code to reduce the amount of impervious or pervious paving specifically for nonresidential parking lots, although the surface parking lots largely contribute to storm water runoff, the heat island effect, and the degradation of water quality. There are also no requirements for green infrastructure although there are some options available toward required landscaping credits in Article X, Landscaping and Tree Conservation regulations. The 2019 Drainage Design Manual, as amended also allows some flexibility mostly for private development and streets to use green infrastructure, stating, "Permeable interlocking pavers are suitable for sidewalks, walking paths, pedestrian plazas, parking lots, driveways, street parking areas, and low-traffic roads."

There are no incentives to encourage developers to provide a lower percentage of minimum parking spaces above required parking on nonresidential lots or restrict less parking to reduce impervious surfaces or screening requirements for parking lots in most of the nonresidential districts, such as the retail or commercial districts. There are only off-street parking lot screening requirements from adjoining residential uses and from the

streets in the office and urban corridor districts.[9,10] Some design options in Article X can be selected toward a list of required credits, such as trees planted in the median to meet landscaping requirements, parking lot screening, permeable vehicular paving, green infrastructure (rain gardens and bioswales), and open spaces maintained as athletic fields.

The EPA defines green infrastructure as the range of measures that use plant or soil systems, permeable pavement or other permeable surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspirate stormwater and reduce flows to sewer systems or to surface waters.[11]

Staff recommends incentivizing nature-based solutions, such as the greening factors like trees and plantings or green infrastructure, such as bioswales or rain gardens, and other sustainable surfaces, such as all-weather and drainable paving, for nonresidential development for parking areas to allow the natural infiltration of water from rainfall, runoff, and stormwater drainage to reduce flooding, degradation of water quality, and heat associated with impervious and hardscape surfaces, such as parking areas while providing shade, cleaning of the air, a more comfortable and safe walking environment, increasing the tree canopy coverage, and to help blend or soften the expanse of large off-street surface parking areas with surrounding land uses. The incentives for solar trees (canopies) in the parking areas help to provide shade and provide energy sources and solar farms in the parking areas help to divert the rainfall to the natural rain gardens planted below the solar panels reducing flooding while also providing energy.

CONCLUSION

These amendments will help the City to achieve CECAP goals of reducing the environmental impacts of stormwater runoff, such as flooding, and the heat island effect by reducing stormwater runoff that contributes to flooding, and the heat island effect.`

The impervious coverage maximums will reduce the amount of impervious surfaces while increasing the amount of natural, pervious surface area, like vegetation and trees to facilitate the natural infiltration of water from rainfall, runoff, and stormwater drainage to reduce flooding, degradation of water quality, and heat associated with impervious and hardscape surfaces, such as parking areas.

The impact of additional trees and plantings cannot be overstated in terms of the positive environmental impacts of this seemingly small change. In addition to allowing the natural

[9] Sec. 51A-4.121. Office Districts. Division 51A-4.120. Nonresidential District Regulations. (amlegal.com)
[10] Sec. 51A-4.127. Urban Corridor Districts. Division 51A-4.120. Nonresidential District Regulations. (amlegal.com)
[11] What is Green Infrastructure? | US EPA

permeability or infiltration of rainfall runoff, snow or ice melt runoff, or surface runoff and drainage, trees also help to filter the air by removing particulate matter and pollution from the air we breathe. Trees can help stormwater to infiltrate into the ground by an increase of 20 to 60 percent and can reduce the daytime temperatures by 15 degrees Fahrenheit and up to 2 degrees Fahrenheit at night. Texas Trees Foundation stated in the Smart Growth for Dallas study, "Tree planting and preservation [has been] found to be more than 3.5 times as effective in lowering temperatures as cool materials strategies."[12] One large, live oak tree can also clean approximately up to 5 pounds of air pollutants from the air, including ozone, sulfur dioxide, and particulate matter.[13]

Any additional tree plantings will also help to increase the tree canopy coverage in both the private and public realm to implement recommendations to increase the tree canopy from the Urban Forest Master Plan – a stated goal of CECAP. Any additional trees in lieu of impervious surface area will also provide much-needed shade while offering a more comfortable and safe walking environment and will help blend or soften the expanse of large off-street parking surface areas associated with nonresidential development with surrounding land uses.

Addressing the lack of impervious coverage requirement will also help to provide more equity and better health outcomes in Dallas as many disadvantaged or low-income areas are more prone to flooding and have less shade from the excessive heat that leads to poorer health outcomes.

Based on other cities researched, input from internal departments, studies conducted for the City by our non-profit partners, and preliminary drawing samples provided by PUD staff that demonstrate that the desired percentage of reduction of impervious surface is achievable, and will help reduce stormwater runoff, and the heat island effect, staff recommends the following draft ordinance amendments.

[12] Smart Growth for Dallas: Smart Growth for Dallas (tplgis.org)
[13] Urban Forest MasterPlan: https://dallascityhall.com/projects/forestry/DCH%20Documents/City%20of%20Dallas%202021%20Urban%20Forest%20Master%20Plan.pdf

Proposed 51A Amendments

Note: Underlines indicate new text and ~~strikethroughs~~ indicate deleted text.

MAXIMUM IMPERVIOUS COVERAGE

SEC. 51A-2.102.DEFINITIONS.

(XX) IMPERVIOUS COVERAGE means a percentage of area that is covered by impervious surface.

(XX) IMPERVIOUS SURFACE means a surface that prevents or impedes water from recharging groundwater. This condition can be caused by a structure, paving, compacted soil or gravel or other feature that forms a barrier between precipitation and the earth's surface.

~~(26)~~ (XX) LOT COVERAGE means the percentage of lot area covered by a roof, floor, or other structure, except that roof eaves up to 24 inches and other ordinary building projections up to 12 inches are excluded.

Division 51A-4.110. Residential District Regulations.

(4) Yard, lot, and space regulations. (Note: The yard, lot, and space regulations in this subsection must be read together with the yard, lot, and space regulations contained in Division 51A-4.400. In the event of a conflict between this subsection and Division 51A-4.400, Division 51A-4.400 controls.)

