

**ORDINANCE NUMBER 23-2634**

**AN ORDINANCE TO APPROVE THE RIVERCHASE PLANNED UNIT DEVELOPMENT – 2023 AMENDMENT AND CONDITIONAL USE APPROVAL APPLICATION TO THE RIVERCHASE PLANNED UNIT DEVELOPMENT REGULATIONS**

**WHEREAS**, the City of Hoover zoned the property now known as “Riverchase” into the zoning designation of “Planned Unit Development (PUD)” on April 6, 1981 and approved the Riverchase Planned Unit Development (“PUD”) Regulations in January, 1982;

**WHEREAS**, Regions Bank, Healthcare Resources, LLC, and SB Dev. Corp. (collectively, the “Developers”) desire to amend the Riverchase PUD Regulations related to the Property and have submitted the 2023 Amendment to the Riverchase Planned Unit Development Regulations and Conditional Use Application (“Amendment”) to the City of Hoover (a copy of which is attached as Exhibit 1); and

**WHEREAS**, the location and legal description of the property for which the amendment is related are shown in Exhibit 1 (the “Property”); and

**WHEREAS**, the City’s Planning & Zoning Commission held a public hearing and considered this amendment at its regularly scheduled meeting on the 9<sup>th</sup> day of October, 2023 and recommended such amendment to the City Council for adoption; and

**WHEREAS**, the City Clerk set a public hearing before the City Council for the 20<sup>th</sup> day of November, 2023 and advertised such public hearing as required by law; and

**WHEREAS**, a public hearing was held by the City Council on the 20<sup>th</sup> day of November, 2023 concerning this rezoning; and

**WHEREAS**, the City Council of the City of Hoover, Alabama has considered the Amendment proposed by Developers and desires to amend the Zoning Ordinance of Hoover, Alabama (“Zoning Ordinance”) to amend the Riverchase PUD Regulations as to the Property conditioned upon the agreement and satisfaction by the Developers of certain conditions set forth herein.

**NOW THEREFORE, BE IT ORDAINED** by the City Council of the City of Hoover at a regular meeting, duly assembled, a quorum being present as follows:

**Section 1. APPROVAL OF 2023 AMENDMENT TO THE RIVERCHASE PLANNED UNIT DEVELOPMENT REGULATIONS AND CONDITIONAL USE APPLICATION; CONDITIONS.**

- A. The 2023 Amendment to the Riverchase Planned Unit Development Regulations and Conditional Use Application, which is attached hereto as

Exhibit 1, is hereby approved subject to the satisfaction of the conditions set forth in Section 1(B).

- B. The PUD Amendment and Conditional Use Application approval is hereby conditionally approved subject to the following: (i) the conditions attached as Exhibit 2 are agreed to and satisfied by Developers and (ii) the consent of Riverchase Business Association to the Amendment as set forth in Exhibit M of the Amendment.
- C. The legal description and map of the subject property is hereby attached in Exhibit 1.

**Section 2. REPEAL.** All ordinances or parts of ordinances in conflict herewith are hereby repealed.

**Section 3. SEVERABILITY.** That if any section, subsection, sentence, clause, or phrase of this ordinance is, for any reason, held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this ordinance. The City of Hoover hereby declares that it would have passed this ordinance, and each section, subsection, clause and phrase thereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses, and phrases be declared unconstitutional.

**Section 4. LEGAL RIGHTS NOT IMPAIRED.** That nothing in this ordinance hereby adopted shall be construed to affect any suit or proceeding impending in any court, or any rights acquired, or liability incurred, or any cause or causes of action acquired or existing, under any act or ordinance hereby repealed as cited in Section 2 of this ordinance; nor shall any just or legal right or remedy of any character be lost, impaired or affected by this ordinance.

**Section 5. ORDINANCE CUMULATIVE; COMPATIBILITY WITH OTHER REGULATIONS.** This Ordinance shall not be construed to modify or to repeal any other ordinance, rule, regulation, or other provision of law except as set forth herein. The requirements of this Ordinance are in addition to and cumulative to the requirements of any other ordinance, rule, regulation, or other provision of law, and where any provision of this ordinance imposes restrictions different from those imposed by any other ordinance, rule, regulation, or other provision of law, whichever provision is more restrictive or imposes higher protective standards for human health or the environment shall control.

**Section 6. PUBLICATION OF ORDINANCE.** That the City Clerk of the City of Hoover is hereby ordered and directed to cause this ordinance to be published and that a copy of this Ordinance be entered upon the minutes of the meeting of the City Council.

**Section 7. EFFECTIVE DATE OF ORDINANCE.** This ordinance shall become effective only following satisfaction with each of the following: (i) approval and adoption by the City Council of the City of Hoover, Alabama, (ii) publication as required by law, (iii)

satisfaction of the Condition Precedent set forth in Exhibit 1 and (iv) the consent to the Amendment by the Riverchase Business Association as set forth in Exhibit M of the Amendment.

**ADOPTED AND APPROVED** this the 20th day of November, 2023.

**APPROVED BY:**

\_\_\_\_\_  
John B. Lyda, Council President

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Frank V. Brocato, Mayor

**ATTESTED BY:**

\_\_\_\_\_  
Wendy Dickerson, City Clerk

**EXHIBIT 1**

**2023 AMENDMENT TO THE RIVERCHASE PLANNED**  
**UNIT DEVELOPMENT REGULATIONS AND**  
**CONDITIONAL USE APPLICATION**



**2023 AMENDMENT TO THE  
RIVERCHASE PLANNED UNIT  
DEVELOPMENT REGULATIONS  
AND  
CONDITIONAL USE APPLICATION**

**Date: 14 August 2023**

2023 AMENDMENT  
TO THE  
RIVERCHASE PLANNED UNIT DEVELOPMENT REGULATIONS  
AND  
CONDITIONAL USE APPLICATION

**TABLE OF EXHIBITS**

Exhibit A	-	Legal Description of the Property
Exhibit B	-	Survey of the Property
Exhibit C	-	Vicinity Map
Exhibit D	-	Zoning Plan
Exhibit E	-	Master Land Use and Conditional Use Plan
Exhibit F-1	-	Land Use Development Criteria – Definitions
Exhibit F-2	-	Land Use Development Criteria
Exhibit F-3	-	Land Use Regulations
Exhibit G-1	-	Typical Lot Dimensions for Single-Family Residential Unit
Exhibit G-2	-	Roadway Diagrams
Exhibit H	-	Tree Conservation Plan
Exhibit I	-	Traffic Impact Study and Traffic Memorandum
Exhibit J	-	Owner’s Authorization
Exhibit K	-	Shared Parking Analysis
Exhibit L	-	Harbert-Equitable Joint-Venture Consent
Exhibit M	-	Riverchase Business Association Consent
Exhibit N	-	Circulation Plan
Supplement	-	Deviations from Ordinances and Regulations

**2023 AMENDMENT TO THE RIVERCHASE  
PLANNED UNIT DEVELOPMENT REGULATIONS  
AND CONDITIONAL USE APPLICATION**

THIS 2023 AMENDMENT TO THE RIVERCHASE PLANNED UNIT DEVELOPMENT ZONING REGULATIONS AND CONDITIONAL USE APPLICATION (this "Amendment") is entered into as of the 14th day of August, 2023 by REGIONS BANK, an Alabama banking corporation ("Owner"), HEALTHCARE RESOURCES, LLC an Alabama limited liability company ("Developer"), SB DEV. CORP., an Alabama corporation ("Signature"), and the CITY OF HOOVER, ALABAMA, an Alabama municipal corporation ("City").

**R E C I T A L S:**

The Harbert-Equitable Joint Venture, has previously submitted to the City the Riverchase Planned Unit Development Regulations dated January 1982, prepared by the Birmingham Regional Planning Commission, which were approved by the City and adopted by the City Council on April 6, 1981, as amended through the date hereof (collectively, the "PUD Plan").

Harbert Corporation, a Delaware corporation, successor-by-merger to Harbert Corporation, an Alabama corporation, successor-by-merger to Harbert Properties Corporation, an Alabama corporation ("Harbert") as sole surviving member of the Harbert-Equitable Joint Venture, an Alabama general partnership (the "Venture") has consented to the development contemplated and land uses set forth hereinafter in **Exhibit L** attached hereto and incorporated herein by reference.

The Riverchase Business Association, Inc, an Alabama nonprofit corporation, is to consent to the development contemplated and land uses set forth hereinafter in **Exhibit M** attached hereto and incorporated herein by reference, and further its Architectural Review Committee shall endorse the Master Land Use and Conditional Use Plan attached hereto as **Exhibit E** and incorporated herein by reference.

Regions Bank is the owner of that certain real property (the "Property") situated in the City of Hoover, Shelby County, Alabama, consisting of approximately 91 acres, more or less, which is more particularly described in **Exhibit A** attached hereto and incorporated herein by reference.

A boundary survey for the Property is attached hereto as **Exhibit B** and incorporated herein by reference.

The Property lies within the corporate limits of the City as shown on the Vicinity Map attached hereto as **Exhibit C** and incorporated herein by reference.

Following approval of this Amendment by the City, Developer and Signature have agreed to purchase, and Regions Bank has agreed to sell, transfer, assign and convey the Property to Developer and Signature and all of its entitlements and rights under this Amendment.

Developer and Signature desire to develop the Property in a manner influenced by New Urbanism, promoting environmentally friendly habits, creating walkable neighborhoods containing a wide range of housing sizes, prices and styles, with civic and commercial development located in proximity to neighboring residences.<sup>1</sup> The development plan for the Property expressed herein includes New Urbanism objectives of creating healthy places for people and businesses to thrive and prosper. The Developer also contemplates a “Wellness Center” within the Property, focusing on the art of healing disease and of preserving physical, mental, and spiritual health, along with concepts embodied in a Traditional Neighborhood Development, which include not only a wide range of housing types but also emphasize a network of well-connected streets and blocks, public spaces, and amenities such as stores, schools, and worship within walking distance of residences.<sup>2</sup>

The Property will incorporate a “Town Center” concept which will promote traditional commercial developments coupled with urban style residential and commercial areas, both of which will promote walkable communities which include greenways, parks, sidewalks, and open spaces for enjoyment by residents, tenants, employees, guests, and the general public. Regions Bank will maintain a significant presence in the existing and new development.

The Developer plans to develop the Riverwalk Health and Wellness Center which will be designed to offer a wide range of health care services for all stages of life, from pediatrics to geriatrics. The Developer will seek a Certificate of Need from the Alabama State Health Planning and Development Agency for development and operation of a “non-traditional hospital” or “boutique hospital,” with outpatient surgery and other forms of ambulatory care.

Riverwalk ‘s combination of wellness, residential, and clinical care will provide access to high-quality healthcare focused on integrating prevention and wellness as a part of overall patient care. The Property’s proximity to existing research, biotechnology and life sciences reinforces the location for such a health-focused and residential development.

There are three entrances on Riverchase Parkway to enter the Property. The Property will promote more highly concentrated commercial development, both office and retail, which will serve not only the Property but the various other communities along Riverchase Parkway, Valleydale Road, and Highway 31, as well as providing residential, both single-family and multi-family development, as hereinafter described.

The development concept proposed for the Property necessitates flexibility to allow different land uses within the Property mixing uses which are incorporated herein.

As a result of Developer’s and Signature’s goal to utilize the mixed-use development throughout the Property as espoused by New Urbanism and Traditional Neighborhood Development, Developer and Signature desire that all of the Property (a) be known as “Riverwalk”

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<sup>1</sup> Boeing; et al. (2014). “LEED-ND and Livability Revisited.” *Berkeley Planning Journal*. 27: 31–55; Katz (1994). “The New Urbanism—Toward an Architect of Community.” 28-32.

<sup>2</sup> Stahl, Brooks, Chellman and Duany (1990-1992). “TND Ordinance”. Town of Bedford, NH.

and this Amendment may sometimes be referred to as the “Riverwalk PUD Application” which project title may appear in instruments prepared prior to being formatted as an Amendment to the PUD Plan, (b) be rezoned as Planned Unit Development, Planned Commercial with Conditional Use for Mixed Use in accordance with the provisions of the Zoning Ordinance of Hoover, Alabama, as amended, which was approved by the City on December 21, 2020 and adopted by the City Council in Ordinance Number 20-2500 (the “Zoning Ordinance”), Article 8 and Section 8.04.04 C. thereof, subject to the terms, conditions, and exceptions set forth herein which deviate from the PUD Plan and the Zoning Ordinance in order to accomplish such planning objectives and (c) be subject to the terms and provisions of this Amendment and not the PUD Plan.

Developer and Signature seek to establish zoning and land use classifications, subdivision regulations, and public work standards which are specific for the Property and which deviate from, and will completely replace, the zoning and land use classifications, subdivision regulations, and public work standards, set forth in the PUD Plan and which are not found in current land planning and zoning edicts in order to reflect that the relationship between architecture and public space can be “urban” regardless of building height or mass and that spatial hierarchy can be achieved regardless of land use intensity by utilizing the principles of mixed-use land planning<sup>3</sup> throughout the Property.

Owner has granted to the Developer the right and capacity to act on behalf of Owner in all matters regarding the zoning of the Property. The foregoing authorization is attached hereto as **Exhibit J** and incorporated herein by reference.

NOW, THEREFORE, in consideration of the premises and other good and valuable consideration the parties hereto agree as follows:

A. Application Fees.

1. Zoning Fee. In accordance with the provisions of § 8.02.03, A. of the Zoning Ordinance, the PUD amendment application fee in the amount of \$100.00 has been deposited with the City. No other fees, charges or other amounts shall be payable to the City in connection with the zoning submission and approval by the City of this Amendment unless otherwise required by law.

2. Conditional Use Fee. In accordance with the provisions of § 2.04.01, 1 A. of the Zoning Ordinance, the Conditional Use application fee in the amount of \$100.00 has been deposited with the City. No other fees, charges or other amounts shall be payable in connection with the Conditional Use submission and approval by the City of the conditional uses described in this Amendment unless otherwise required by law.

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<sup>3</sup> Duany, Speck, and Lydon (2009). “The Smart Growth Manual.” Preface; Katz; xi.

B. Master Plan and Intent.

In accordance with the provisions of § 8.02.03, B. of the Zoning Ordinance, the zoning plan (the “Zoning Plan”) for the Property set forth in **Exhibit D** attached hereto and incorporated herein by reference does hereby supersede and replace the Land Use Plan set forth in the PUD Plan. Further, the terms or provisions of this Amendment, with respect to the Property only, shall supersede and replace all the terms, conditions and requirements set forth in the PUD Plan and the Zoning Ordinance when in conflict with the terms, conditions, and requirements thereof. As reflected and shown on the Zoning Plan, the Property is zoned as a Planned Unit Development consisting of Planned Commercial with Conditional Use for Mixed-Use, as hereinafter defined, and allows all of the permitted uses set forth in **Exhibit F-3** attached hereto and incorporated herein by reference. Upon approval of this Amendment by the City, the Master Land Use and Conditional Use Plan incorporated into this Amendment shall supersede guidance found in the future land use plan component of the Comprehensive Plan of the City as the desired future development pattern for the Property.

C. Planning Criteria.

1. Legal Description. The legal description of the Property is attached hereto as **Exhibit A.**

2. General Description of Surrounding Area and Current Zoning. The Property consists of approximately 91 acres, more or less, of improved and unimproved land situated in the City, Shelby County, Alabama and is currently governed by the PUD Plan and zoned Planned Commercial (PC) and Planned Industrial (PI). The Property lies east of Riverchase Parkway and north of Valleydale Road.

(a) Vicinity Map. The Vicinity Map attached hereto as **Exhibit C** and incorporated herein by reference reflects the general location of the Property in relation to the city limits of the City.

(b) Access. The Property is located directly adjacent to and is provided three access points via Riverchase Parkway and Parkway Office Circle. Improvements to those access points are defined by the Traffic Impact Study and are contemplated in this Amendment.

3. Planning Objectives. The utilization of PUD zoning for the Property will allow (i) the Property to be developed for a variety of mixed uses without application of more conventional zoning ordinances which require a separation and buffer between different land uses and types of development; (ii) the control of a diverse development for the Property; (iii) the establishment of a variety of residential uses within the Property, together with convenient commercial uses and large scale commercial and medical uses; (iv) the creation and preservation of natural areas, including development guidelines and restrictions and landscaping features such as parks, nature trails, lakes, fountains, and walkways which would not be as readily accomplished under conventional zoning classifications; (v) for the development of a complete and balanced neighborhood which will include a variety of compatible uses in accordance with the terms and provisions of this Amendment; (vi) subject to the minimum yard, lot width setback and floor area

requirements established by the Land Use Development Criteria (as hereinafter provided), the establishment of separate setbacks, minimum yard requirements, greenbelts, on-street and off-street parking requirements and Building size restrictions for each distinctive land use category and classification within the Property as well as different setbacks and yard requirements and different Building sizes within each distinctive land use category and classification; and (vii) cross parking and shared parking to satisfy the parking requirements established herein in order to reduce impervious surfaces within the Property; to be determined by a shared parking analysis performed by a professional traffic engineer and subject to the approval of the City Engineer.