A maximum impervious coverage percentage for all Residential and Nonresidential Districts is added to the Yard, lot, and space regulations as follows:

SEC. 51A-4.410 SCHEDULE OF YARD, LOT AND SPACE REGULATIONS

TYPE OF REGULATION		DISTRICTS	Single Family							D/TH			Multifamily							Office							Retail			Com/Ind				Cntrl		Mixed Use						Multiple Com				
(F)	MAXIMUM LOT COVERAGE (PERCENT)	A (A)	R-1ac (A)	R-1/2ac (A)	R-16 (A)	R-13 (A)	R-10 (A)	R-7.5 (A)	R-5 (A)	D (A)	TH(1-3) (A)	CH	MF-1 (A)	MF-1 (SAH)	MF-2 (A)	MF-2 (SAH)	MF-3 (A)	MF-4 (A)	MH (A)	NO (A)	LO-1	LO-2	LO-3	MO-1	MO-2	GO (A)	NS (A)	CR	RR	CS	LI	IR	IM	CA-1 (A)	CA-2 (A)	MU-1	MU-1 (SAH)	MU-2	MU-2 (SAH)	MU-3	MU-3 (SAH)	MC-1	MC-2	MC-3	MC-4	P (A)
1	Residential structures	10	40	40	40	45	45	45	45	60	60	60	60	60	60	60	60	80	20																										
2	Nonresidential structures	25	25	25	25	25	25	25	25	25	25	60	25	25	50	50	60	80	25	50	80	60	80	80	80	80	40	60	80	80	80	80	80	100	100	80	80	80	80	80	80	80	80	

	Maximum Impervious Coverage (Percent)	A	R-1ac	R-1/2 ac	R-16	R-10	R-7.5	R-5	D	TH	CH	MF-1	MF-2	MF-3	MF-4	MH	NO	LO	MO	GO	NS	CR	RR	CS	LI	IR	IM	CA	MU	MC	UC	P
	Residential uses	30	40	40	40	40	40	40	40	40	40	40	40	40	40	40																
	Non Residential uses	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]	80[1]

[1] Maximum Impervious Coverage for Nonresidential Uses in all districts with lots abutting a parkway street as shown on the Complete Streets Vision Map, and referenced in the Complete Streets Design Manual, as amended shall be 60 percent.

Note: The following Section 51A-4.407.1 is an entirely new proposal. Underlining is not shown for easier reading.

SEC. 51A-4.407.1 MAXIMUM IMPERVIOUS COVERAGE.

(a) Applicability. This section applies to:

(1) Lots developed with residential uses when the cumulative area of impervious coverage is increased by more than 200 square feet in the required front yard.

(2) Lots developed with nonresidential uses when the cumulative area of impervious coverage increases by more than 2,000 square feet within a 24-month period.

(b) General provisions.

(1) When a lot contains both residential and nonresidential uses, both subparagraphs (c) and (d) apply.

(2) Lots abutting a parkway street, as shown on the Complete Streets Vision Map and referenced in the Complete Streets Design Manual, as amended are not eligible for additional impervious coverage described in subsection (c) or (d) in this section.

(3) The maximum impervious coverage requirements in a planned development, historic, or conservation district are controlled by the planned development, historic, or conservation district regulations.

(4) The board (BDA) may grant a special exception to impervious coverage when, in the opinion of the board, the special exception will not be contrary to the public interest and will not adversely affect neighboring properties.

(c) Sites containing residential uses.

(1) Measurement.

(A) In single family, duplex and multifamily districts, maximum impervious coverage for residential uses is measured as a percentage of the required front yard area that is covered by impervious surfaces. Linear surfaces that do not exceed

12 inches in depth, such as flower bed edges, retaining walls, and fences, are excluded from this measurement. If any portion of a public sidewalk is located within the front yard, the public sidewalk surface is excluded from this measurement.

(B) In all other districts, maximum impervious coverage for residential uses is measured as a percentage of the area between the street-facing façade and the right-of-way line that is covered by impervious surfaces. Linear surfaces that do not exceed 12 inches in depth, such as flower bed edges, retaining walls, and fences, are excluded from this measurement. If any portion of a public sidewalk is located within the front yard, the public sidewalk surface is excluded from this measurement.

(2) Additional impervious coverage. A cumulative additional 10 percent impervious coverage is allowed for the incorporation of the following features.

(A) A maximum additional 10 percent impervious coverage is allowed when green infrastructure techniques to mitigate stormwater runoff, such as bioswales and rain gardens, are incorporated into the site design and approved per the Drainage Design Manual, as amended.

(B) A maximum additional five percent impervious coverage is allowed for each of the following features for a maximum total of 10 percent:

(i) Water collection techniques, including but not limited to rain barrels, as designed and approved per the Drainage Design Manual, as amended.

(ii) Use of an all-weather and drainable material, other than hot-mix asphalt or concrete, which is approved by the building official for off-street parking surfaces or pedestrian paths in the front yard. Surfaces are required to be contained so sediment and materials are not discharged off the site and are maintained in good condition.

(d) Sites containing nonresidential uses.

(1) Measurement.

(A) Maximum impervious coverage for sites containing nonresidential uses is measured as a percentage of impervious surfaces used in off-street surface parking areas.

(B) Pedestrian paths, drive aisles, maneuvering, handicap or accessible areas or landscape buffer areas where immediately adjacent to such parking and loading areas that are located within the off-street parking area are included in this calculation.

(C) Parking structures (garages) and underground parking is exempted from impervious coverage.

(2) Additional impervious coverage. A cumulative additional 10 percent impervious coverage is allowed for the incorporation of the following features.

(A) An additional 10 percent impervious coverage is allowed when green infrastructure techniques to mitigate stormwater runoff, including but not limited to bioswales and rain gardens, are designed and approved per the Drainage Design Manual, as amended, and the following surfaces and greening factors:

(i) Plantings abutting all off-street parking areas.

(aa) An evergreen hedge, located adjacent to sidewalks with plant materials located in a bed that is at least three feet wide with a minimum soil depth of 24 inches. Initial plantings must be capable of obtaining a solid appearance within three years. Plant materials must be placed a maximum of 24 inches on center over the entire length of the bed unless the building official approves an alternative planting density that a landscape authority certifies as being capable of providing a solid appearance within three years.

(bb) Earthen berm, located adjacent to sidewalks planted with turf grass or ground cover recommended for local area use by the director of parks and recreation. The berm may not have a slope that exceeds one foot of height for each two feet of width.

(cc) Large to medium, 2-inch to 3-inch caliper trees where not required, located adjacent to sidewalks per the recommended plant list in Article X.

(ii) Solar energy generation techniques, such as solar trees, solar coatings, and solar farms throughout all off-street surface parking areas designed per industry and best management practices, as amended.

(iii) Multiuse design for areas primarily used as recreational green, vegetated space with occasional use as off-street parking, such as overflow special event parking on athletic fields. The green space may not be paved with a solid surface of hot-mix asphalt, concrete, or other solid surfaces, but may contain grass crete or other suitable materials for recreational use.

(iv) When located behind the buildings within the interior of the site, use of an all-weather and drainable material, other than hot-mix asphalt or concrete, which is approved by the building official for off-street parking surfaces including pedestrian pathways whether required or not required. Surfaces are required to be contained so sediment and materials are not discharged off the site and are maintained in good condition.

(v) Other techniques or methods that effectively reduce stormwater runoff and the heat island effect while maximizing health and equity co-benefits as determined by the director or designee.

(3) A maximum additional five percent impervious coverage is allowed for each of the following features, up to a cumulative maximum increase of 10 percent:

(i) Water management techniques, including but not limited to diverted downspouts and rain barrels that capture and recycle water used in off-street surface parking areas for landscaping or cisterns for stormwater storage that are designed and approved per the Drainage Design Manual, as amended.

(ii) Use of all-weather and drainable material, other than hot-mix asphalt or concrete, which is approved by the building official for off-street parking surfaces

including pedestrian pathways whether required or not required for off-street parking surfaces. Surfaces are required to be contained so sediment and materials are not discharged off the site and are maintained in good condition.

(iii) Reflective, light-colored cool paving for off-street surface parking lots and pedestrian pathways whether required or not required.

(iv) Other techniques or methods that effectively reduce stormwater runoff or the heat island effect while maximizing health and equity co-benefits as determined by the director or designee.

(e) Schedule of maximum impervious coverage.

(1) Except as provided in this section, a person shall not increase Impervious Coverage that is greater than is allowed in the district regulations (Divisions 51A-4.100 et seq.). A schedule of maximum impervious coverage is contained in Section 51A-4.410.

SEC 51A-4.507. NEIGHBORHOOD STABILIZATION OVERLAY.

(e) Neighborhood stabilization overlay.

(1) In general.

…

(F) The yard, lot, and space regulations of the neighborhood stabilization overlay must be read together with the yard, lot, and space regulations in Division 51A-4.400. In the event of a conflict between the neighborhood stabilization overlay and Division 51A-4.400, the neighborhood stabilization overlay controls

(2) Front yard setback. …

(3) Corner side yard setback. …

(4) Interior side yard setback. …

(5) Maximum Impervious Coverage. The maximum impervious coverage must be within the range between the maximum impervious coverage of the underlying zoning and the median impervious coverage of developments within the district. This range may allow for a maximum percentage of impervious coverage that is lesser than the maximum impervious cover of the underlying zoning. For example, if the maximum impervious coverage of the underlying zoning is 40 percent and the median maximum impervious coverage of the front yards within the district is 10 percent, the maximum impervious coverage selected must be between 40 percent and 10 percent.

(6[~~5~~]) Height. …

(7[~~6~~]) Garage access, connection, location. …

ARTICLE X. LANDSCAPE AND TREE CONSERVATION REGULATIONS.

Division 51A-10.100. In General.

51A-10.101. Definition

(13) COVERED SOIL AREA means an area of soil that is under ~~nonpermeable~~ impervious pavement and is designed to accommodate tree root growth.

(18) ENHANCED PAVEMENT means any ~~permeable or nonpermeable~~ decorative pavement material intended for pedestrian or vehicular use approved by the director. Examples of enhanced pavement include, but are not limited to, brick or stone pavers, grass paver, exposed aggregate concrete, and stamped and stained concrete.

(39) NONPERMEABLE COVERAGE means impervious coverage ~~with any pavement that is not "permeable pavement"~~ as defined in ~~this section~~. Article I.

(44) PERMEABLE PAVEMENT means ~~director approved paving systems, pavers, or other structural surfaces that allow storm~~ all-weather and drainable material, other than hot-mix asphalt or concrete, or off-street parking surface which is approved by the building official. ~~water infiltration.~~

(49) REMOVE OR SERIOUSLY INJURE means an intentional or negligent action that will more likely than not cause a tree to decline and die within five years of the act. Actions that constitute removing or seriously injuring a tree include, but are not limited to: cutting down a tree; damaging the root system or the trunk of a tree (such as by operating machinery near, or by clearing or grading the area around, the trunk of a tree); failing to repair an injury to a tree from fire or other causes, which results in or permits tree infections or pest infestations into or on the tree; applying herbicidal or other lethal chemicals; and placing ~~nonpermeable~~ pavement over the root system of a tree.

Division 51A-4.800. Development Impact Review.

51A-4.803. Site Plan Review.

(a) When a site plan is required.…

(3) A site plan is not required under Subsection (a)(1) if the permit is only needed for:

(A) restoration of a building that has been damaged or destroyed by fire, explosion, flood, tornado, riot, act of the public enemy, or accident of any kind; or

(B) construction work that does not change the use or increase the existing building height, floor area ratio, or ~~nonpermeable~~ impervious coverage of the lot.

…

(d) Site plan requisites.

…

(5) The following information, in addition to being shown graphically, must be separately tabulated in a conspicuous place on the plan for quick and easy reference:

…

(D) Square footage and percentages of ~~building~~ lot coverage and ~~nonpermeable~~ impervious coverage of the lot.

Division 51A-13.100. General Provisions.

SEC. 51a-13.703. SITE PLAN REVIEW.

(a) Site Plan Required.

…

(2) A site plan is not required if the permit is only needed for:

(A) restoration of a building that has been damaged or destroyed by fire, explosion, flood, tornado, riot, act of the public enemy, or accident of any kind; or

(B) construction work that does not change the use or increase the existing building height, floor area ratio, or ~~nonpermeable~~ impervious coverage of the lot.

SEC. 51A-4.127. URBAN CORRIDOR DISTRICTS.

(c) UC Districts

(7) Landscape and open space provisions.

~~(F) Permeable surface area. A minimum of 10 percent of the lot area must be open space in the form of permeable surfaces such as perimeter landscape buffer strip, recreation area, or conservation area. Discrete open space areas smaller than 25 square feet or less than 5 feet wide, and landscaping in the public right-of-way, are not counted towards this 10 percent requirement.~~

DCA212-008(LL)