4. Development Schedule.

(a) Proposed Commencement Date. Developer and Signature intend to commence development of the Property for its intended uses promptly following completion of all necessary engineering and related professional work with respect to the development of the Property, which engineering and related design work is anticipated to be completed on or before January 2024.

(b) Proposed Completion Date and Phasing of Development. It is anticipated that the development of the Property pursuant to the Zoning Plan and Master Land Use and Conditional Use Plan will be over several years following approval of this Amendment. The phased development for the Property will be market driven. Absorption and sales of the different products will dictate and directly influence the completion of development of the Property; accordingly, completion of the Property may be earlier or later than the above-mentioned anticipated completion date. Although the Property will be developed in phases, no phase-by-phase development schedule will apply to the development of the Property.

5. Quantitative Data.

(a) Density. In the event this Amendment is approved by the City and all Conditions Precedent, as hereinafter defined, are satisfied, the Property shall be subject to the following maximum development density (the “Maximum Development Density”)<sup>4</sup>:

Commercial Buildings <sup>5</sup>	584,000 ft2
Age-Restricted Multi-Family Units	375 units
Multi-Family Units	120 units
Single-Family Units <sup>6</sup>	102units

<sup>4</sup> As used in this Section C.5, capitalized terms used herein shall have the same meanings given to such terms in Exhibit F-1 hereto.

<sup>5</sup> Commercial Buildings includes Hotels; however, the square footage of any Hotels shall not be counted toward the Maximum Development Density for Commercial Buildings but rather the maximum number of units within any Hotels within the Property shall not exceed 135 units.

<sup>6</sup> The permitted maximum development density for Single-Family Units may be increased by deducting units from the Multi-Family Units; thereby reducing the maximum development density for Multi-Family Units.

(b) Parking. Shared parking is desired as a part of the overall redevelopment of the Property. If shared parking is desired for a phase or sector of the overall redevelopment, a shared parking analysis shall be performed and submitted to the City with the project or phases' respective site plan or subdivision plat. Cross-parking Agreements, based upon the results of a parking analysis, submitted for approval to the City Engineer, which approval shall not be unreasonably withheld, shall satisfy, in whole, or in part, required parking as set forth in **Exhibit F-2** attached hereto.

(c) Age-Restricted Density. Further, the City acknowledges and agrees that units of residential development utilized solely for Age-Restricted Single-Family Units or Age-Restricted Multi-Family Units which may be constructed within the property shall not constitute a Single-Family Unit.

(d) Land Uses. As reflected in the Master Land Use and Conditional Use Plan depicted in **Exhibit E** hereto, there may be different land uses (individually, a "Land Use" or "Land Use Area" and collectively, the "Land Uses" or "Land Use Areas") within the Property. All of the Land Uses set forth in the Land Use Regulations of **Exhibits F-3** hereto as permitted uses within the Planned Commercial with Conditional Use for Mixed-Use Land Area are permitted principal uses within the Property. In addition, the Property may also provide as permitted principal uses Open Space (as hereinafter defined), common areas, and amenities which will become the central gathering point for all of the Property.

(e) Conditional Use Application. This Amendment also constitutes a conditional use request pursuant to §2.04 of the Zoning Ordinance to allow Planned Commercial with Conditional Use for Mixed-Use for all of the Property. This Amendment shall also be deemed an approval by the City of, the land uses set forth in the land use table provided in **Exhibit F-3** designated with a "P" for permitted use which shall supersede all contrary use permissions set forth in Article 8 of the Zoning Ordinance.

(f) Conditional Uses. The Property, as depicted in the Master Land Use and Conditional Use Plan attached hereto as **Exhibit E**, is planned to be developed as Planned Commercial with Conditional Use for Mixed-Use ("Planned Commercial with Conditional Use for Mixed-Use") which will include a mixture of permitted principal uses, both vertically and horizontally, as set forth in **Exhibit F-3** attached hereto which uses will benefit all of the Property as well as neighboring adjacent developments. The Property may also include as a permitted principal use recreational and community gathering areas. Accordingly, the use, area, dimensional and other regulations set forth in Article 8 of the Zoning Ordinance shall not be applicable to the Property to the extent that such regulations conflict with the specific provisions of this Amendment; rather, the Land Use Development Criteria set forth in **Exhibits F-1** and **F-2**, both attached hereto and incorporated herein by reference, shall be substituted in lieu thereof and shall be the development criteria applicable to all of the Property.



(g) Major Change. As used herein, the term “Major Changes” shall mean any of the following: (i) any change of Land Use within the Property which would not comply with the Master Plan and Conditional Use Plan as shown in Exhibit E hereto and with the Land Use Regulations set forth in Exhibits F-1 through Exhibits F-3 hereto; (ii) any Land Use resulting in a change of traffic circulation which would not comply with the Circulation Plan as shown in Exhibit N hereto; (iii) any Land Use within the Property which are not permitted principal uses as described in Exhibits F-1 through F-3 hereto and: (iv) any uses set forth in Exhibit F-3 below which must be approved by the City as a conditional use.

(h) Minor Change. Except for Major Changes, as defined in Section C.5(g) above, any changes to the Master Land Use and Conditional Use Plan which are not Major Changes, will be reflected on subdivisions plats for those portions of the Property submitted to the City’s Planning and Zoning Commission (which includes review by City staff) and shall not require any other documentation, consents, or approvals from the City other than subdivision plat approval by the City’s Planning and Zoning Commission. Any overlapping land uses authorized on the Master Land Use and Conditional Use Plan may be developed for those land uses shown within any of the overlapping land uses and as such shall be considered a Minor Change.

(i) Open Space. Approximately 31.6 acres, more or less, (20% of 91 acres comprising the Property), will be maintained as permanent “Open Space”<sup>7</sup> as illustrated on the Conceptual Tree Conservation Plan in Exhibit H attached hereto and incorporated herein by reference. The Open Space may consist of and be used for lakes, floodway areas, Greenways, parks, nature areas, natural or landscaped areas located outside the paved areas of any right-of-way, and similarly situated areas and uses. Notwithstanding anything to the contrary provided in the Zoning Ordinance, the Open Space may be utilized as a permitted principal use for any of the following: (i) the construction, operation, maintenance and repair of any recreational trails, paths, walkways and other recreational facilities, including, but not limited to, ball fields, (ii) the construction, installation, operation, maintenance and repair of underground utilities (including, without limitation, storm drainage) and related appurtenances therein, (iii) the construction, installation, operation, maintenance and repair of roads and road and utility crossings, and (iv) any similar purposes or uses. Open Space shall be provided within the overall Property and shall not be required on a phase-by-phase, sector-by-sector, or parcel-by-parcel basis so long as upon final build-out of the Property the required minimum Open Space requirements set forth herein are satisfied.

6. Utility Availability. The following utilities are available to serve the Property (through existing service lines situated on or in close proximity to the boundaries of the Property) or shall be available to serve the Property in the future:

<u>Type of Utility</u>	<u>Provider</u>
Electricity	Alabama Power
Telephone/Cable	AT&T and/or others
Water	Birmingham Water Works

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<sup>7</sup> As used in this Amendment, the term “Open Space” shall have the same meaning given to such term in § 8.08.02 E of the Zoning Ordinance and the remaining terms and provisions of this Section C.5(h).

7. Planned Street and Subdivision Designs. The following provisions shall be applicable to all of the Property:

(a) When in conflict with the City's current design standards, specifications and requirements for roads, streets, drives and alleys as set forth in the Subdivision and Development Regulations of the City of Hoover (the "Subdivision Regulations"), the design and construction criteria, specifications and requirements set forth herein and in the Typical Lot Dimensions for Residential Land Use (the "Typical Lot Dimensions for Residential Land Use") as **Exhibit G-1** and the Roadway Diagrams (the "Roadway Diagrams") as **Exhibit G-2**, both attached hereto and incorporated herein by reference, shall be applicable to and at all times control the development of the Property. All sidewalks constructed within the rights-of-way of any public roadways within the Property will be considered for perpetual maintenance by the City pending satisfactory inspection, approval by the City Engineer, and adoption of a resolution for acceptance of the same by the Hoover City Council. All sidewalks constructed within the rights-of-way, which also have adjacent trees planted within the rights-of-way, of any public roadways within the Property shall be maintained by the Developer and/or Owner's association established for the respective portions of the Property. Subject to the provisions of Section C.7(c) below, the City will consider accepting as public roadways to be maintained by the City all roadways constructed within the Property which have been constructed pursuant to the Typical Lot Dimensions for Residential Land Use and this Section C, pending satisfactory inspection, approval by the City Engineer and adoption of a resolution for acceptance of the same by the Hoover City Council.

(b) The Master Land Use and Conditional Use Plan contemplates that some Residential Units will front parks, greenways, or Open Spaces and not roads, streets, or drives. Vehicular access and utilities, which may be subject to or located in an easement, to such Residential Units will be provided only via a lane at the rear of such Residential Units, as shown in **Exhibit G-1** hereto. Accordingly, notwithstanding anything provided to the contrary in the Zoning Ordinance or the Subdivision Regulations, subdivisions of any Lots containing such Residential Units which front parks, greenways, or Open Spaces (and not roads, streets or drives) and the subdivision plats for the same shall be authorized, allowed, and approved by the City although such Residential Units are only accessed via a rear lane. In the event access is to be provided by only a lane, such lane shall be located within a dedicated right-of-way, the dimensions of which are shown in **Exhibit G-2** hereto, and named on the final subdivision plat containing such lane. All lanes shall meet access standards established by the Hoover Fire Department. Residential Units which do not front public streets but only front parks, greenways, or Open Space will have access to handicap accessible sidewalks within the parks, greenways, or Open Space, to the extent the same exist.

(c) Prior to any roadway being opened for use by the general public, traffic control and street signage for such roadway shall be in place. All roads within the Property will be designed and constructed in accordance with the above road standards and the Subdivision Regulation standards. In addition, the Hoover Planning Commission will consider for approval innovative roadway and alley designs provided such designs do not materially and adversely affect

public safety. The City Council will consider acceptance all roadways within the Property so long as such roadways were built in accordance with the road design standards set forth in this Amendment and City Subdivision Regulation standards and at the time of such dedication are in good repair and condition in the opinion of the City Engineer. Following the dedication of any roadways within the Property as public roadways and the formal acceptance by resolution of the City Council, the City shall maintain and repair such roadways and sidewalks.

(d) Bicycle, jogging and similar paths, lanes and crossings may be constructed within the rights-of-way of any public or private roadways within the Property, subject to the reasonable approval of the location of the same by the City Engineer. Such routes, not located within a right-of-way which has been accepted by the City Council, will be maintained by the Developer and/or owners' association.

(e) School bus pick-up buildings and open areas may be located within the rights-of-way of any public or private roadways within the Property, subject to the reasonable approval of the location of the same by the City Engineer.

(f) Sidewalks and pedestrian ways, if any, street, and accent lights (including streetlights), irrigation systems, landscaped areas, and project identification signage may be located within the rights-of-way (including medians) of any public roadways within the Property so long as the City Engineer has approved the location of the same. Any accent lights (including streetlights), irrigation systems, landscaped areas, signage, decorative walls, sidewalks, street trees, or other such appurtenances located within public rights-of-way, which are not accepted by the City Council, shall be maintained by the owners' associations established for the applicable portion of the Property served or benefited by the same.

(g) Subject to the reasonable review and approval by the City Engineer, the shoulder of any roadways within the Property may remain at natural grade; all designs shall comply with the latest edition of the "*Roadway Design Guide*" as published by AASHTO so long as the same does not create unsafe conditions. Concrete valleys may be used in lieu of curbing and gutters, if any, subject to approval of the same by the City Engineer.

(h) Permanent street signage, directional signage for Property amenities, facilities, schools, and other governmental facilities or providing directions to any of the foregoing and project identification signage shall be allowed within all public or private road rights-of-way (including medians), subject to the approval of the City Engineer. Developer and Signature may elect to utilize non-standard traffic signage within any portions of the Property, so long as (i) such non-standard signage complies with the minimum requirements of the latest edition of the Manual on Uniform Traffic Control Devices or other regulations of the State of Alabama governing signage, (ii) such non-standard traffic signage is approved by the City Engineer, which approval will not be unreasonably withheld or delayed and (iii) Signature and Developer (or any owners' associations created for any of the Property) shall assume all repair and replacement obligations for all "non-standard" or decorative signs, street signage and traffic control signals located within publicly dedicated roadways within the Property. An architectural review process for the Property will be created to adopt design standards for streetlights, street signs, traffic control signs, informational and directional signs, real estate signs, temporary and permanent business location

signs, project signs for the applicable portions of the Property for which such applicable ARC has jurisdiction and specific developments therein and other such streetscape structures to be located within and along public roadways and pedestrian ways and any of the private roads and pedestrian ways within the Property.

(i) City's MS4 Permit. As a portion of the Property have existing improvements and buildings and future new development is planned, compliance with the City's MS4 Permit shall be as follows:

(i) Existing portions of the Property, as currently developed and discharge stormwater into the existing storm water system and pond are deemed, without modification, in compliance with the City's MS4 Permit stormwater requirements.

(ii) Any portions of the Property being newly or re-developed which discharges stormwater into the existing stormwater system and pond, then such new developments may utilize any unused capacity of the existing pond. A drainage plan with hydrology will be provided for all newly developed or re-developed portions of the property to confirm any unused and available stormwater capacity in the existing pond. In the event the existing stormwater pond does provide sufficient capacity for and is utilized by a new development, such development shall be deemed in compliance with the City's MS4 Permit requirements. In the event the existing stormwater pond does not provide sufficient capacity to meet and comply with the City's current MS4 Permit requirements for newly developed or re-developed portions of the property that will connect to the existing stormwater pond, then the Developer shall install additional stormwater facilities, and the pond shall be modified, to comply with the City's current MS4 Permit requirements.

(iii) Any new development within the Property, resulting in stormwater discharge not into the existing stormwater management pond, shall be designed and constructed to meet the City's MS4 Permit stormwater requirements in place at the time of the approval of such development.

(j) Subject to terrain, larger Lot sizes or other natural features (including slopes, flood plain and floodway areas) as well as limitations created by existing pipeline easement and electrical rights-of-way, the Property will be developed in a manner that will interconnect streets and roadways within the Property, respectively; provided, however, that interconnectivity may be initially limited. The foregoing is not intended to prohibit cul-de-sacs within the Property; but rather, to the extent reasonably physically and fiscally feasible, interconnectivity of streets and roads will be established.

(k) The Property shall be developed in accordance with the Land Use Development Criteria set forth in this Amendment (the "Land Use Development Criteria") as **Exhibits F-1** and **F-2** attached hereto and incorporated herein by reference and shall not be subject to any contrary provisions in the PUD Plan, the Zoning Ordinance, or the Subdivision

Regulations. The Land Use Development Criteria set forth in **Exhibits F-1** and **F-2** herein shall supersede and replace any and all other contrary provisions in the PUD Plan or the provisions, ordinances (including the Zoning Ordinance and the Subdivision Regulations) of the City which may be applicable to the Property. All other covenants, conditions, and restrictions (including the Zoning Ordinance), and regulations (including the Subdivision Regulations) which are not in conflict with the Land Use Development Criteria or the terms of this Amendment shall remain applicable to the Property.

8. **Sidewalks and Pedestrian Ways.**

(a) A Circulation Plan is attached hereto as **Exhibit N** and incorporated herein by reference. Alteration to the existing vehicular circulation routes as shown on the Circulation Plan shall be considered a “Major Change” as defined in **Section C.5(g)** herein. Alteration to the pedestrian circulation routes as shown on the Circulation Plan shall be considered a Minor Change as defined in **Section C.5(g)** herein.

(b) All sidewalks constructed within public or private rights-of-way shall meet or exceed the City’s Subdivision Regulations unless otherwise approved by the City Engineer.

(c) Developer shall install sidewalks along the frontage roads, Riverchase Parkway East, and Office Park Circle.

(d) Developer shall designate the location and number of connections between the on-site pedestrian network and new sidewalk along Riverchase Parkway East and Office Park Circle and any other known connection points along the periphery of the Property.

9. **Traffic Impact Study.** Skipper Consultants, Inc., has prepared a Traffic Impact Study dated October 27, 2023 (the “**Traffic Impact Study**”), which is attached hereto as **Exhibit I** and incorporated herein by reference, for the Property. Internal infrastructure improvements to the Property including traffic calming, turn lanes, etc. shall be evaluated and constructed by the Developer as each phase is being developed. Neither Developer, Signature, nor any of their respective successors or assigns shall be required to make any public improvements outside the Property unless expressly set forth in the Traffic Impact Study or unless mutually agreed to by the City and Developer.

10. **Restrictive Covenants.** That portion of the Property which has been previously developed as two (2) office buildings with a shared parking deck (the “**Existing Regions Development**”) will continue to be subject to the Declaration of Protective Covenants, Agreements, Easements, Charges, and Liens for Riverchase (Business) (the “**Business Covenants**”), subject to the requirements set forth below as one of the Conditions Precedent that certain amendments to the Business Covenants be made. With respect to the remainder of the Property (the “**Remainder of the Property**”), the same will be subject to a declaration of covenants, conditions, and requirements (the “**Declaration**”). The Declaration, among other matters, will (i) allow for the establishment of architectural standards for all Buildings and other improvements to be constructed within the Property; (ii) provide for the review and approval of all construction

and architectural plans and specifications for all improvements to be constructed within the Property by an architectural review committee (the “ARC”); (iii) establish a nonprofit owners’ association which will own and maintain the common areas described in the Declaration; and (iv) provide for the assessment of each Lot owner for its prorata share of the costs of operating, maintaining, repairing, managing, and owning the common areas described in the Declaration. In addition to the Declaration, each land use within the Property may also have additional restrictive covenants which shall be applicable only to that particular land use area or any portion thereof. *At no time shall the City have the obligation or duty to enforce any provisions of the Declaration.*

11. Interim Uses. The Property may be used for any of the following interim uses: (i) Temporary parking areas for construction, agents, employees, customers, visitors, gatherings, product offerings, public safety, utilities, and special events; (ii) Information and/or sales centers, including model homes and modular building; (iii) Special events such as musical concerts, picnics and other similar or related uses in accordance with the currently adopted ordinances of the City; (iv) Borrow and fill areas for the purpose of grading on any portion of the Property; (v) Planting and landscaping areas for stocking, growing, and maintaining plants; (vi) Storage of landscaping equipment, machinery, garages, tools and buildings; (vii) Storage of construction materials, construction trailers and construction equipment to the extent provided for in Municipal Code of the City of Hoover; (viii) Other temporary recreational and conservation uses; (ix) Public and private vehicular parking areas; and (x) Temporary signage advertising the Property or any portion thereof for sale and the location of businesses or activities being conducted on the Property. Signature and Developer acknowledge that, at the City’s request, any such temporary signs are subject to removal if deemed inappropriate by the City.

12. Tree Conservation.

(a) The Conceptual Tree Conservation Plan (the “Tree Conservation Plan”) attached hereto as **Exhibit H** and incorporated herein by reference shall be applicable to all the Property and shall be considered to meet all requirements of Article 13 of the Zoning Ordinance in accordance with Section 13.02.09 D thereof. Actual tree placement is subject to change with the final locations of buildings on the Property. A Tree Conservation Plan will be required as a part of the site civil construction plans or preliminary plat for each development within each Land Use area of the Property.

(b) Notwithstanding the provisions of the Tree Conservation Plan, the following provisions of Article 13 of the Zoning Ordinance shall not be applicable to the Property:

(i) Common Area Lots and Amenity Lots for active or passive use within residential areas shall be granted by right and shall not require additional submission for conditional use, special use, special exception, or variance;

(ii) Section 13.02.9 E: Required trees per individual lot may be accommodated within the common areas or within the right-of-way, as approved;

(iii) Section 13.03: Walls, fences and impervious buffers create unnecessary division between compatible but varied land uses. The ARC shall regulate the required landscape requirements between lots and land uses;

(iv) Section 13.04.02 A.1: Up to 5% of required trees and landscape areas may be provided in Common Areas;

(v) Section 13.04.02 B.1: The developer intends to plant some or all of the required landscaping and trees within the adjacent public street right-of-way;

(vi) Section 13.04.02 B.2: The ARC shall require planting beds that reduce visibility of parking areas from the right-of-way but not necessarily require shrubs to be 30" height at installation or planted in double staggered row;

(vii) Section 13.05: Design/Build irrigation contractor may install systems with tap of one inch or less without submitting an irrigation plan for approval;

(viii) Section 13.06: The Tree Conservation Plan submitted herein shall be approved without submission of financial guarantee, however, a financial guarantee may be required for building permits;

(xi) Tree Selection and Cover Guide: The ARC may allow and approve trees that may not be listed in the Zoning Ordinance provided such are not deemed invasive or hazardous by the Alabama Invasive Plant Council.

E. Permitted Uses, Conditional Uses, and Amendments.

1. Permitted Principal Uses. All of the uses designated as permitted principal uses for the Property set forth in **Exhibit F-3**, as well as public and private parks, private amenity buildings, pools, lakes, ponds, Open Space, common areas, and nature trails, and recreational areas shall be deemed to be principal permitted uses within the Property.

2. Conditional Uses. **Exhibit F-3** sets forth those conditional uses which must be approved as a conditional use by the City.

3. Amendments.

(a) Developer and Signature and their respective successors and assigns shall have the right, each in their sole and absolute discretion (with the approval of the City), to modify and amend those portions of this Amendment which are applicable only to that portion of the Property owned by each of them, in each case without the consent or approval of the other party; provided, however, that neither Developer or Signature shall have the right to amend this Amendment in any manner which would affect any portions of the Property owned by the other party (*i.e.*, Developer will have the right to amend any portion of this Amendment or any exhibits

or schedules attached hereto with respect to any portion of the Property owned by Developer; provided, however, that any such amendment shall not be binding on any portion of the Property then owned by Signature or likewise, Signature will have the right to amend any portion of this Amendment or any exhibits or schedules attached hereto with respect to any portion of the Property owned by Signature; provided, however, that any such amendment shall not be binding on any portion of the Property then owned by Developer). Notwithstanding the foregoing, to the extent any amendment to this Amendment requested by one party will affect the other party or any portion of the Property owned by the other party, then such amendment must be approved by all parties affected by such proposed amendment. *At no time shall the City have the obligation or duty to enforce any provisions of the Business Covenants, or the Declaration as defined in Section C.10 above.*

(b) To the extent either Developer or Signature fail to perform (or otherwise default in the performance of) any of their respective obligations under this Amendment, then, Developer shall have the liability and the responsibility for such deficiencies required under this Amendment.

4. Additional Property. Without the consent or approval of the other party (but subject to the approval by the City), each of Signature and Developer may add additional real property to the terms and provisions of this Amendment if such additional real property is situated directly contiguous with the Property.

F. Miscellaneous Provisions.

1. Municipal Services. The City agrees that all municipal services, rights, and privileges afforded to residents of and properties within the corporate limits of the City, including, without limitation, fire and police protection, emergency medical and garbage and trash pick-up and removal services for single-family residences only, shall be extended and provided to the Property on the same basis as provided to such other properties within the City.

2. Compliance with City Regulations. Except as provided below in this Section F.2, Developer, Signature, and their respective successors and assigns, shall comply with all ordinances, statutes, rules, regulations, and requirements of the City. Notwithstanding the foregoing:

(a) In the event of any conflict between the terms and provisions set forth in this Amendment and the terms and provisions set forth in the Zoning Ordinance and Subdivision Regulations, as the same may be amended from time to time, then the terms and provisions of this Amendment shall at all times control.

(b) Pursuant to § 8.09 of the Zoning Ordinance, no amendment or modification of the Zoning Ordinance that is in direct conflict with a regulation or standard prescribed by this Amendment shall be effective as to this Amendment or the Property unless Developer and/or Signature, and their respective successors and assigns, elect to amend this Amendment to incorporate such amendment or modification to the Zoning Ordinance.



(c) As to the Property only, the terms and provisions of this Amendment supersede and replace all of the terms and provision of the PUD Plan and none of the terms and provisions of the PUD Plan shall be binding on any of the Property,

3. Miscellaneous Provisions. Each exhibit which is referenced and attached to this Amendment is incorporated herein as if set out fully in the body hereof. The captions or headings used herein are included for convenience and general reference only and shall not be construed to describe, define, or limit the scope, intent, or construction of this Amendment. Except as otherwise specifically provided to the contrary in this Amendment, neither this Amendment nor any provision thereof may be waived, modified, or amended, except by written instrument signed by the party against whom the enforcement of such waiver, modification or amendment is sought and then only to the extent specifically set forth in such instrument. This Amendment shall be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns. This Amendment shall be governed by, and construed in accordance with, the laws of the State of Alabama. This Amendment constitutes the entire and complete agreement among the parties hereto and supersedes any and all oral or written agreements or understandings between the parties with respect to the subject matter hereof. It is expressly agreed that there are no verbal understandings or agreements which in any way change the terms, covenants and conditions set forth herein. If any term or provision of this Amendment or the application thereof to any person or circumstance shall, to any extent, be invalid or unenforceable, then the remainder of this Amendment or the application of such provision to persons or circumstances other than those as to which it is held invalid or unenforceable shall not be affected thereby and each provision shall be valid and enforceable to the fullest extent permitted.

4. Condition to Effectiveness of Amendment. To the extent this Amendment has been approved by the City, but the Condition Precedent, as herein defined, has not been satisfied by January 15, 2024, then this Amendment shall be deemed to have been withdrawn immediately before such City Council approval and shall not be binding on Owner, Signature, the City or the Property. As used herein, the term “Condition Precedent” means Developer or its affiliates shall have acquired the Property from Owner.

IN WITNESS WHEREOF, this RIVERWALK PLANNED UNIT DEVELOPMENT ZONING APPLICATION AND DEVELOPMENT PLAN AND AMENDMENT TO THE RIVERCHASE PLANNED UNIT DEVELOPMENT REGULATIONS has been executed as of the day and year first above written by the parties hereto.


**OWNER:**

**REGIONS BANK**, an Alabama banking corporation

See Owner's Authorization attached as **Exhibit J**


**DEVELOPER:**

**HEALTHCARE RESOURCES, LLC**,  
an Alabama liability company

By:   
Printed Name: Robert A. Simon  
Title: MANAGER

**SIGNATURE:**

**SB DEV. CORP.**, an Alabama corporation

By:   
Printed Name: Jonathan Belcher  
Title: President

**APPROVAL OF AMENDMENT**

The foregoing 2023 AMENDMENT TO THE RIVERCHASE PLANNED UNIT DEVELOPMENT REGULATIONS AND CONDITIONAL USE APPLICATION is hereby approved as of the \_\_\_ day of \_\_\_\_\_, 2023.

**THE PLANNING AND ZONING COMMISSION  
OF THE CITY OF HOOVER, ALABAMA**

By: \_\_\_\_\_  
Its Commision President

**CITY COUNCIL OF THE CITY OF HOOVER,  
ALABAMA**

By: \_\_\_\_\_  
Its Council President

By: \_\_\_\_\_  
Its Mayor

**EXHIBIT A**

LEGAL DESCRIPTION OF THE PROPERTY

Lots 1 and 2 according to the Subdivision of AmSouth Riverchase as recorded in the Office of the Judge of Probate for Shelby County, Alabama in Map Book 18, Page 83.

See attached.



AMSOUTH RIVERCHASE

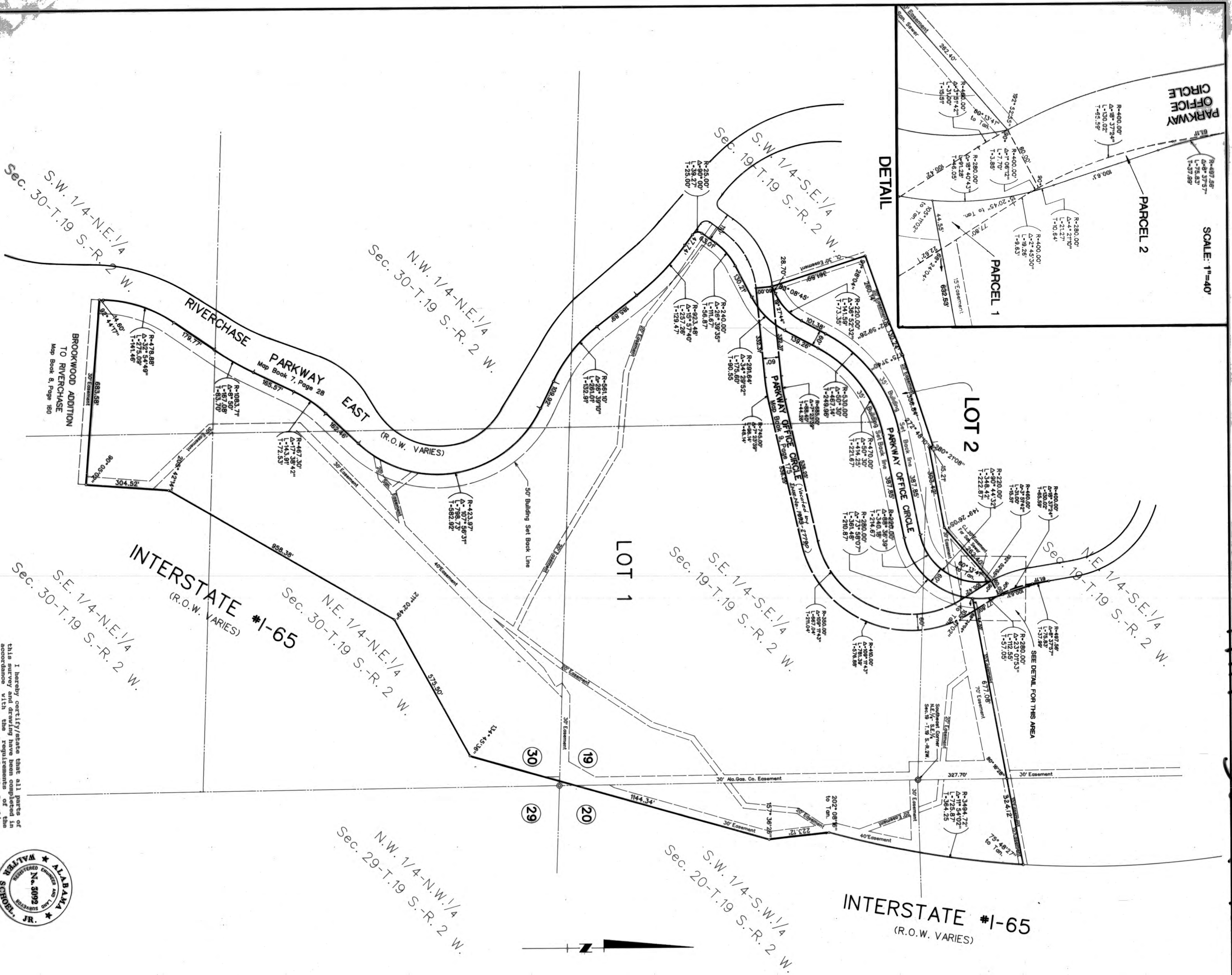
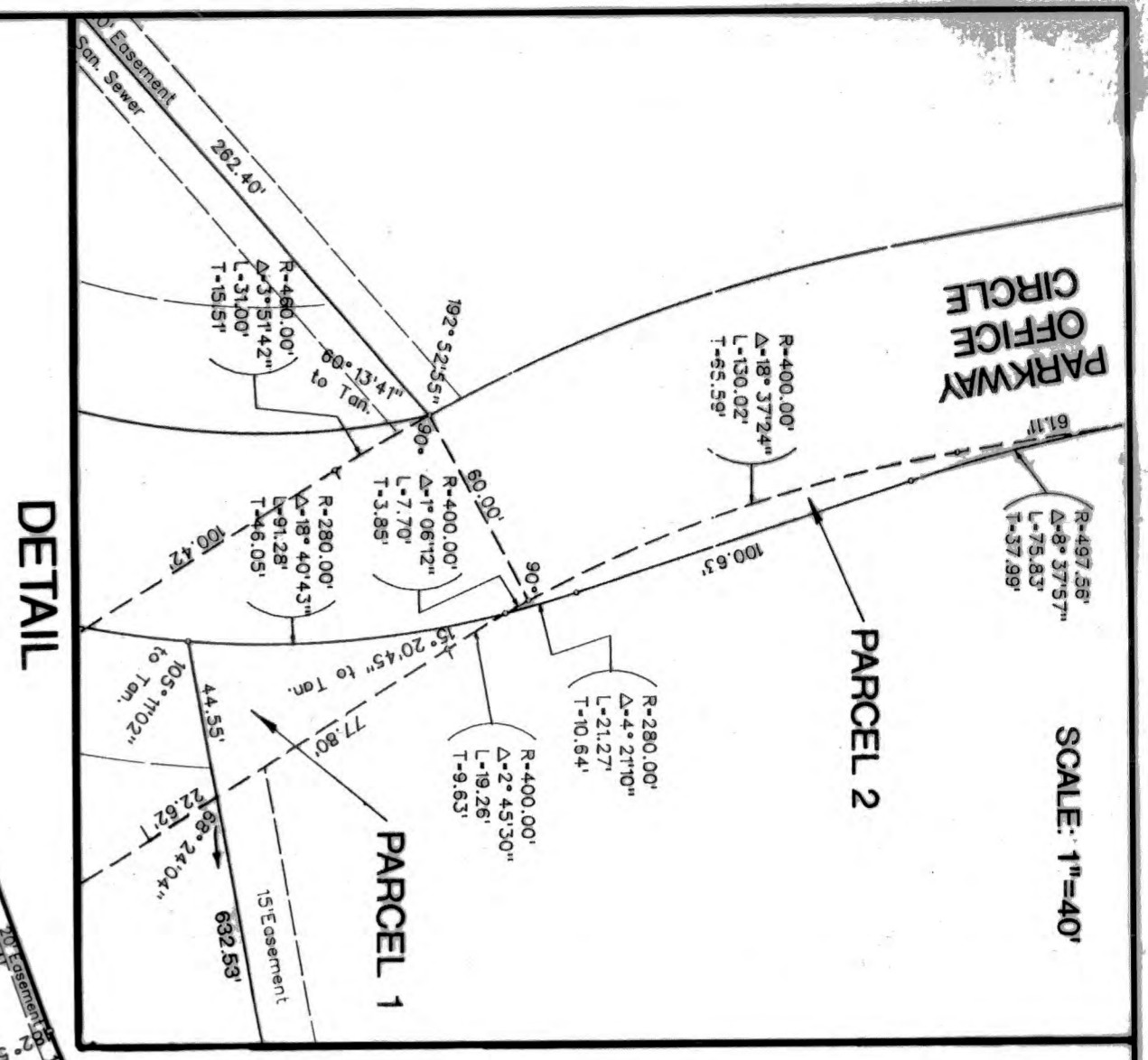
BEING A SUBDIVISION OF ACRES SITUATED IN THE S.E. 1/4 OF SECTION 19, THE W. 1/4 OF SECTION 20 AND THE N.E. 1/4 OF SECTION 30, TOWNSHIP 19 SOUTH, RANGE 2 WEST, SHELBY COUNTY, ALABAMA

SCALE : 1" = 200'

JULY 1993

WALTER SCHOEL ENGINEERING COMPANY, INC.