Complete Steets Vision Map

Legend

Street Typology

- Commercial
- Industrial
- Mixed Use
- Parkway
- Residential

Printed 9/4/2018

Street Typology

Maximum Impervious Area City Comparisons
Table 1 of 5

	DALLAS			ADDISON			ATLANTA			AUSTIN			BALTIMORE			
Maximum Impervious Coverage for Residential	Proposed			Y			Y			Y			Y			
Maximum Lot Coverage/ Maximum Impervious Coverage of Front Yard or Cover Percentages (by zoning district)	Max. Lot Cover-age (%)	Max. Imper-vious Coverage (%)-FY	District	Max. Lot Cover-age (%)	Max. Imper-vious Area (%)-FY	District	Max. Lot Cover-age (%)-FY	Max. Imper-vious Area (%)-FY	District	Max. Lot Cover-age (%)	Max. Imper-vious Area (%)-FY	District	Max. Lot Cover-age (%)	Max. Imper-vious Area (%) - FY	Max. Imper-vious Area (%) – RY	District
	10%	30%[1]	A (A)	N/A	60	R-1	N/A	N/A	N/A	N/A	65%	Lots < 4,000 SF (Cottage and Urban Home - Small Lot Amnesty)	25%	40%	N/A	R-1A-R-1E (Larger Lots)
	40%	40%[1]	R-ac(A) R-1/2ac (A) R-16(A)	40%	60%	R-1 R-2	N/A	N/A	N/A	N/A	40%	All other Resid. Districts	30%	50%	N/A	R-1, R-2
				65%	80%	R-3										
	45%	40%[1]	R-13(A) R-10(A) R-7.5(A) R-5(A)	60%	70	R-4(SF-D)	N/A	N/A	N/A	N/A	N/A	N/A	35%	50%	N/A	R-3, R-4
	60%	40%[1]	TH-1(A)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	R-5 through R-10 (Rowhouse)			
	60%	40%[1]	TH-2(A)	60%	90	R-4 (SF-A)	N/A	N/A	N/A	N/A	N/A	N/A	40%	45%	65%	R-5
	60%	40%[1]	TH-3(A), D(A), MF-1(A)(SAH)-MF-	60%	70	R-4 (D,Tri-plex, Fourplex, MF)	N/A	55%	Per Storm water permit	MF	N/A	N/A	40%	50%	65%	R-7

[1]Additional 10% of impervious area may be granted with conditions (See 51A-XX of the Dallas Development Code)

Maximum Impervious Area City Comparisons
Table 1 of 5

	DALLAS			ADDISON			ATLANTA			AUSTIN			BALTIMORE			
Maximum Impervious Coverage for Residential	Proposed			Y			Y			Y			Y			
Maximum Lot Coverage/ Maximum Impervious Coverage of Front Yard or Cover Percentages	Max. Lot Cover-age (%)	Max. Imper-vious Coverage (%)-FY	District	Max. Lot Cover-age (%)	Max. Imper-vious Area (%)-FY	District	Max. Lot Cover-age (%)-FY	Max. Imper-vious Area (%)-FY	District	Max. Lot Cover-age (%)	Max. Imper-vious Area (%)-FY	District	Max. Lot Cover-age (%)	Max. Imper-vious Area (%) - FY	Max. Imper-vious Area (%) – RY	District
			3(A)(SAH)													
	60%	40%[1]	CH(A)	60%	70	R-5	N/A	N/A	N/A	N/A	N/A	N/A	40%	60% (Lots >/= 80' depth; other-wise 80%	65%	R-8
	20%	30%	MH(A)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	35%	60%	N/A	R-9 SF-D or SF-Semi-detached
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40%	N/A	65%	Row-house
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40%	N/A	N/A	MF
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40%	N/A	N/A	All other
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	35%	60%	N/A	R-10 SF-D or SF-Semi-detached
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	80%	N/A	65%	Row-house

[1]Additional 10% of impervious area may be granted with conditions (See 51A-XX of the Dallas Development Code)

Maximum Impervious Area City Comparisons
Table 1 of 5

	DALLAS			ADDISON			ATLANTA			AUSTIN			BALTIMORE			
Maximum Impervious Coverage for Residential	Proposed			Y			Y			Y			Y			
Maximum Lot Coverage/ Maximum Impervious Coverage of Front Yard or Cover Percentages	Max. Lot Cover-age (%)	Max. Imper-vious Coverage (%)-FY	District	Max. Lot Cover-age (%)	Max. Imper-vious Area (%)-FY	District	Max. Lot Cover-age (%)-FY	Max. Imper-vious Area (%)-FY	District	Max. Lot Cover-age (%)	Max. Imper-vious Area (%)-FY	District	Max. Lot Cover-age (%)	Max. Imper-vious Area (%) - FY	Max. Imper-vious Area (%) – RY	District
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	80%	N/A	N/A	MF
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	70%	N/A	N/A	All other
	N/A	N/A	N/A	80%	90%	M-1 (Mixed-Use Neigh.)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	60%	70%	M-1 (Mixed-use MF)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	60%	75%	M-2 (Mixed-Use Suburban)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	60%	75%	M-3 (Mixed-Use Urban Corridor)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	90%	100%	M-4(Mixed-Use Center)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	90%	100%	M-5 (Mixed-Use Regional)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

[1]Additional 10% of impervious area may be granted with conditions (See 51A-XX of the Dallas Development Code)

Maximum Impervious Area City Comparisons
Table 2 of 5

	DALLAS			BOSTON			COLLEGE STATION			DUNCANVILLE			FRISCO		
Maximum Impervious Coverage for Residential	Proposed			Y			Y			Y			Y		
Maximum Lot Coverage/ Maximum Impervious Coverage of Front Yard or Cover Percentages (by zoning district)	Max. Lot Cover-age (%)	Max. Imper-vious Coverage (%)-**FY**	District	Max. Lot Cover-age (%)	Max. Imper-vious Area (%)**-FY**	District	Max. Lot Cover-age (%)-**FY**	Max. Imper-vious Area (%)-**FY**	District	Max. Lot Cover-age (%)	Max. Imper-vious Area (%)**-FY**	District	Max. Lot Cover-age (%)	Max. Imper-vious Area (%)**-FY (Front Loaded only)**	District
	10%	30%[1]	A (A)	Groundwater-retaining paving required system that will promote infiltration of rainfall to groundwater capture of a volume of </= 1.0 across that portion of surface area of lot to be paved		Groundwater Conserv-ation Overlay District; Greenbelt Protection Overlay District	N/A	30%	R,WE, E (N)(P)	20%	N/A	SF-43	N/A	50%	AG
	40%	40%[1]	R-ac(A) R-1/2ac (A) R-16(A)				N/A	40%	WRS	50%	N/A	SF-13 SF-10	20%	50%	RE
	45%	40%[1]	R-13(A) R-10(A) R-7.5(A) R-5(A)				N/A	50%	RS(J)	50%	N/A	SF-7	30%	50%	SF-16
	60%	40%[1]	TH-1(A)	N/A	N/A	N/A	N/A	55%	GS (J)(P)	50%	N/A	TF-7 (Townhouse)	40%	50%	SF-12.5
	60%	40%[1]	TH-2(A)	N/A	N/A	N/A	N/A	75%	T	50%	N/A	TF-7 (Townhouse)	45%	50%	SF-10 SF-8.5 SF-7
	60%	40%[1]	TH-3(A), D(A),	N/A	N/A	N/A	N/A	65%	D	50%	N/A	TF-7 (D) MF-14 MF-21	55%	50%	D MF OTR

[1]Additional 10% of impervious area may be granted with conditions (See 51A-XX of the Dallas Development Code)