BIRMINGHAM, ALABAMA GRAPHIC SCALE



INTERSTATE #1-65 (R.O.W. VARIES)

S.W. 1/4-S.W. 1/4 S. R. 2 W. Sec. 20-T.19

N.W. 1/4-N.W. 1/4 S. R. 2 W. Sec. 29-T.19

N.E. 1/4-N.E. 1/4 S. R. 2 W. Sec. 30-T.19

INTERSTATE #1-65 (R.O.W. VARIES)

S.W. 1/4-NE 1/4 S. R. 2 W. Sec. 30-T.19

WALTER SCHOEL ENGINEERING COMPANY, INC. BIRMINGHAM, ALABAMA

ASSOCIATE BANK, N.A., OWNER. By: [Signature]

THE INDUSTRIAL DEVELOPMENT BOARD OF THE CITY OF HOOPER, ALABAMA. By: [Signature]

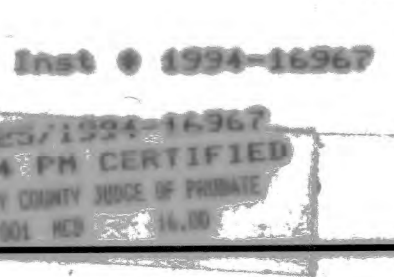
STATE OF ALABAMA. JERRY W. HARRIS, Notary Public in and for said county and state. Given under my hand and seal this 22nd day of July, 1993.

STATE OF ALABAMA. Notary Public in and for said county and state. Given under my hand and seal this 22nd day of July, 1993.

STATE OF ALABAMA. Notary Public in and for said county and state. Given under my hand and seal this 22nd day of July, 1993.

RESOLUTION: Be it resolved by the Mayor and the City Council of the City of Hoover, Alabama, that the assent of this body be, and the same hereby is given to the dedication of the streets, alleys and public conveniences shown on this plat or map being further identified by a special resolution of the City Council, signed by the City Clerk, of even date herewith, but this shall not be construed to imply any liability upon the City of Hoover for the upkeep of same.

APPROVED: [Signatures] Assistant City Clerk



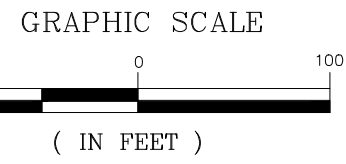
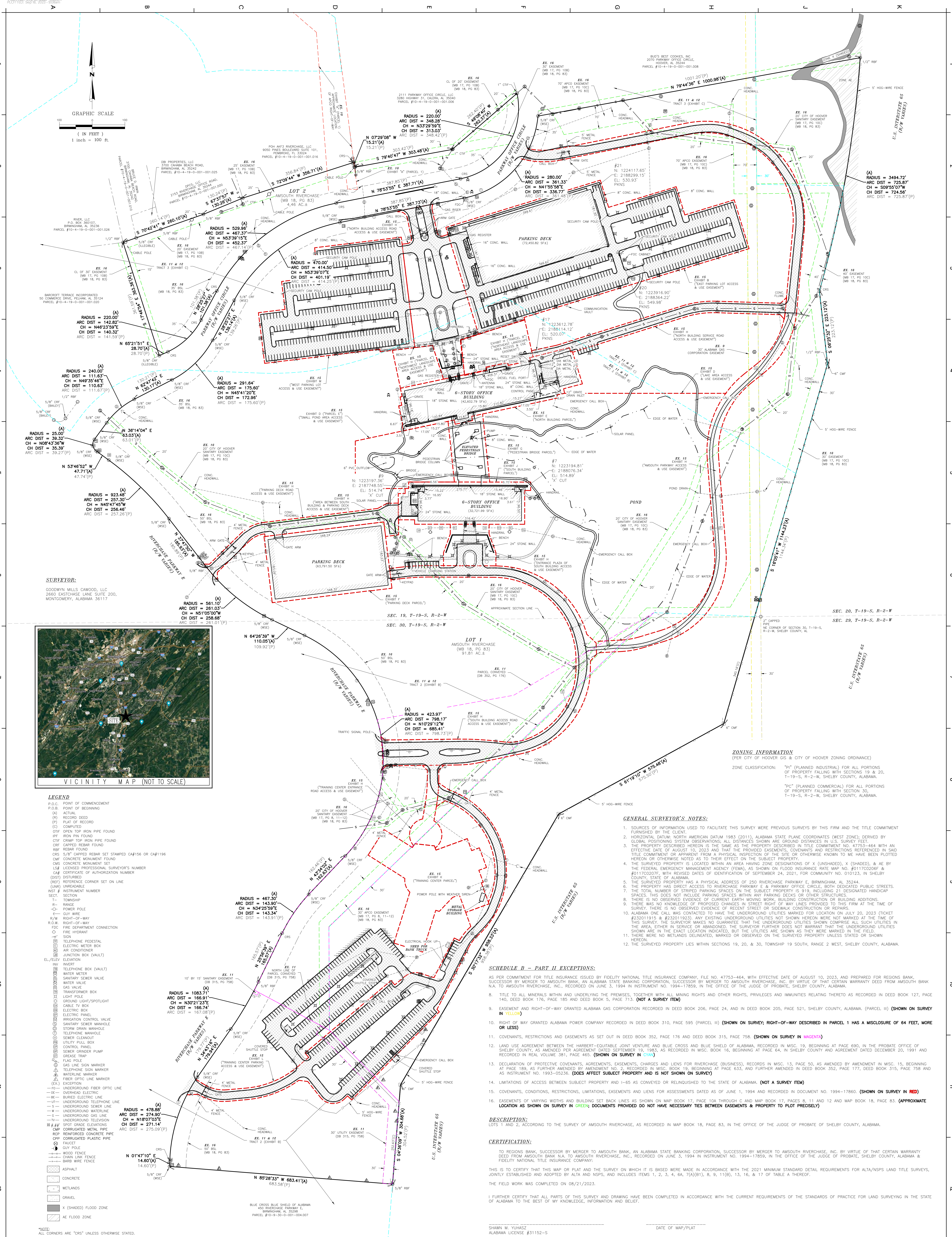


**EXHIBIT B**

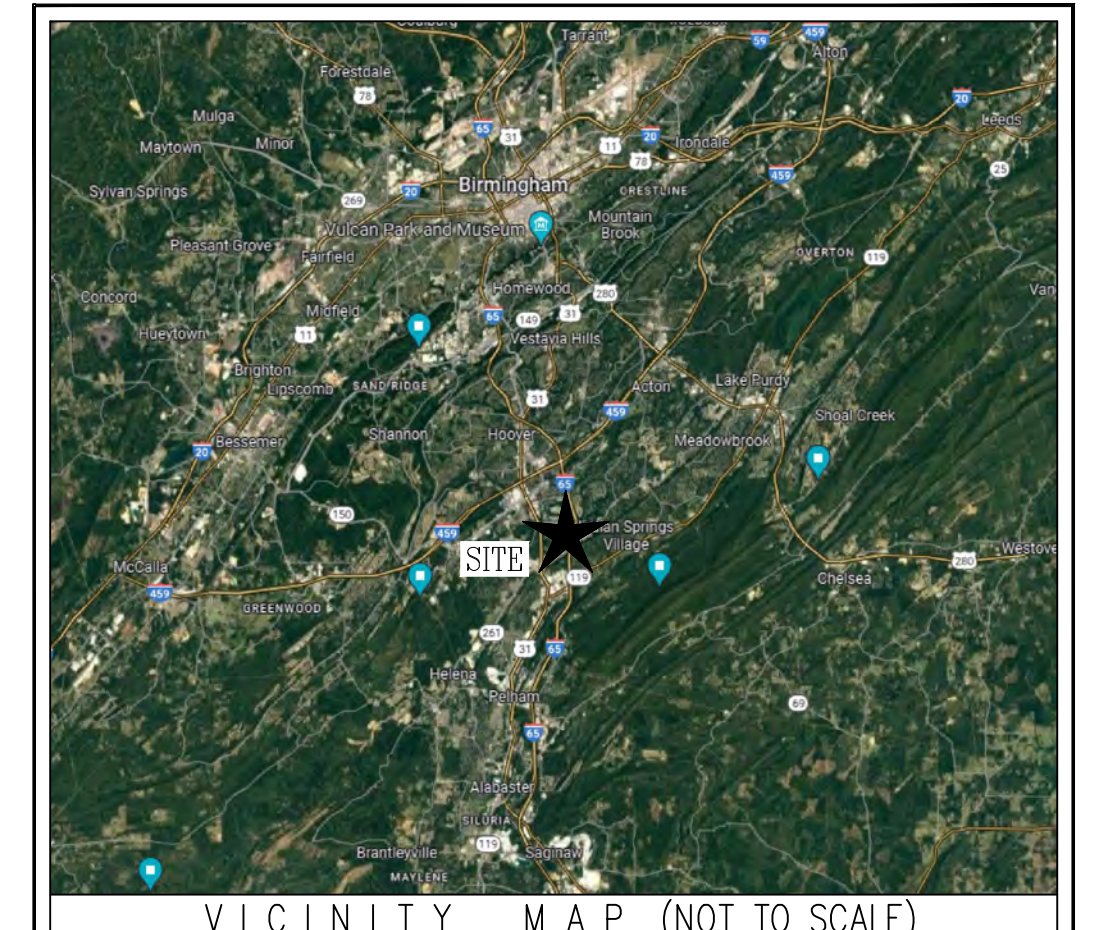
SURVEY OF PROPERTY

See attached.





**SURVEYOR:**  
 GOODWYN MILLS CAWOOD, LLC  
 2640 EASTCHASE LANE SUITE 200,  
 MONTGOMERY, ALABAMA 36117



- LEGEND**
- P.O.C. POINT OF COMMENCEMENT
  - P.O.B. POINT OF BEGINNING
  - (A) ACTUAL
  - (R) RECORD DEED
  - (C) COMPUTED
  - DTP OPEN TOP IRON PIPE FOUND
  - RFP IRON PIPE FOUND
  - CTF CRIMP TOP IRON PIPE FOUND
  - CRF CAPPED REBAR FOUND
  - RFB REBAR FOUND
  - CRS 5/8" CAPPED REBAR SET STAMPED CAF156 OR CAF1196
  - CMF CONCRETE MONUMENT FOUND
  - CMS CONCRETE MONUMENT SET
  - LSF LICENSED PROFESSIONAL SURVEYOR'S NUMBER
  - CAF CERTIFICATE OF AUTHORIZATION NUMBER
  - (DIST) DISTURBED
  - (IMP) IMPROVEMENT CORNER SET ON LINE
  - (UNR) UNRELIABLE
  - INST # INSTRUMENT NUMBER
  - SECT. # SECTION NUMBER
  - T- TOWNSHIP
  - R- RANGE
  - PO POWER POLE
  - GW GUY WIRE
  - R.O.W. RIGHT-OF-WAY
  - FDC FIRE DEPARTMENT CONNECTION
  - PIE HYDRANT
  - SIGN SIGN
  - TELEPHONE PEDestal
  - EMR ELECTRIC METER BOX
  - ACR AIR CONDITIONER
  - JUN JUNCTION BOX (VAULT)
  - EL/ELEV ELEVATION
  - INV INVERT
  - TELEPHONE BOX (VAULT)
  - WATER METER
  - WATER VALVE
  - WATER VALVE
  - TRANSFORMER BOX
  - GROUND LIGHT/SPOTLIGHT
  - CABLE TV BOX
  - ELECTRIC BOX
  - ELECTRIC PANEL
  - IRRIGATION CONTROL VALVE
  - SANITARY SEWER MANHOLE
  - STORM DRAIN MANHOLE
  - TELEPHONE MANHOLE
  - SEWER CLEANOUT
  - UTILITY PULL BOX
  - CONTROL PANEL
  - SEWER CLEANER PUMP
  - GREASE TRAP
  - FLAG POLE
  - GAS LINE SIGN MARKER
  - TELEPHONE SIGN MARKER
  - WATERLINE MARKER
  - FIBER OPTIC LINE MARKER
  - (EX) EXCEPTION
  - UNDERGROUND FIBER OPTIC LINE
  - OVERHEAD ELECTRIC
  - BURIED ELECTRIC LINE
  - UNDERGROUND TELEPHONE LINE
  - UNDERGROUND SEWER LINE
  - UNDERGROUND WATERLINE
  - UNDERGROUND GAS LINE
  - UNDERGROUND TELEVISION
  - SPOT SPACE ELEVATIONS
  - CMF CORRUGATED METAL PIPE
  - RCP REINFORCED CONCRETE PIPE
  - CRP CORRUGATED PLASTIC PIPE
  - OUT FOLE
  - WOOD FENCE
  - CHAIN LINK FENCE
  - BARB WIRE FENCE
  - ASPHALT
  - CONCRETE
  - GRAVEL
  - X (SHADED) FLOOD ZONE
  - AE FLOOD ZONE

**ZONING INFORMATION**  
 (PER CITY OF HOOVER GIS & CITY OF HOOVER ZONING ORDINANCE)

ZONE CLASSIFICATION: "PI" (PLANNED INDUSTRIAL) FOR ALL PORTIONS OF PROPERTY FALLING WITH SECTIONS 19 & 20, T-19-S, R-2-W, SHELBY COUNTY, ALABAMA.

"TC" (PLANNED COMMERCIAL) FOR ALL PORTIONS OF PROPERTY FALLING WITH SECTION 30, T-19-S, R-2-W, SHELBY COUNTY, ALABAMA.

- GENERAL SURVEYOR'S NOTES:**
- SOURCES OF INFORMATION USED TO FACILITATE THIS SURVEY WERE PREVIOUS SURVEYS BY THIS FIRM AND THE TITLE COMMITMENT FURNISHED BY THE CLIENT.
  - HORIZONTAL DATUM: NORTH AMERICAN DATUM 1983 (2011), ALABAMA STATE PLANE COORDINATES (WEST ZONE); DERIVED BY GLOBAL POSITIONING SYSTEM OBSERVATIONS; ALL DISTANCES SHOWN ARE GROUND DISTANCES IN U.S. SURVEY FEET.
  - THE PROPERTY DESCRIBED HEREON IS THE SAME AS THE PROPERTY DESCRIBED IN TITLE COMMITMENT NO. 47753-464 WITH AN EFFECTIVE DATE OF AUGUST 10, 2023 AND THAT THE PROVIDED EASEMENTS, COVENANTS AND RESTRICTIONS REFERENCED IN SAID TITLE COMMITMENT OR APPARENT FROM A PHYSICAL INSPECTION OF THE SITE OR OTHERWISE KNOWN TO ME HAVE BEEN PLOTTED HEREON OR OTHERWISE NOTED AS TO THEIR EFFECT ON THE SUBJECT PROPERTY.
  - THE SURVEYED PROPERTY IS LOCATED WITHIN AN AREA HAVING ZONE DESIGNATIONS OF X (UNSHADED), X (SHADED), & AE BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA), AS SHOWN ON FLOOD INSURANCE RATE MAP NO. #0117C0206F & #0117C0207F, WITH REVISED DATES OF IDENTIFICATION OF SEPTEMBER 24, 2021, FOR COMMUNITY NO. 010123, IN SHELBY COUNTY, STATE OF ALABAMA.
  - THE SURVEYED PROPERTY HAS A PHYSICAL ADDRESS OF 250 RIVERCHASE PARKWAY E, BIRMINGHAM, AL 35244.
  - THE PROPERTY HAS DIRECT ACCESS TO RIVERCHASE PARKWAY E & PARKWAY OFFICE CIRCLE, BOTH DEDICATED PUBLIC STREETS.
  - THE TOTAL NUMBER OF STRIPED PARKING SPACES ON THE SUBJECT PROPERTY IS 919, INCLUDING 21 DESIGNATED HANDICAP SPACES. THIS DOES NOT INCLUDE PARKING SPACES WITHIN ANY PARKING DECKS OR OTHER STRUCTURES.
  - THERE IS NO OBSERVED EVIDENCE OF CURRENT EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS.
  - THERE WAS NO KNOWLEDGE OF PROPOSED CHANGES IN STREET RIGHT OF WAY LINES PROVIDED TO THIS FIRM AT THE TIME OF SURVEY. THERE IS NO OBSERVED EVIDENCE OF RECENT STREET OR SIDEWALK CONSTRUCTION OR REPAIRS.
  - ALABAMA ONE CALL WAS CONTACTED TO HAVE THE UNDERGROUND UTILITIES MARKED FOR LOCATION ON JULY 20, 2023 (TICKET #23201915 & #23201923). ANY EXISTING UNDERGROUND UTILITIES NOT SHOWN HEREON WERE NOT MARKED AT THE TIME OF SURVEY. THERE IS NO OBSERVED EVIDENCE OF RECENT STREET OR SIDEWALK CONSTRUCTION OR REPAIRS.
  - ALABAMA ONE CALL WAS CONTACTED TO HAVE THE UNDERGROUND UTILITIES MARKED FOR LOCATION ON JULY 20, 2023 (TICKET #23201915 & #23201923). ANY EXISTING UNDERGROUND UTILITIES NOT SHOWN HEREON WERE NOT MARKED AT THE TIME OF SURVEY. THERE IS NO OBSERVED EVIDENCE OF RECENT STREET OR SIDEWALK CONSTRUCTION OR REPAIRS.
  - THERE WERE NO WETLANDS DELINEATED, MARKED OR OBSERVED ON THE SURVEYED PROPERTY UNLESS STATED OR SHOWN HEREON.
  - THE SURVEYED PROPERTY LIES WITHIN SECTIONS 19, 20, & 30, TOWNSHIP 19 SOUTH, RANGE 2 WEST, SHELBY COUNTY, ALABAMA.