Maximum Impervious Area City Comparisons
Table 2 of 5

	DALLAS			BOSTON			COLLEGE STATION			DUNCANVILLE			FRISCO		
Maximum Impervious Coverage for Residential	Proposed			Y			Y			Y			Y		
Maximum Lot Coverage/ Maximum Impervious Coverage of Front Yard or Cover Percentages (by zoning	Max. Lot Cover-age (%)	Max. Imper-vious Coverage (%)-**FY**	District	Max. Lot Cover-age (%)	Max. Imper-vious Area (%)**-FY**	District	Max. Lot Cover-age (%)-**FY**	Max. Imper-vious Area (%)-**FY**	District	Max. Lot Cover-age (%)	Max. Imper-vious Area (%)**-FY**	District	Max. Lot Cover-age (%)	Max. Imper-vious Area (%)**-FY (Front Loaded only)**	District
			MF-1(A)(SAH)-MF-3(A)(SAH)	N/A	N/A	N/A	N/A	Per engineer drainage analysis	MF MU						(Original Town Resid.) PH
	20%	30%[1]	MH(A)	N/A	N/A	N/A	N/A	N/A	MHP	N/A	N/A	N/A	N/A	50%	MH
	60%	40%[1]	CH(A)	N/A	N/A	N/A	Clustered Residential Districts			N/A	N/A	N/A	65%	50%	TH
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	30%	R,WE, E (N)(P)	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	30%	WRS	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	40%	RS(J)	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	50%	GS (J)(P)	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	55%	T	N/A	N/A	N/A	N/A	N/A	N/A

[1]Additional 10% of impervious area may be granted with conditions (See 51A-XX of the Dallas Development Code)

Maximum Impervious Area City Comparisons
Table 3 of 5

	DALLAS			FT. WORTH			HOUSTON			MINNEAPOLIS			RICHARDSON		
Maximum Impervious Coverage for Residential	Proposed			Y			Y			N			Y		
Maximum Lot Coverage/ Maximum Impervious Coverage of Front Yard or Cover Percentages (by zoning district)	Max. Lot Cover-age (%)	Max. Imper-vious Coverage (%)- **FY**	District	Max. Lot Cover-age (%)	Max. Imper-vious Area (%)**- FY (Driveway Cover-Age, including parking pads)**	District	Max. Lot Cove r-age (%)- **FY**	Max. Imperviou s Area (%)- **FY**	District	Max. Lot Cove r-age (%)	Max. Imper-vious Area (%)**- FY**	District	Max. Lot Cover-age (%)	Max. Imper-vious Area (%) **-FY (Front Loaded only)**	District
	10%	30%[1]	A (A)	N/A	50% 65%-Circular Driveway (one-family dwellings)	AG AR	N/A	Drainage Rate Charges per imper-vious areas	All	45%	60%	Parks	N/A	N/A	N/A
	40%	40%[1]	R-ac(A) R-1/2ac (A) R-16(A)	20%	50% 65%-Circular Driveway	A-2.5A A-43	N/A	N/A	N/A	45%	60%	Interior 1 Interior 2	50% Lot Cov – the cumulative area of any driveway plus any located btw the front property line and any front building wall		R-2000-M R-1800-M
	45%	40%[1]	R-13(A) R-10(A) R-7.5(A) R-5(A)	30%	50% 65%-Circular Driveway	A-43 A-21	N/A	N/A	N/A	60%	75%	Interior 3 Corridor 3			R-1500-M R-1250-M R-1100-M R-1000-M R-950-M R-850-M
	60%	40%[1]	TH-1(A)	40%	50% 65%-Circular Driveway	A-10	N/A	N/A	N/A	70%	85%	Corridor 4 Corridor 6	N/A	N/A	RA-1100-M

[1]Additional 10% of impervious area may be granted with conditions (See 51A-XX of the Dallas Development Code)

Maximum Impervious Area City Comparisons
Table 3 of 5

	DALLAS			FT. WORTH			HOUSTON			MINNEAPOLIS			RICHARDSON		
Maximum Impervious Coverage for Residential	Proposed			Y			Y			N			Y		
Maximum Lot Coverage/ Maximum Impervious Coverage of Front Yard or Cover Percentages (by zoning district)	Max. Lot Cover-age (%)	Max. Imper-vious Coverage (%)- **FY**	District	Max. Lot Cover-age (%)	Max. Imper-vious Area (%)**- FY (Driveway Cover-Age, including parking pads)**	District	Max. Lot Cove r-age (%)- **FY**	Max. Imperviou s Area (%)- **FY**	District	Max. Lot Cove r-age (%)	Max. Imper-vious Area (%)**- FY**	District	Max. Lot Cover-age (%)	Max. Imper-vious Area (%) **-FY (Front Loaded only)**	District
	60%	40%[1]	TH-2(A)	45%	50% 65%-Circular Driveway	A-7.5		No parking or driveways Within the building line	Walk-able Places TOD	80%	90%	Transit 10 Transit 15 Transit 20 Transit 30	N/A	N/A	N/A
	60%	40%[1]	TH-3(A), D(A), MF-1(A)(SAH)-MF-3(A)(SAH)	50%	50% 65%-Circular Driveway	A-5 B (Two-family) MF (Adjacent to Resid.)	N/A	N/A	N/A	N/A	100%	Core 50 Productio n	50% Lot Cov – the cumulative area of any driveway plus any located btw the front property line and any front building wall		D-1400-M D-2400-M D-300-M
	20%	30%[1]	MH(A)	N/A	50% 65%-Circular Driveway	MH	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	60%	40%[1]	CH(A)	N/A	No Front entry driveway or parking	R-1 (Det. Zero Lot Line)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	50% 65%-Circular	R-1 (Attache	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

[1]Additional 10% of impervious area may be granted with conditions (See 51A-XX of the Dallas Development Code)

Maximum Impervious Area City Comparisons
Table 3 of 5

	DALLAS			FT. WORTH			HOUSTON			MINNEAPOLIS			RICHARDSON		
Maximum Impervious Coverage for Residential	Proposed			Y			Y			N			Y		
Maximum Lot Coverage/ Maximum Impervious Coverage of Front Yard or Cover Percentages (by zoning district)	Max. Lot Cover-age (%)	Max. Imper-vious Coverage (%)- **FY**	District	Max. Lot Cover-age (%)	Max. Imper-vious Area (%)**- FY (Driveway Cover-Age, including parking pads)**	District	Max. Lot Cover-age (%)- **FY**	Max. Imperviou s Area (%)- **FY**	District	Max. Lot Cover-age (%)	Max. Imper-vious Area (%)**- FY**	District	Max. Lot Cover-age (%)	Max. Imper-vious Area (%) **-FY (Front Loaded only)**	District
					Driveway	d ZLA)									
	N/A	N/A	N/A	N/A	50% 65%-Circular Driveway	R-1 (Cluster)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	50% 65%-Circular Driveway	R-2(TH-Cluster)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