- SCHEDULE B - PART II EXCEPTIONS:**
- AS PER COMMITMENT FOR TITLE INSURANCE ISSUED BY FIDELITY NATIONAL TITLE INSURANCE COMPANY, FILE NO. 47753-464, WITH EFFECTIVE DATE OF AUGUST 10, 2023, AND PREPARED FOR REGIONS BANK, SUCCESSOR BY MERGER TO AMSOUTH BANK, AN ALABAMA STATE BANKING CORPORATION, SUCCESSOR BY MERGER TO AMSOUTH RIVERCHASE, INC. BY VIRTUE OF THAT CERTAIN WARRANTY DEED FROM AMSOUTH BANK N.A. TO AMSOUTH RIVERCHASE, INC., RECORDED ON JUNE 3, 1994 IN INSTRUMENT NO. 1994-17859, IN THE OFFICE OF THE JUDGE OF PROBATE, SHELBY COUNTY, ALABAMA.
- RIGHT TO ALL MINERALS WITHIN AND UNDERLYING THE PREMISES, TOGETHER WITH ALL MINING RIGHTS AND OTHER RIGHTS, PRIVILEGES AND IMMUNITIES RELATING THERETO AS RECORDED IN DEED BOOK 127, PAGE 140, DEED BOOK 176, PAGE 185 AND DEED BOOK 1, PAGE 713. (NOT A SURVEY ITEM)
  - EASEMENT AND RIGHT-OF-WAY GRANTED ALABAMA GAS CORPORATION RECORDED IN DEED BOOK 206, PAGE 24, AND IN DEED BOOK 205, PAGE 521, SHELBY COUNTY, ALABAMA. (PARCEL III) (SHOWN ON SURVEY IN YELLOW)
  - RIGHT OF WAY GRANTED ALABAMA POWER COMPANY RECORDED IN DEED BOOK 310, PAGE 595 (PARCEL III) (SHOWN ON SURVEY; RIGHT-OF-WAY DESCRIBED IN PARCEL 1 HAS A MISCLASURE OF 64 FEET, MORE OR LESS)
  - COVENANTS, RESTRICTIONS AND EASEMENTS AS SET OUT IN DEED BOOK 352, PAGE 176 AND DEED BOOK 315, PAGE 758. (SHOWN ON SURVEY IN MAGENTA)
  - LAND USE AGREEMENT BETWEEN THE HARBERT-EQUITABLE JOINT VENTURE AND BLUE CROSS AND BLUE SHIELD OF ALABAMA, RECORDED IN MISC. 19, BEGINNING AT PAGE 690, IN THE PROBATE OFFICE OF SHELBY COUNTY, AS AMENDED BY AGREEMENT DATED SEPTEMBER 19, 1983, AS RECORDED IN MISC. BOOK 16, BEGINNING AT PAGE 64, IN SHELBY COUNTY AND AGREEMENT DATED DECEMBER 20, 1991 AND RECORDED IN REAL VOLUME 381, PAGE 185 AND DEED BOOK 1, PAGE 713. (NOT A SURVEY ITEM)
  - DECLARATION OF PROTECTIVE COVENANTS, AGREEMENTS, EASEMENTS, CHARGES AND LIENS FOR RIVERCHASE (BUSINESS), RECORDS IN MISC. 13, PAGE 50, AS AMENDED BY AMENDMENT IN MISC. 15, BEGINNING AT PAGE 189, AS FURTHER AMENDED BY AMENDMENT NO. 2, RECORDED IN MISC. BOOK 19, BEGINNING AT PAGE 633, AND FURTHER AMENDED IN DEED BOOK 352, PAGE 177, DEED BOOK 315, PAGE 758 AND AS INSTRUMENT NO. 1993-05236. (DOES AFFECT SUBJECT PROPERTY AND IS NOT SHOWN ON SURVEY)
  - LIMITATIONS OF ACCESS BETWEEN SUBJECT PROPERTY AND I-65 AS CONVEYED OR RELINQUISHED TO THE STATE OF ALABAMA. (NOT A SURVEY ITEM)
  - COVENANTS, CONDITIONS, RESTRICTIONS, LIMITATIONS, EASEMENTS AND LIENS FOR ASSESSMENTS DATED AS OF JUNE 1, 1994 AND RECORDED IN DOCUMENT NO. 1994-17860. (SHOWN ON SURVEY IN RED)
  - EASEMENTS OF VARYING WIDTHS AND BUILDING SET BACK LINES AS SHOWN ON MAP BOOK 17, PAGE 10A THROUGH C AND MAP BOOK 17, PAGES 8, 11 AND 12 AND MAP BOOK 18, PAGE 83. (APPROXIMATE LOCATION AS SHOWN ON SURVEY IN GREEN; DOCUMENTS PROVIDED DO NOT HAVE NECESSARY TIES BETWEEN EASEMENTS & PROPERTY TO PLOT PRECISELY)

**DESCRIPTION:**  
 LOTS 1 AND 2, ACCORDING TO THE SURVEY OF AMSOUTH RIVERCHASE, AS RECORDED IN MAP BOOK 18, PAGE 83, IN THE OFFICE OF THE JUDGE OF PROBATE OF SHELBY COUNTY, ALABAMA.

**CERTIFICATION:**  
 TO REGIONS BANK, SUCCESSOR BY MERGER TO AMSOUTH BANK, AN ALABAMA STATE BANKING CORPORATION, SUCCESSOR BY MERGER TO AMSOUTH RIVERCHASE, INC. BY VIRTUE OF THAT CERTAIN WARRANTY DEED FROM AMSOUTH BANK N.A. TO AMSOUTH RIVERCHASE, INC., RECORDED ON JUNE 3, 1994 IN INSTRUMENT NO. 1994-17859, IN THE OFFICE OF THE JUDGE OF PROBATE, SHELBY COUNTY, ALABAMA & FIDELITY NATIONAL TITLE INSURANCE COMPANY.

THIS IS TO CERTIFY THAT THIS MAP OR PLAN AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2021 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 1, 2, 3, 4, 6A, 7(A)(B1), 8, 9, 11(B), 13, 16, & 17 OF TABLE A THERETO.

THE FIELD WORK WAS COMPLETED ON 08/21/2023.

I FURTHER CERTIFY THAT ALL PARTS OF THIS SURVEY AND DRAWING HAVE BEEN COMPLETED IN ACCORDANCE WITH THE CURRENT REQUIREMENTS OF THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN THE STATE OF ALABAMA TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

SHAWN M. YUHASZ  
 ALABAMA LICENSE #31512-S  
 DATE OF MAP/PLAN

<b>ALTA/NSPS LAND TITLE SURVEY</b>  <b>RIVERWALK PROJECT</b> HOOVER, ALABAMA  <b>SEC. 19, 20, &amp; 30, T-19-S, R-2-W</b> <b>SHELBY COUNTY, ALABAMA</b> <b>GMC Project #CBHM230046</b>	<b>ISSUE DATE</b> FIELD WORK: 08/21/2023 SURVEY DRAWING: 09/18/2023	2400 5th Avenue S., Ste. 200 Birmingham, AL 35233 T 205.879.4462 GMCNETWORK.COM	
	DRAWN BY: AES CHECKED BY: SMY		

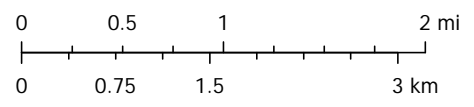
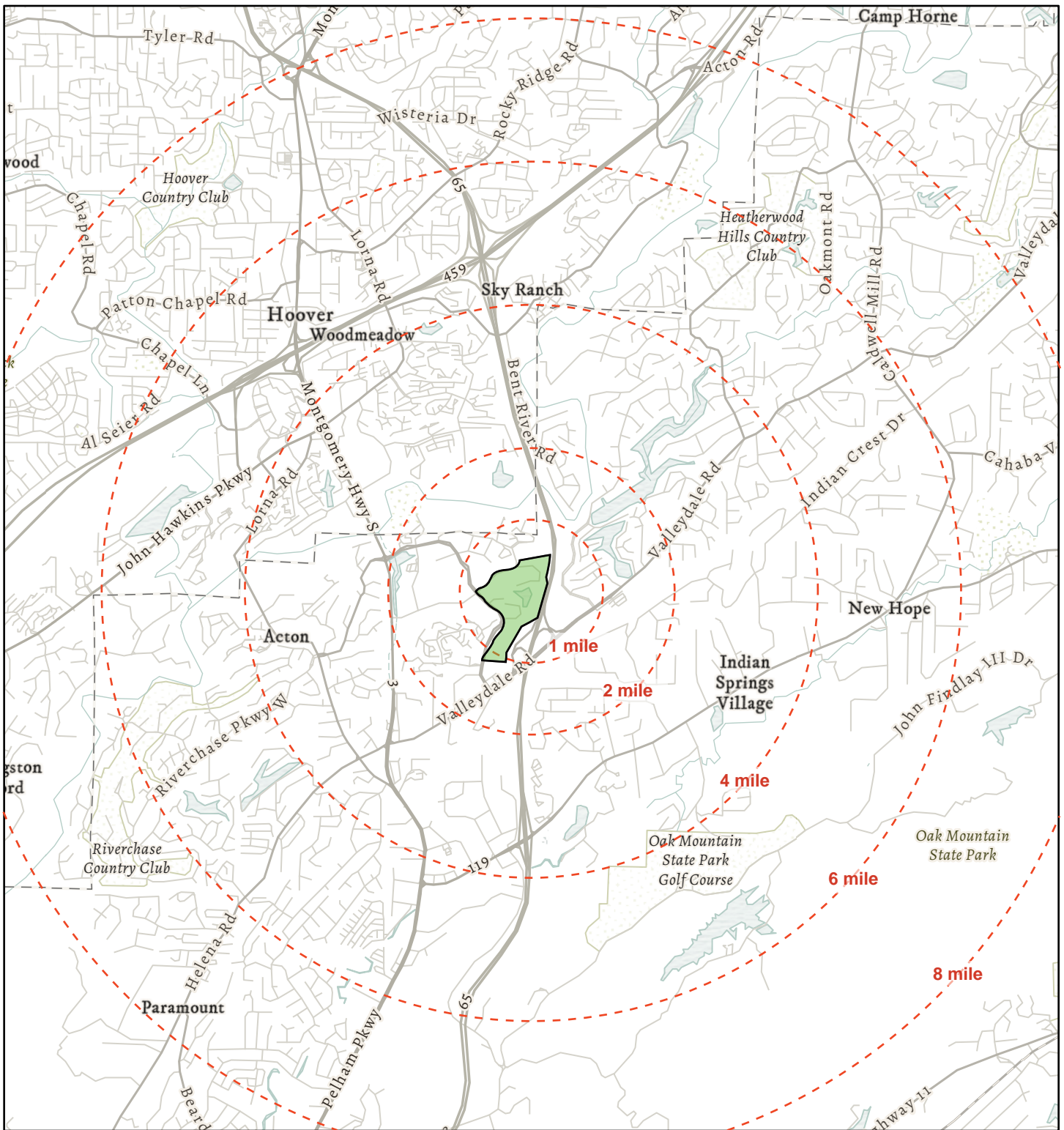
sheet 1 of 1



**EXHIBIT C**

VICINITY MAP

See attached.



\*This plan is conceptual and schematic in nature. Actual amenities, buildings, land uses, and roadways, may vary and are subject to change, at any time, by the applicants.

## RIVERCHASE - VICINITY MAP

08.07.2023

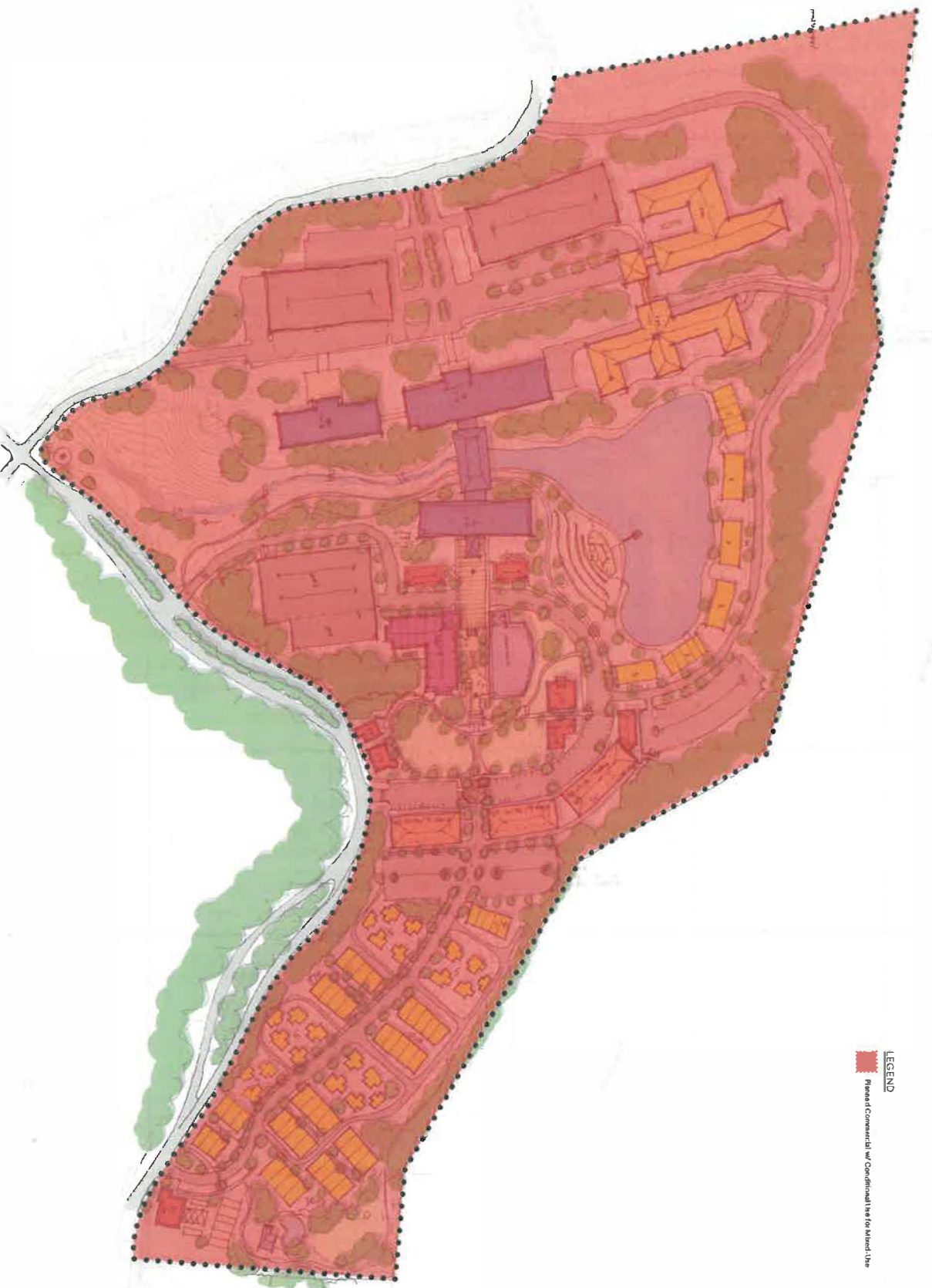


**EXHIBIT D**

ZONING PLAN

See attached.

LEGEND  
Pleasant Commercial, w/ Conditional Use for Mixed-Use



# RIVERWALK ZONING PLAN

09.21.2023

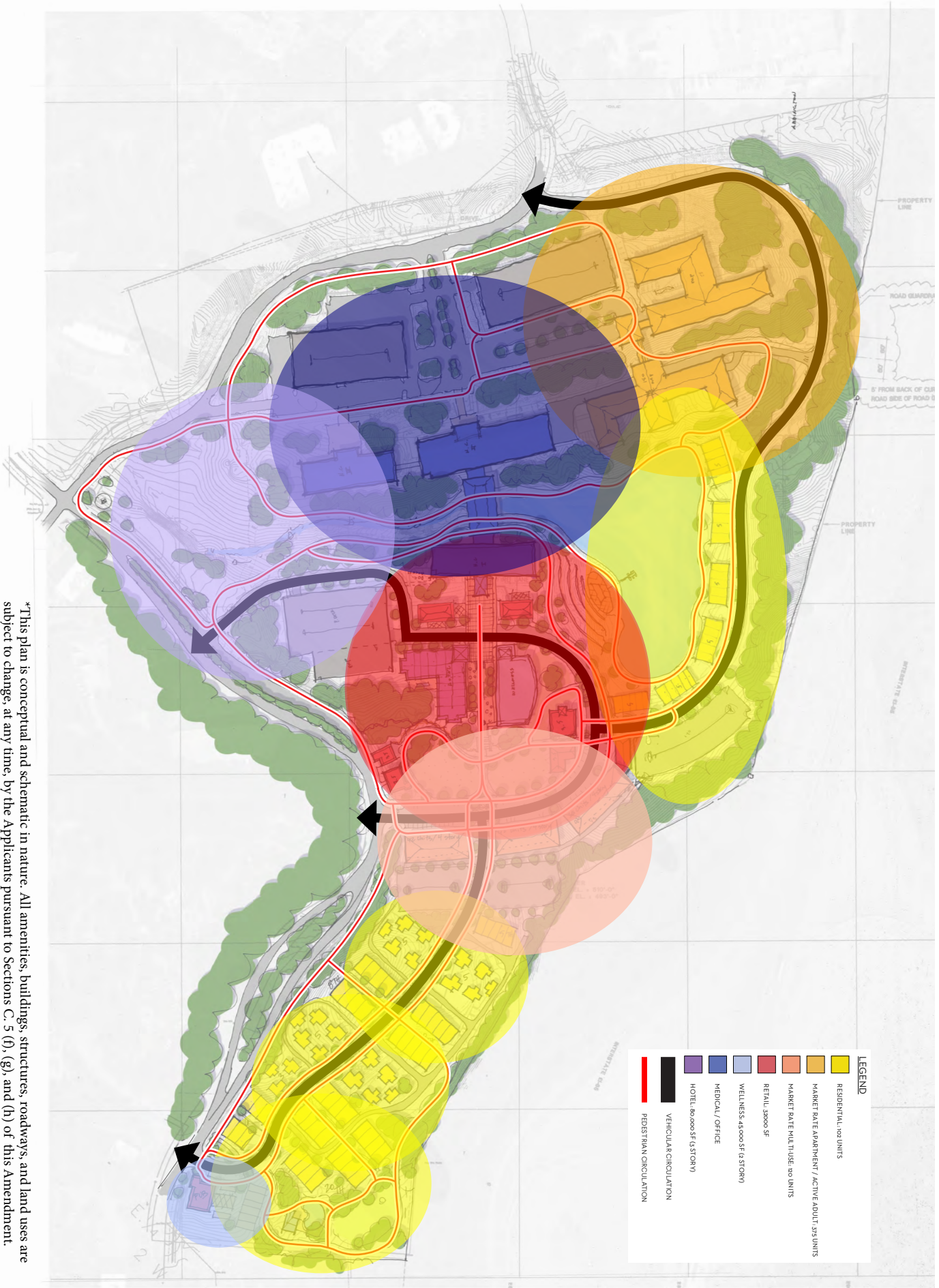


**EXHIBIT E**

MASTER LAND USE AND CONDITIONAL USE PLAN

See attached.





**LEGEND**

<span style="display:inline-block; width:15px; height:15px; background-color:yellow; border:1px solid black;"></span> RESIDENTIAL 100 UNITS
<span style="display:inline-block; width:15px; height:15px; background-color:orange; border:1px solid black;"></span> MARKET RATE APARTMENT / ACTIVE ADULT 375 UNITS
<span style="display:inline-block; width:15px; height:15px; background-color:red; border:1px solid black;"></span> MARKET RATE MULTIFUSE 900 UNITS
<span style="display:inline-block; width:15px; height:15px; background-color:purple; border:1px solid black;"></span> RETAIL 30000 SF
<span style="display:inline-block; width:15px; height:15px; background-color:blue; border:1px solid black;"></span> WELLNESS 45000 SF (4 STORY)
<span style="display:inline-block; width:15px; height:15px; background-color:lightblue; border:1px solid black;"></span> MEDICAL / OFFICE
<span style="display:inline-block; width:15px; height:15px; background-color:darkblue; border:1px solid black;"></span> HOTEL 80000 SF (3 STORY)
<span style="display:inline-block; width:15px; height:15px; background-color:black; border:1px solid black;"></span> VEHICULAR CIRCULATION
<span style="display:inline-block; width:15px; height:15px; background-color:red; border:1px solid black;"></span> PEDESTRIAN CIRCULATION

\*This plan is conceptual and schematic in nature. All amenities, buildings, structures, roadways, and land uses are subject to change, at any time, by the Applicants pursuant to Sections C. 5 (f), (g), and (h) of this Amendment.

# RIVERWALK MASTER LAND USE AND CONDITIONAL USE PLAN

10.03.2023



## **EXHIBIT F-1**

### LAND USE DEVELOPMENT CRITERIA

#### DEFINITIONS

In addition to the defined terms set forth elsewhere in this Amendment, as used throughout this **Exhibit F-1** and **Exhibit F-2** hereto, the following terms shall have the meanings set forth below, which meanings shall be applicable to both the singular and plural forms and tenses of such terms:

1.01 AGE-RESTRICTED MULTI-FAMILY UNITS. The term “Age-Restricted Multi-Family Units” shall mean and include any Multi-Family Units, Duplexes, Triplexes and Quadplexes situated on any Lot within any of the Property which are subject to Age Restrictions.

1.02 AGE-RESTRICTED SINGLE-FAMILY UNITS. The term “Age-Restricted Single-Family Units” shall mean and include any attached or detached single-family dwelling which is subject to Age Restrictions.

1.03 AGE-RESTRICTIONS. The term “Age-Restrictions” shall mean Residential Units which are subject to restrictive covenants imposing age-restricted occupancy requirements for persons 55 years of age or older as authorized and allowed by the Fair Housing Act (42 U.S.C. 3601-3619), and all amendments thereto, including, specifically, the Housing for Older Persons Act of 1995 (Pub. L. 104-76, 109 Stat. 787), as the same may be amended from time to time.

1.04 ARC. The term or letters “ARC” shall mean the architectural review committee appointed pursuant to the Declaration for the Property.

1.05 ASSISTED LIVING BUILDING. The term “Assisted Living Building” means any Building which contains assisted living, independent living, nursing home, skilled care, or congregate care units as well as support facilities such as food service preparation and other areas.

1.06 ARCHITECTURAL STANDARDS. The term “Architectural Standards” shall mean the standards prepared, issued, and amended from time to time by the ARC for the purpose of reviewing and approving all exterior improvements, landscaping and any other improvements which may be made to any Lot.

1.07 BUILDING. The term “Building,” with an initial capital letter, shall mean and refer to any dwelling, building or other structure of any nature constructed, situated, erected, maintained, placed, or installed on any Lot, including, without limitation, all Commercial Buildings and Residential Buildings.

1.08 COMMERCIAL BUILDING. The term “Commercial Building” shall include any Building within the Property which is designed for office, retail, commercial or light industrial uses and shall include Hotels and those portions of any Mixed-Use Building which are used for office, retail, commercial or light industrial purposes or uses; provided, however, that except as

provided above with respect to Mixed-Use Buildings, no Buildings which are included within the definition of Residential Buildings shall be considered a Commercial Building.

1.09 DUPLEXES, TRIPLEXES AND QUADPLEXES. The term “Duplexes, Triplexes and Quadplexes” shall mean and refer to any Residential Building situated on a Lot (or Lots) which contains two (2) or more separate living units which are attached to each other but specifically excluding Townhouses. Each living unit within any Duplexes, Triplexes and Quadplexes shall constitute a separate Residential Unit.

1.10 GREENWAY. The term “Greenway” shall mean and refer generally to those portions of the Property shown on the Conceptual Tree Conservation Plan and shall include all walkways, biking and hiking paths, trails, and other improvements, if any, situated within any of the floodway or flood plain areas of the Property which provide connections to other areas adjacent to or in close proximity with the Cahaba River.

1.11 HOTEL. The term “Hotel” means a Building situated on a Lot operated to provide overnight, short-term, paid lodging for travelers or tourists in the form of a hotel or motel. Such definition shall also include the term as defined in §3.01.62 of the Zoning Ordinance.

1.12 LOT. The term “Lot” shall mean and refer to any portion of the Property upon which it is intended that either a Commercial Building or a Residential Building be constructed thereon. Upon the recordation of any subdivision plat for any portion of the Property, each lot indicated thereon (other than any lots designated thereon as common areas, or which subsequently become common areas) shall be deemed a Lot for purposes of this **Exhibit F-1** and **Exhibit F-2**. Each condominium unit (including a Residential Condominium Unit) within the Property shall also constitute a Lot for the purposes of this **Exhibit F-1**. Common areas shall not constitute Lots (even if designated as a lot on any subdivision plat of any portion of the Property).

1.13 MIXED-USE BUILDING. The term “Mixed-Use Building” shall mean and refer to a Building situated on a Lot which contains both residential dwelling units and commercial space, in which event each residential dwelling unit shall constitute a Residential Unit and the commercial space (less the square footage of heated and cooled space within the residential dwelling units) shall constitute a Commercial Building.

1.14 MULTI-FAMILY UNIT. The term “Multi-Family Unit” shall mean and include any apartment or multi-family residential dwelling units situated on any Lot within any of the Property; provided, however, that Single-Family Units, Residential Condominium Units, Age-Restricted Multi-Family Units, Age-Restricted Single-Family Units, Duplexes, Triplexes, Quadplexes, and Townhouses shall not be considered Multi-Family Units. Each Multi-Family Unit within a Building shall constitute a Residential Unit. Notwithstanding anything provided herein to the contrary, if any Multi-Family Units are at any time converted to a condominium form of ownership, then each such Multi-Family Unit shall constitute a Lot and be deemed a Residential Condominium Unit.

1.15 RESIDENTIAL BUILDING. The term “Residential Building” shall mean and refer to any Building situated on any Lot within the Property which is designed for residential living purposes and shall include any Building which constitutes or contains a Single-Family Unit, a



Residential Condominium Unit, any Duplex, Triplex, and Quadplex, any Age-Restricted Multi-Family Unit, any Age-Restricted Single-Family Unit, any Townhouse, and any Multi-Family Unit.

1.16 RESIDENTIAL CONDOMINIUM UNIT. The term “Residential Condominium Unit” shall mean and refer to any condominium unit which is utilized for residential living purposes. Each Residential Condominium Unit shall constitute a Lot and a Residential Unit. Residential Condominium Units may be part of a Residential Building or a Mixed-Use Building.

1.17 RESIDENTIAL UNIT. The term “Residential Unit” shall mean and refer to each separate residential dwelling unit situated in any Residential Building and shall include Age-Restricted Multi-Family Units, Age-Restricted Single-Family Units, Single-Family Units, Residential Condominium Units, Duplexes, Triplexes and Quadplexes, Townhouses, Multi-Family Units, and the residential dwelling units within any Mixed-Use Building. For example, a Multi-Family Building may contain 100 separate dwelling units, each of which shall constitute a separate Residential Unit.

1.18 SINGLE-FAMILY ATTACHED UNIT. The term “Single-Family Attached Unit” shall mean and refer collectively to Duplexes, Triplexes and Quadplexes and Townhomes.

1.19 SINGLE-FAMILY DETACHED UNIT. The term “Single-Family Detached Unit” shall mean and refer to any detached single-family dwelling situated within the Property; provided, however, that if a Single-Family Detached Unit contains a separate garage apartment or in-law suite which is detached from the main dwelling unit on the Lot, then both the separate garage apartment or in-law suite and the main dwelling unit on such Lot shall constitute only one (1) Residential Unit. Each Single-Family Detached Unit constitutes a Residential Unit.

1.20 SINGLE-FAMILY UNIT. The term “Single-Family Unit” shall mean and refer to both a Single-Family Attached Unit and a Single-Family Detached Unit.

1.21 TOWNHOUSE. The term “Townhouse” shall mean and refer to two (2) or more attached residential dwellings containing more than one (1) story. Such definition shall also include the term as defined in §3.01.132 of the Zoning Ordinance.

## EXHIBIT F-2

### TOWN CENTER DEVELOPMENT CRITERIA (PLANNED COMMERCIAL WITH CONDITIONAL USE FOR MIXED-USE)

#### 1.0 MINIMUM/MAXIMUM LAND USE DENSITY AND USES.

1.1 All of the Property shall constitute part of the Planned Commercial with Conditional Use for Mixed-Use and all of the uses set forth in the schedule attached to this **Exhibit F-3** hereto as permitted uses within the Planned Commercial with Conditional Use for Mixed-Use Land Area are permitted principal uses within the Property. Within the Property, Land Uses may include, as permitted principal uses, subject to the limitations set forth below, all Land Uses designated as “P” or “Permitted by Right” for Planned Commercial with Conditional Use for Mixed-Use as set forth in schedule attached to this **Exhibit F-3**, including those uses authorized and allowed in Section C.5(d) of this Amendment. Any uses set forth in the schedule attached to this **Exhibit F-3** which are deemed “C” or “Conditional Use Required” will require conditional use approval by the City; however, a conditional use plan will not be required for the development of any of the permitted principal uses established for Planned Commercial with Conditional Use for Mixed-Use within the Property.

1.2 Upon the City’s approval of this Amendment, the Master Land Use and Conditional Use Plan attached as **Exhibit E** to this Amendment shall be deemed to have fully satisfied all the requirements for conditional use approval pursuant to §2.04 of the Zoning Ordinance permitting a mix of residential and commercial land uses for the Property as described above in Section 1.1 of this **Exhibit F-2**. In accordance with the provisions of Section C 5.(f) “Major Change” and Section C.5 (g) “Minor Change” of this Amendment, the Master Land Use and Conditional Use Plan may be changed from time to time and at any time to rearrange any of the proposed uses within the Property.

2.0 SETBACKS/YARDS. A minimum 35-foot setback is required for all portions of the Property fronting Riverchase Parkway East and Office Park Circle. Additionally, a 50-foot setback is required from US I-65 right-of-way. No minimum setback requirements are established for the remainder of the Property. Minimum setbacks will be shown on the respective preliminary and final subdivision plat submitted to the City for any portion of the Property.

3.0 FLOOR AREAS. With respect to any Residential Units, such Residential Units shall contain a minimum gross floor area of 500 square feet per Residential Unit; provided, however, that there is no minimum floor area requirement for any Hotel, or Commercial Buildings within the Property. No minimum floor area or square footage requirement shall apply to any Commercial Building within the Property.

4.0 MINIMUM LOT SIZE. There shall be no minimum lot size for any Lots within the Property.

5.0 SIGNAGE. All signs must comply with the provisions set forth in the Riverchase PUD Regulations or the Declaration for the Property. *At no time shall the City have the obligation*

or duty to enforce any provisions of the PUD Plan, the Business Covenants, or the Declaration as defined in Section C.10 above.

6.0 BUILDING HEIGHT. There shall be no maximum building height for any Buildings within the Property.

7.0 OFF-STREET PARKING AND LOADING REQUIREMENTS.<sup>8</sup>

7.1 Subject to providing a detailed peak versus off peak shared parking analysis to the City and approval by the City Engineer, which approval shall not be unreasonably withheld, on-street and off-street parking requirements for the Property shall be provided in accordance with the guidelines established in *Shared Parking*<sup>9</sup> published by the Urban Land Institute attached hereto as **Exhibit K** and incorporated herein by reference or as approved by the Architectural Review Committee.

7.2 Absent the use of a Shared Parking analysis for a phase or project within the Property, the minimum on-street and off-street parking requirements for the Property shall be as follows:

(i) At least two (2) parking spaces per Single-Family Detached Unit shall be provided.

(ii) At least two (2) parking space per Multi-Family Unit (excluding Age-Restricted Multi-Family Units) shall be provided;

(iii) For all other Residential Units, at least two (2) parking space per Residential Unit shall be provided; and

(iv) Any Age-Restricted Multi-Family Unit or Assisted Living Building shall have one (1) parking spaces per assisted living unit providing residential accommodations within such Age-Restricted Multi-Family Unit or Assisted Living Building.

7.3 Parking courts, which may be located adjacent to or in close proximity with any Buildings served by such parking courts, shall be allowed to satisfy any of the parking requirements set forth in Section 7.1 of this **Exhibit F-2**. In addition, cross-parking within the same parking structure based on peak versus non-peak time uses shall be allowed to satisfy the parking requirements set forth in Section 7.1 of this **Exhibit F-2**. On-street parking spaces, a minimum of 9 feet in width, can be used to satisfy any of the foregoing minimum parking

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<sup>8</sup> Off-street parking shall comply with parking and accessibility standards set forth in 28 CFR 35.151; 28 CFR part 26, subpart D (ADAG), ANSI/ICC A117.1, and/or NFPA 101 as approved by the City.