[1]Additional 10% of impervious area may be granted with conditions (See 51A-XX of the Dallas Development Code)

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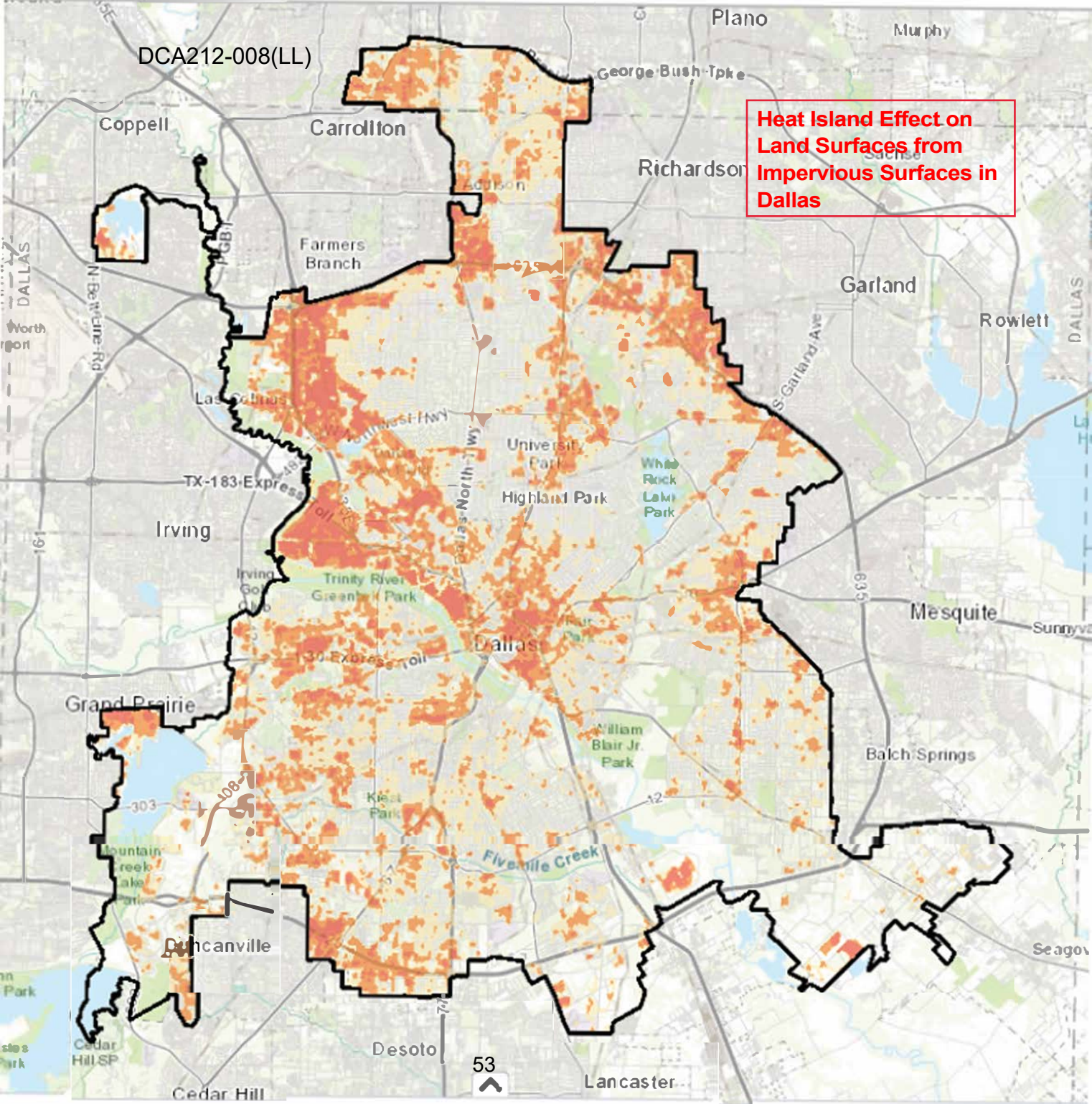
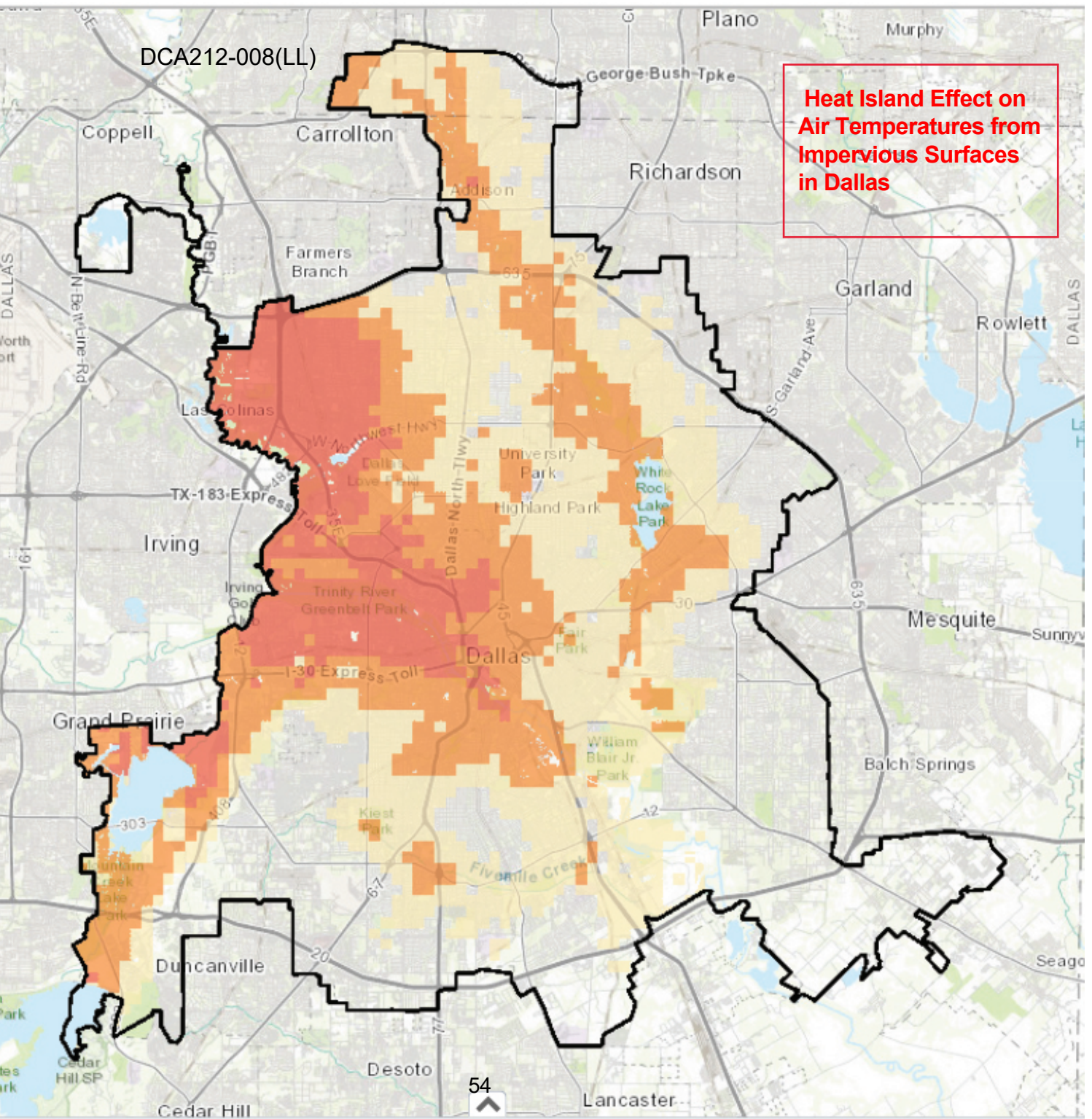
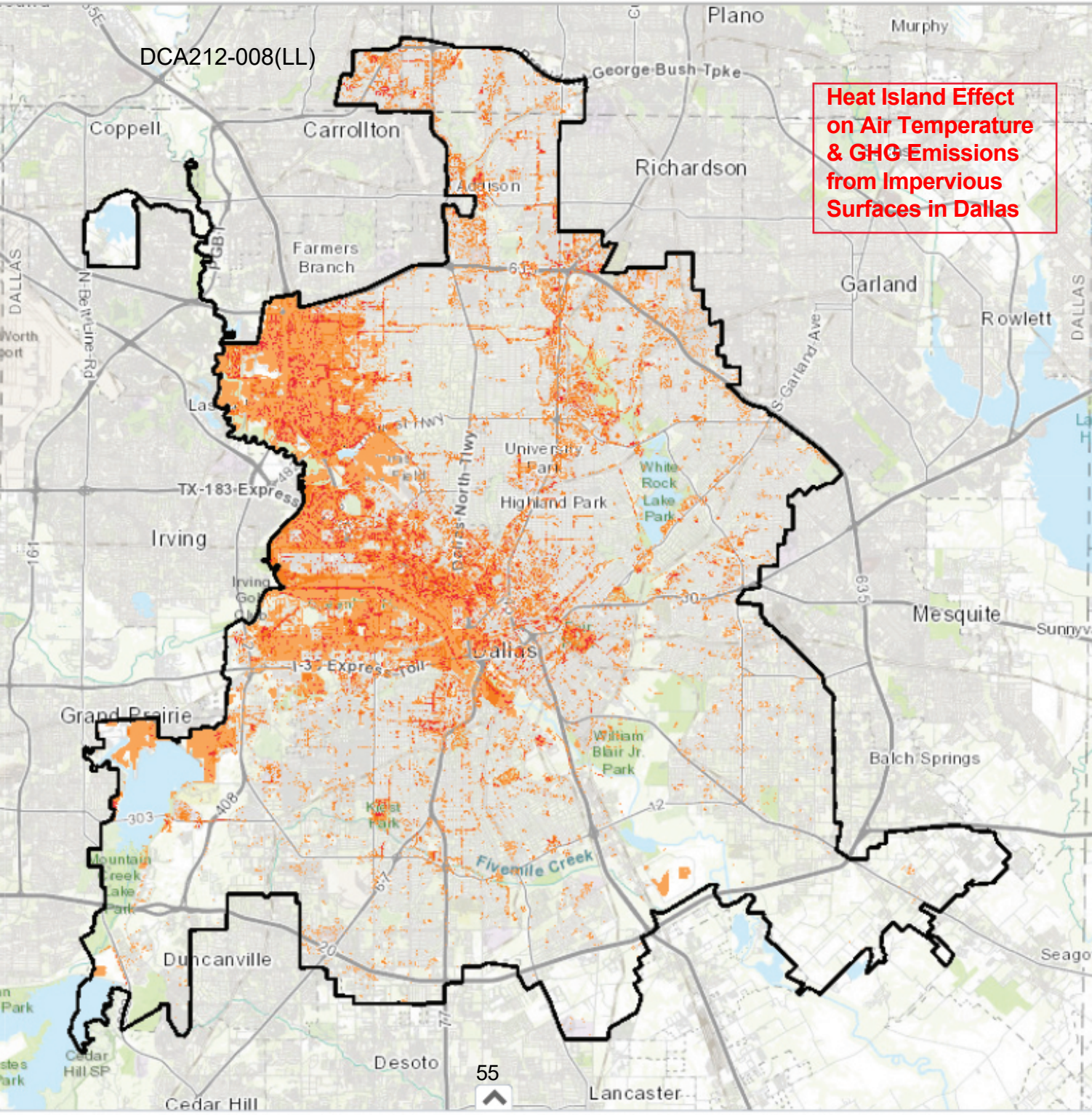
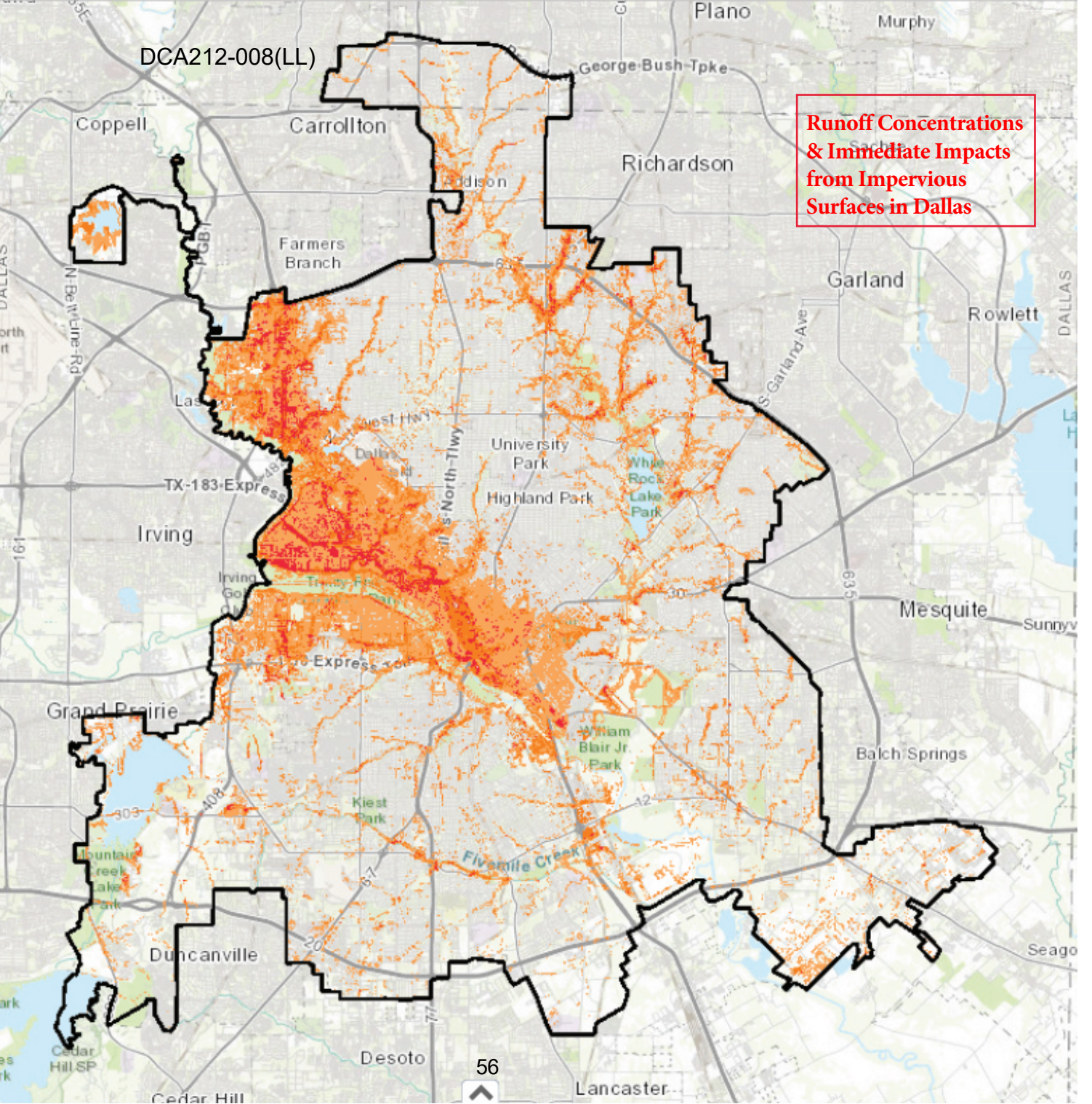



DCA212-008(LL)
Heat Island Effect on Air Temperatures from Impervious Surfaces in Dallas
Plano
Murphy
George Bush Tpke
Coppell
Carrollton
Richardson
Addison
Farmers Branch
Garland
Rowlett
S Garland Ave
N Beltline Rd
Las Colinas
TX-183 Express Toll
Irving
University Park
Highland Park
White Rock Lake Park
Dallas North Tlwy
Trinity River Greenbelt Park
Irving Golf Club
Fair Park
Dallas
I-30 Express Toll
Mesquite
Grand Prairie
William Blair Jr. Park
Balch Springs
Kiest Park
Five Mile Creek
Duncanville
Cedar Hill SP
Desoto
Cedar Hill
Lancaster


DCA212-008(LL)
Heat Island Effect on Air Temperature & GHG Emissions from Impervious Surfaces in Dallas
Plano
Murphy
George Bush Tpke
Coppell
Carrollton
Richardson
Addison
Farmers Branch
Garland
Rowlett
S Garland Ave
N Beltline Rd
DALLAS
Las Colinas
Irving
TX-183 Express
Irving Golf
Dallas North Tlwy
University Park
Highland Park
White Rock Lake Park
Mesquite
Sunnyv
Dallas
I-30 Express Toll
Grand Prairie
William Blair Jr. Park
Balch Springs
Kiest Park
Fivemile Creek
Mountain Creek Lake Park
Duncanville
Seago
Cedar Hill SP
Desoto
Cedar Hill
Lancaster


DCA212-008(LL)
Runoff Concentrations & Immediate Impacts from Impervious Surfaces in Dallas
Plano
Murphy
George Bush Tpke
Coppell
Carrollton
Richardson
Addison
Farmers Branch
Garland
Rowlett
DALLAS
N Beltline Rd
S Garland Ave
Las
West Hwy
Dallas
University Park
Highland Park
White Rock Lake Park
TX-183 Express
Irving
Irving Go
Trinity Rail
Mesquite
Sunnyv
Grand Prairie
William Blair Jr. Park
Balch Springs
Kiest Park
Fivemile Creek
Duncanville
Seago
Cedar Hill SP
Desoto
Cedar Hill
Lancaster

APPENDIX

CITY PLANS, POLICIES, AND STUDIES:

Dashboard | Dallas Climate (dallasclimateaction.com)
Equity Division Racial Equity Plan (dallascityhall.com)
City of Dallas 2021 Urban Forest Master Plan.pdf (dallascityhall.com)
Urban-Heat-Island-Study-Final Print-Logos.pdf (texastrees.org)
GAF Study on Cool Pavement Coatings
https://www.prnewswire.com/news-releases/peer-reviewed-study-on-gaf-and-climate-resolve-initiative-demonstrates-effectiveness-of-cool-pavement-coatings-in-mitigating-extreme-heat-302114003.html
GSI Study
Executive Summary
New CAPA Dallas AI Heat Study (OEQS)
https://www.dallasclimateaction.com/urbanheatislandstudy

OTHER STUDIES:

Impervious Surfaces and Flooding | U.S. Geological Survey (usgs.gov)
Calculation-of-Impervious-Surfaces.pdf (nola.gov)
FAS – Federation of American Scientists
Cooling American with Green and Resilient Infrastructure (fas.org)
SMART SURFACES GUIDEBOOK
Smart Surface Guidebook Final 0727.pdf
SITES
SITES | Developing Sustainable Landscapes (sustainablesites.org)
Study: Carbon-neutral pavements are possible by 2050, but rapid policy and industry action are needed | MIT News | Massachusetts Institute of Technology

HEALTH STUDIES:

Persistent urban heat | Science Advances
Burden of Stroke Attributable to Nonoptimal Temperature in 204 Countries and Territories | Neurology
Current inequality and future potential of US urban tree cover for reducing heat-related health impacts | npj Urban Sustainability (nature.com)
Climate change contributing to rise in immune health problems | News | Harvard T.H. Chan School of Public Health

PERVIOUS MATERIALS:

This simple solution could bring some chill to scorching summer heat | CNN
GEOPAVE Gravel Pavers Parking Lot | Presto Geosystems
Paver Designs & Hardscaping Services | System Pavers
Plastic Grid Pavers - TRUEGRID Pavers
Gravelpave2 Porous Gravel Paving | Gravel Paving Products | Invisible Structures
Interlocking pavers at Lowes.com: Search Results
You searched for Interlocking+pavestone+systems - Belgard
Permeable Interlocking Concrete Pavement (cement.org)
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