<sup>9</sup> Smith, Mary, Shared Parking (3rd ed. 2020) or most recent publication.

<sup>10</sup> The definitions set forth in **Exhibit F-3** are controlling in the event not defined in the Zoning Ordinance.

requirements. Parking shall be allowed on paved surfaces, or such pervious surfaces approved for such use by the City Engineer.

7.4 All Commercial Buildings (including any Mixed-Use Buildings) shall provide a service yard or service area of adequate size and location to facilitate trash removal and for the loading and unloading of merchandise, materials and otherwise managing deliveries. Such service yards or areas shall be paved, be accessible to a street (whether public or private) and be located, to the extent practicable, at the rear or the side of the Building. The ARC shall approve the design, location, and method of screening of all such loading facilities, service yards or service areas.

8.0 EXTERIOR LIGHTING. Parking lot, exterior building and all other exterior lighting within the Property shall satisfy the minimum standards established by the ARC and must satisfy the City's lighting design standards. The maximum height for any free-standing light fixture shall be 12-feet along streets and within plazas, and 16-feet within off-street parking lots.

9.0 GREENBELT REQUIREMENTS. A 10-foot wide green belt shall be required along Riverchase Parkway East and Office Park Circle. No greenbelts or buffers shall be required within any of the Property. Greenbelts, if any, may, in Owner's discretion, be maintained as natural areas without requirement that walls, fences or additional trees, shrubbery, plant life, landscaping or berming be installed, planted, or maintained.

10.0 PUBLIC RIGHTS-OF-WAY. Any irrigation systems, landscaped areas, signage, decorative walls, sidewalks, street trees, or other such appurtenances located within public rights-of-way shall be maintained by the owners' associations established for the applicable portion of the Property served or benefited by the same.

11.0 MISCELLANEOUS. Notwithstanding anything provided to the contrary in the Zoning Ordinance, the Subdivision Regulations or this Amendment, the Design Criteria contained in this **Exhibit F-2**, shall replace, and supersede all conflicting provisions in the Zoning Ordinance and the Subdivision Regulations. Any areas within the Property may be developed for any of the purposes and uses authorized in this **Exhibit F-2**.

**Exhibit F-3**

LAND USE REGULATIONS FOR RIVERWALK PUD

See attached.

## Land Uses for Riverwalk PUD<sup>10</sup>

Land Use District		Planned Commercial with Conditional Use for Mixed-Use
Use		
<b>Residential</b>		
Single Family Detached Unit		P
Duplex/Triplex and Quadplex		P
Townhouse		P
Age-Restricted Single-Family Unit		P
Age-Restricted Multi-Family Unit		P
Multi-Family Unit		P
Assisted Living Building		P
Mixed-Use Building		P
<b>Institutional</b>		
Art Gallery		P
Cemeteries		
Churches, Temples, Synagogues and Other Places of Worship		P
Community Building		P
Clubhouses		P
Community Gardens		P
Golf Courses		C
Greenways		P
Indoor Recreational Facilities (public or private), including swimming pools, tennis, and other indoor courts (e.g., pickleball, handball, racquetball, basketball, etc.)		P
Kennels		
Library		P
Museum		P
Natural Areas		P
Open Spaces		P
Outdoor Recreation and Ball Fields (public or private), including swimming pools, tennis,		P

<sup>10</sup> The definitions set forth in **Exhibit F-3** are controlling in the event not defined in the Zoning Ordinance.

and other outdoor courts (e.g., pickleball, handball, racquetball, basketball, etc.)		
Parking Lots and Garages		P
Recreational Trails, Paths, and Walkways		P
Roads		P
Utilities		P
Parking Courts		P
Public Entertainment Venues		P
Private Entertainment Venues		C
Swimming Pools		P
Tennis Courts		P
Park		P
Playgrounds and Tot Lots		P
Private Club		C
Public Buildings		P
Recreation, Nonprofit		P
Riding Academies		
School – Elementary		P
School – High		P
School – Middle		P
School - Private – No Dorms		P
Stables		
Telecommunications		SE
<b>Retail</b>		
Bakery Restaurant		P
Bakery (which bakes goods for on-premises retail sale only)		P
Brewpub <sup>11</sup>		P
Retail		P
Civic		P
Convenience Store		P
Department Stores		P
Domestic Equipment Rental		P
Drug Store/Pharmacy		P
Fitness/Exercise Centers and Gymnasiums		P
Furniture Stores		P
Grocery Store		P
Off Premise Liquor Retail (as a principal use) – See Sec. 10.09		C
Off Premise Beer and Wine (as a principal use) – See Sec. 10.10		C
On Premise Alcohol Retail (as a principal use)		C
Outside Sale of Merchandise		P

<sup>11</sup> If retail sales involved, Section 10.13 of Zoning Ordinance must be satisfied.

Nursery/Garden Center		P
Radio and TV stations (no antennas)		P
Recreation/Amusement, Commercial		P
Restaurant – Drive Thru/Drive-up		C
Restaurant – Sit Down (Including Outdoor Seating, Dining and Beverage Consumption)		P
Restaurant (Catering)		P
Restaurant (Food Service)		P
Retail (including drive-up and drive through)		P
Wholesale Stores		P
<b>Office/Service</b>		
Bank and other lending institutions		P
Barber/Beauty Shop		P
Car Wash		P
Convenience Commercial Uses		P
Day Care Home/Group Day Care Home/Night Care Facility Home/Nursery School		P
Dry Cleaning		P
Hospital, Surgical Center, Wellness Center		P
Hotel		P
Laundromats		P
Live Entertainment		P
Lounge with on-premises alcohol retail sales		C
Mortuary		
Motel		P
Neighborhood Service Facilities		P
Office		P
Office/Technical Use		P
Professional Office or Clinic (Doctor, Dentist, Attorney, surgeon, architect, engineer, etc.)		P
Residential Information Office		P
Research and Development (R&D)		P
Sanitarium		
Self-Service Storage		P
Shopping Center		P
Theatre – Movie		P
Vet Clinic – No Outside Kennels		P
<b>Industrial</b>		
Bakery		P
Brewery/Distillery <sup>12</sup>		P
Light Industrial, Fabricating, Processing, Assembling and Manufacturing Associated with Medical, Technology, Computer,		P

<sup>12</sup> If retail alcohol sales involved, Section 10.13 of Zoning Ordinance must be satisfied.



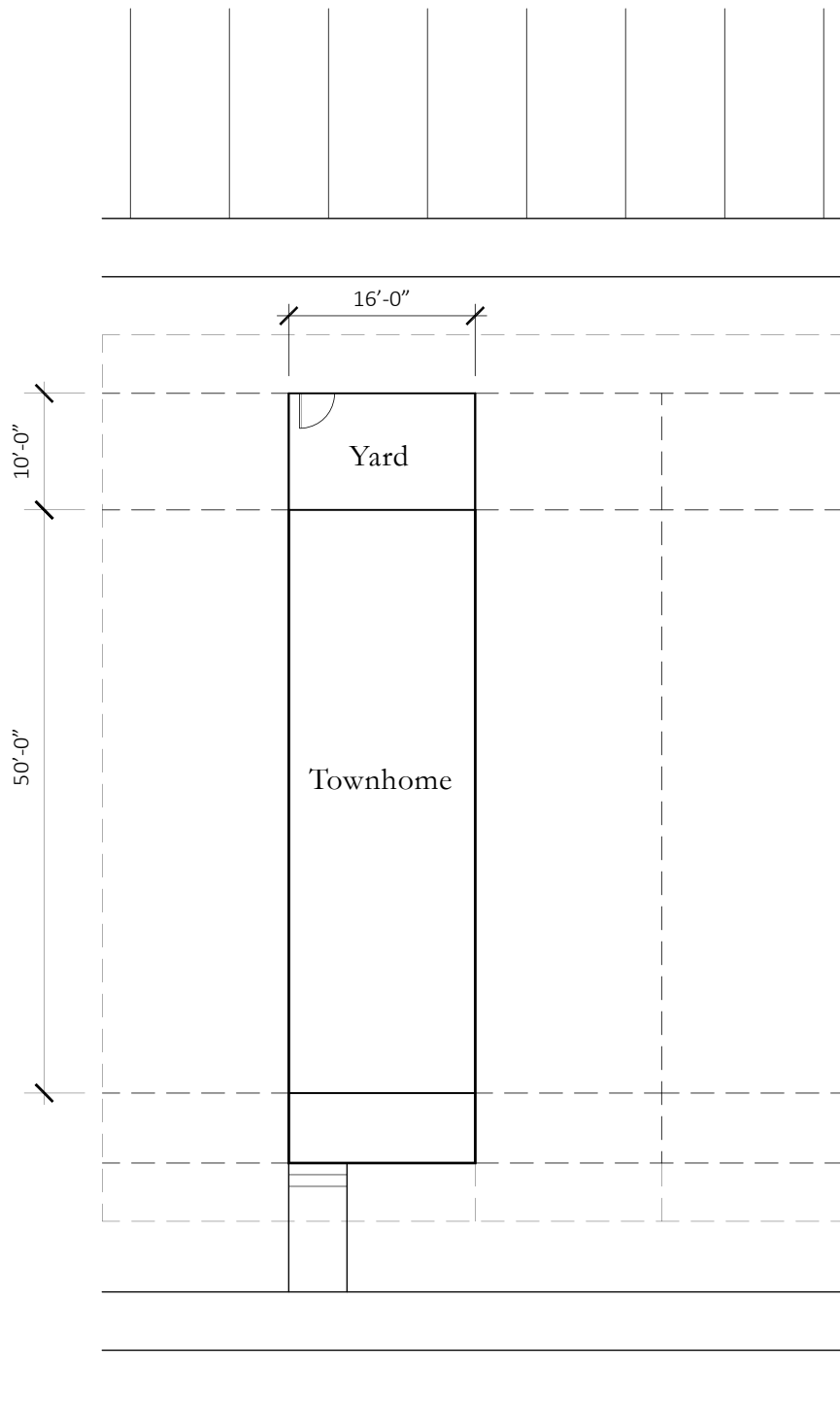
Chemical or Drug Research (e.g., research and development facilities)		
Other Light Industrial, Fabricating, Processing, Assembling and Manufacturing		C
Printing		P
Warehouse (as part of office or retail operation)		P
<b>Accessory</b>		
Medical Gas/Vapor/Liquid Storage Tanks		P
Off Premises Alcohol Retail		P
On Premise Alcohol Retail		P

P = Permitted by Right  
C – Conditional Use Required  
SE – Special Exception Use

**EXHIBIT G-1**

TYPICAL LOT DIMENSIONS FOR RESIDENTIAL LAND USE

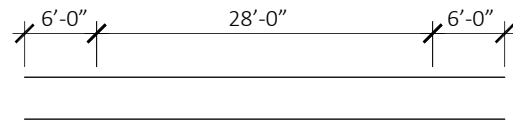
See attached.



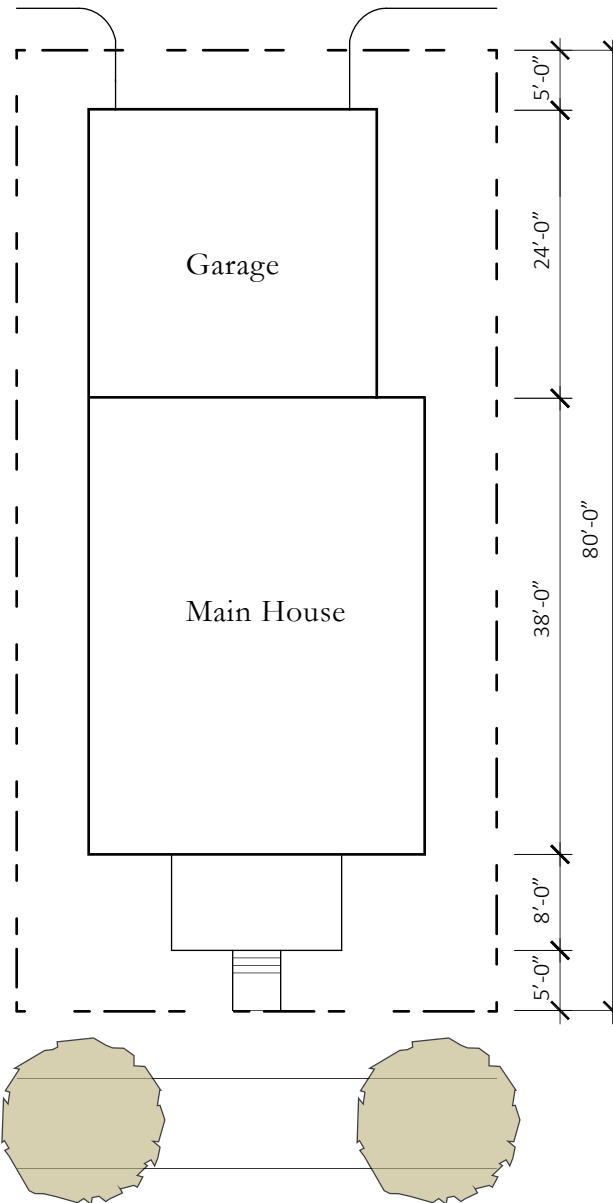
\*This Exhibit illustrates a possible Lot layout.

Actual Lot width may vary from 16' minimum to 45' maximum.

*16' Townhome*  
Scale: 1/16" = 1'-0"



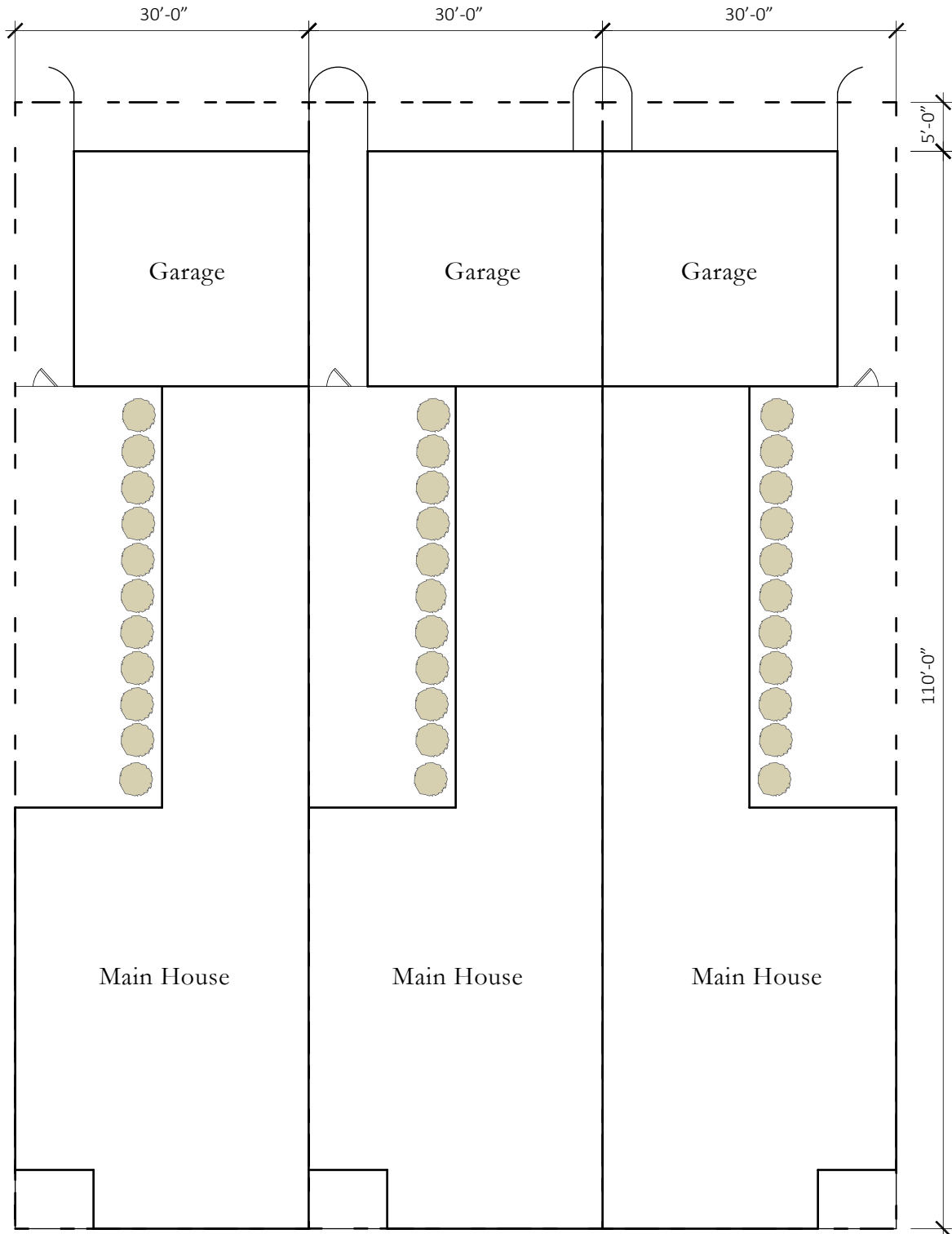
Lane



\*This Exhibit illustrates a possible Lot layout.

Actual Lot width may vary from 16' minimum to 45' maximum.

*Cottage Court*  
Scale: 1/16" = 1'-0"



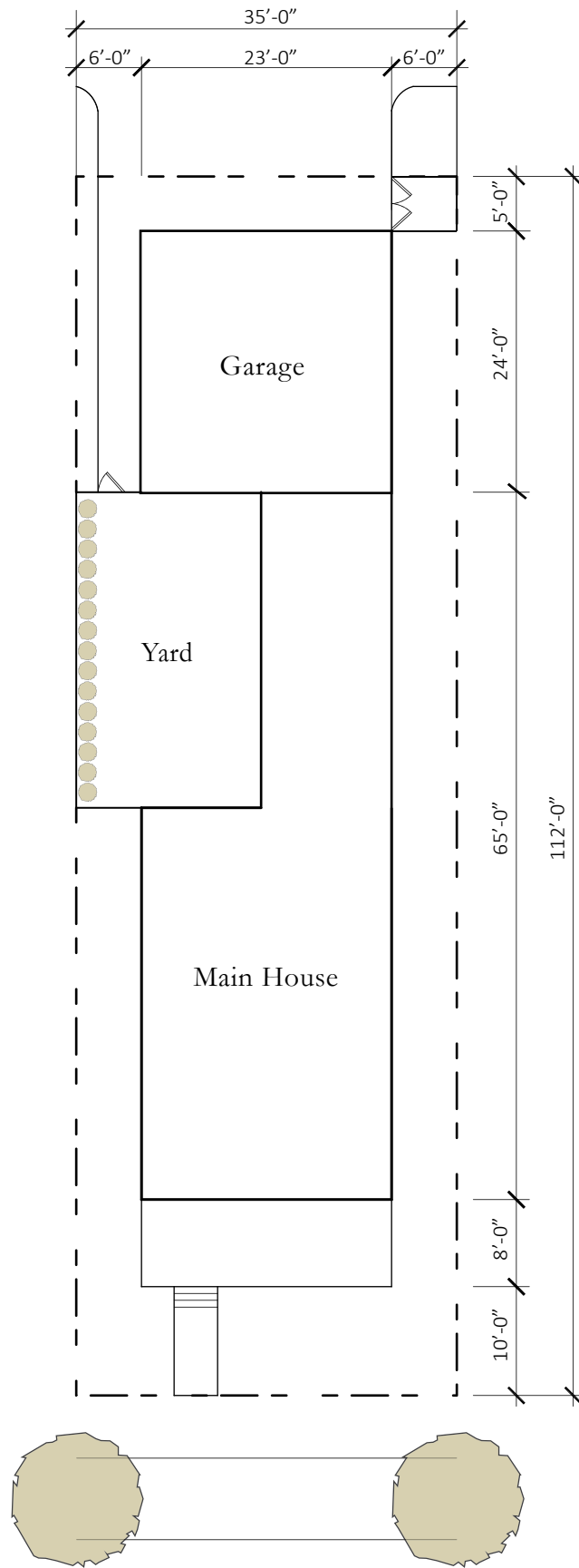
\*This Exhibit illustrates a possible Lot layout.

Actual Lot width may vary from 16' minimum to 45' maximum.

*30' Townhome*  
Scale: 1/16" = 1'-0"

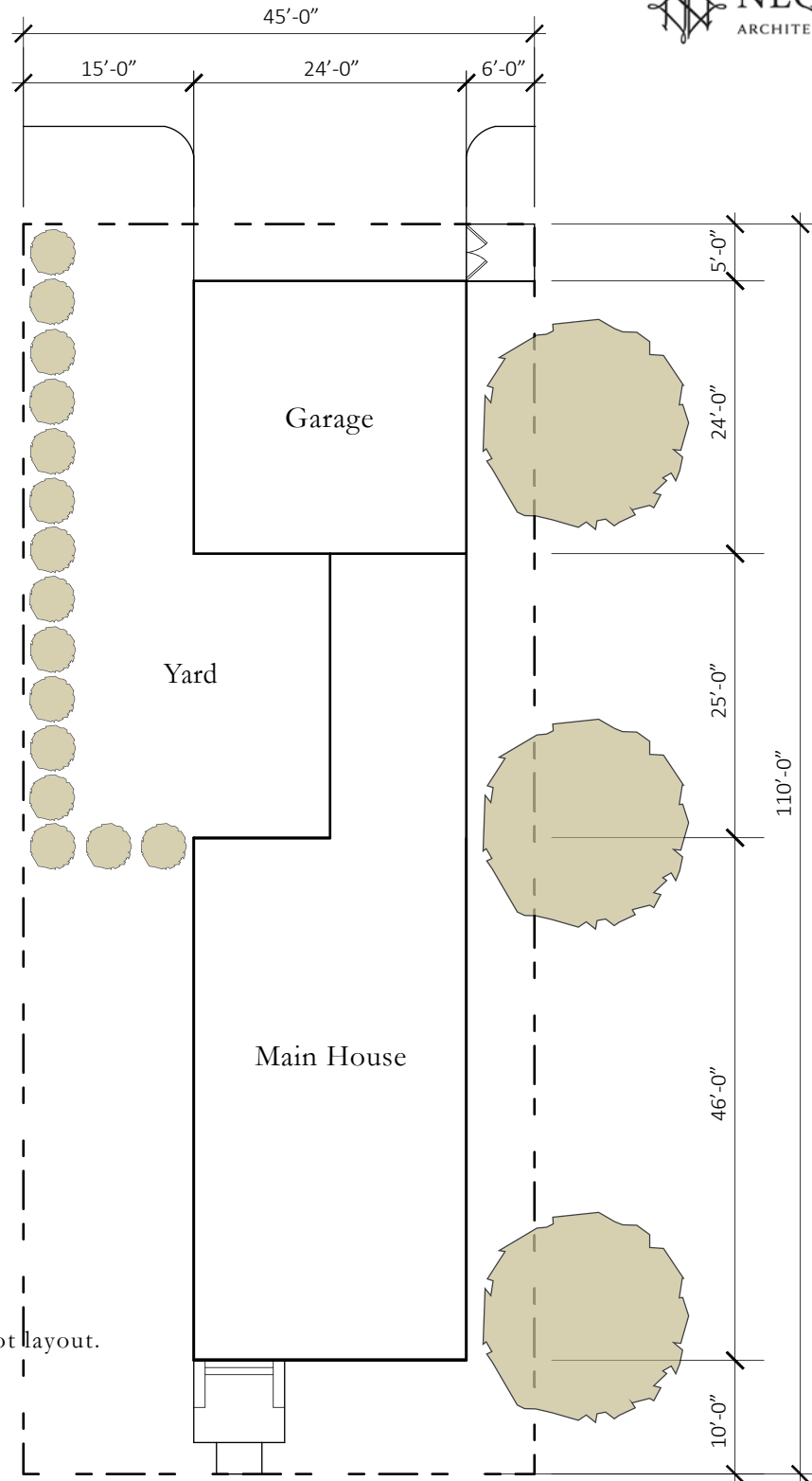
\*This Exhibit illustrates a possible Lot layout.

Actual Lot width may vary from  
16' minimum to 45' maximum



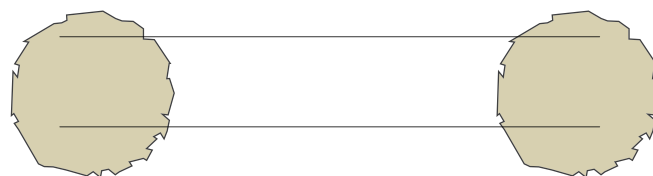
*Single Family Detached*

Scale: 1/16" = 1'-0"



\*This Exhibit illustrates a possible Lot layout.

Actual Lot width may vary from  
16' minimum to 45' maximum.



*Single Family Detached*

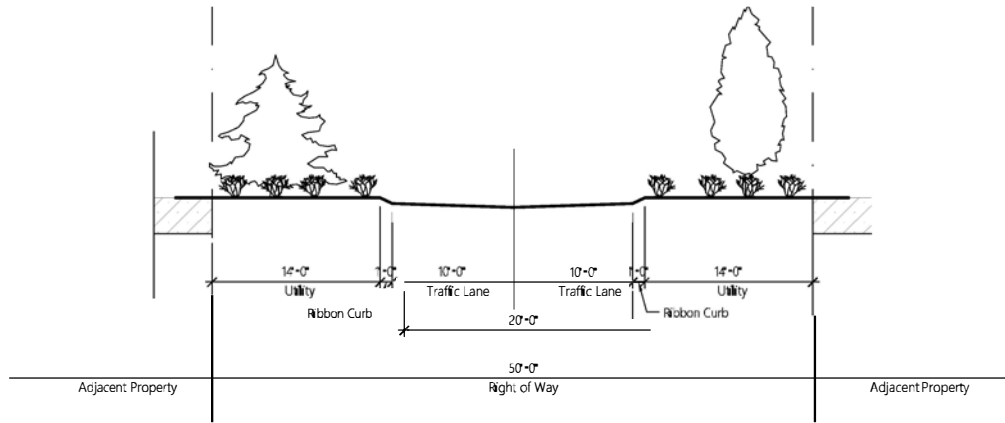
Scale: 1/16" = 1'-0"

**EXHIBIT G-2**

ROADWAY DIAGRAMS FOR RESIDENTIAL LAND USE

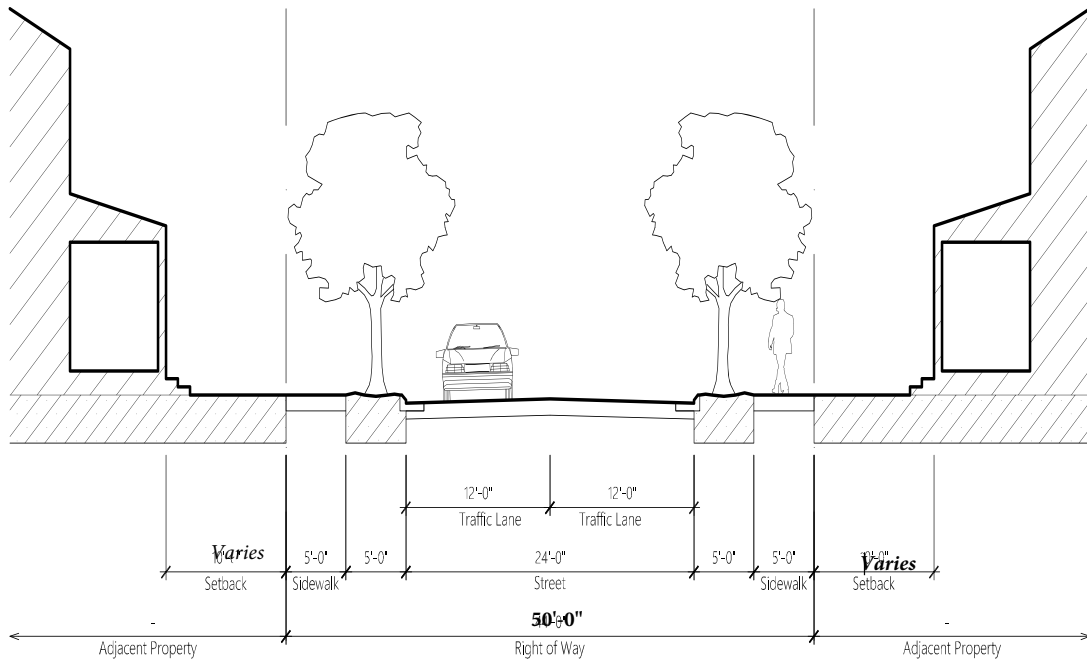
See attached.





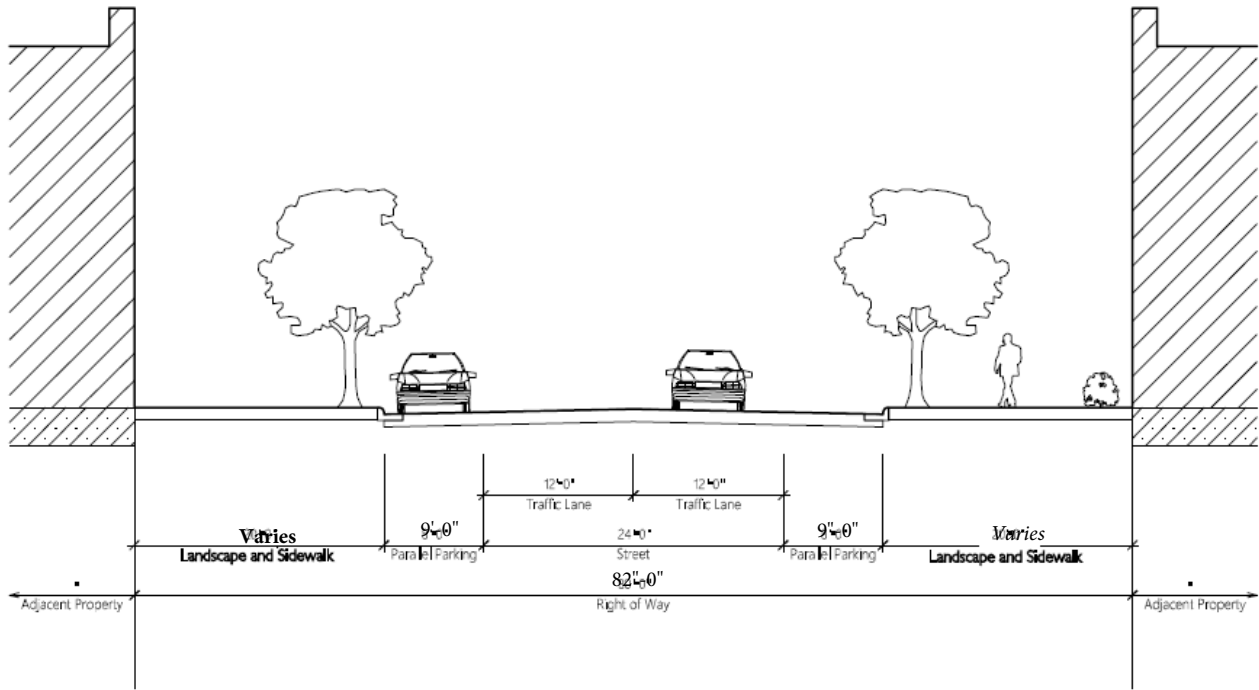
## *Lane*

\* This Exhibit illustrates a possible Lane design, the actual Lane design may vary subject to the approval of the City Engineer.



## Street

\* This Exhibit illustrates a possible Street design, the actual Street design may vary subject to the approval of the City Engineer.



## *On-Street Parking*

\*This Exhibit illustrates a possible On-Street Parking design, the actual On-street Parking design may vary subject to the approval of the City Engineer.

**EXHIBIT H**

TREE CONSERVATION PLAN

See attached.



### Tree Conservation Summary

Total Site Area	91 Acres
Right of Way & Parking	11.88 Acres
Net Site Area	79.12 Acres

### Required Canopy

20% x 79.12 Acres

### Preserved Canopy

 29.56 Acres

Required Canopy 15.82 Acres

 Preserved Canopy 29.56 Acres

**EXHIBIT I**

**TRAFFIC IMPACT STUDY**

See attached.

# Memorandum

**To:** John L. Anthony, P.E. PTOE

**From:** Darrell Skipper, P.E., Skipper Consulting, Inc.

**Date:** October 27, 2023

**Subject:** Riverchase PUD Final Traffic Impact Study, Response to City of Hoover Comments

At the recent Planning Commission meeting where the modification to the Riverchase PUD was presented by Corporate Realty and recommended for approval to the Hoover City Council, there were several requests for additional traffic engineering analysis as a condition to the approval. In an email the following day you outlined six specific actions required which were confirmed by Mac Martin in his email to Doug Jeffords with Corporate Realty on October 26<sup>th</sup>.

Attached please find our response to these specific requests for traffic analysis and a summary of our findings. Also note that our traffic impact study was submitted to the City in September 2023, and we have received three rounds of comments and requests for additional traffic analysis. The attached documentation is the response to the latest requests for such traffic analysis and documentation.

The submission of the original traffic impact study dated September 7, 2023 and all subsequent responses to City comments should be considered as part of the TIS process and such represents in combination the final TIS document. Our responses to comments were dated October 4, 2023, October 9, 2023, and the attached information dated October 27, 2023.

We appreciate the opportunity to present this information and stand ready if additional discussion is required.





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**PREPARED FOR:**

**Corporate Realty  
60 14th Street South  
Suite 104  
Birmingham, Alabama 35233**



# TRAFFIC IMPACT STUDY

## Riverchase Planned Unit Development HOOVER, ALABAMA

Prepared for:  
**Corporate Realty**  
**60 14th Street South**  
**Suite 104**  
**Birmingham, Alabama 35233**

Prepared by:  
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skipperinc.com

SEPTEMBER 2023



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## APPENDICES

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Appendix B	Traffic Count Data
Appendix C	Existing Conditions Capacity Analysis Printouts
Appendix D	Turn Lane Warrant Evaluation Printouts
Appendix E	Future Intersection Capacity Analysis Printouts
Appendix F	Future Intersection Capacity Analysis with Improvements, Printouts

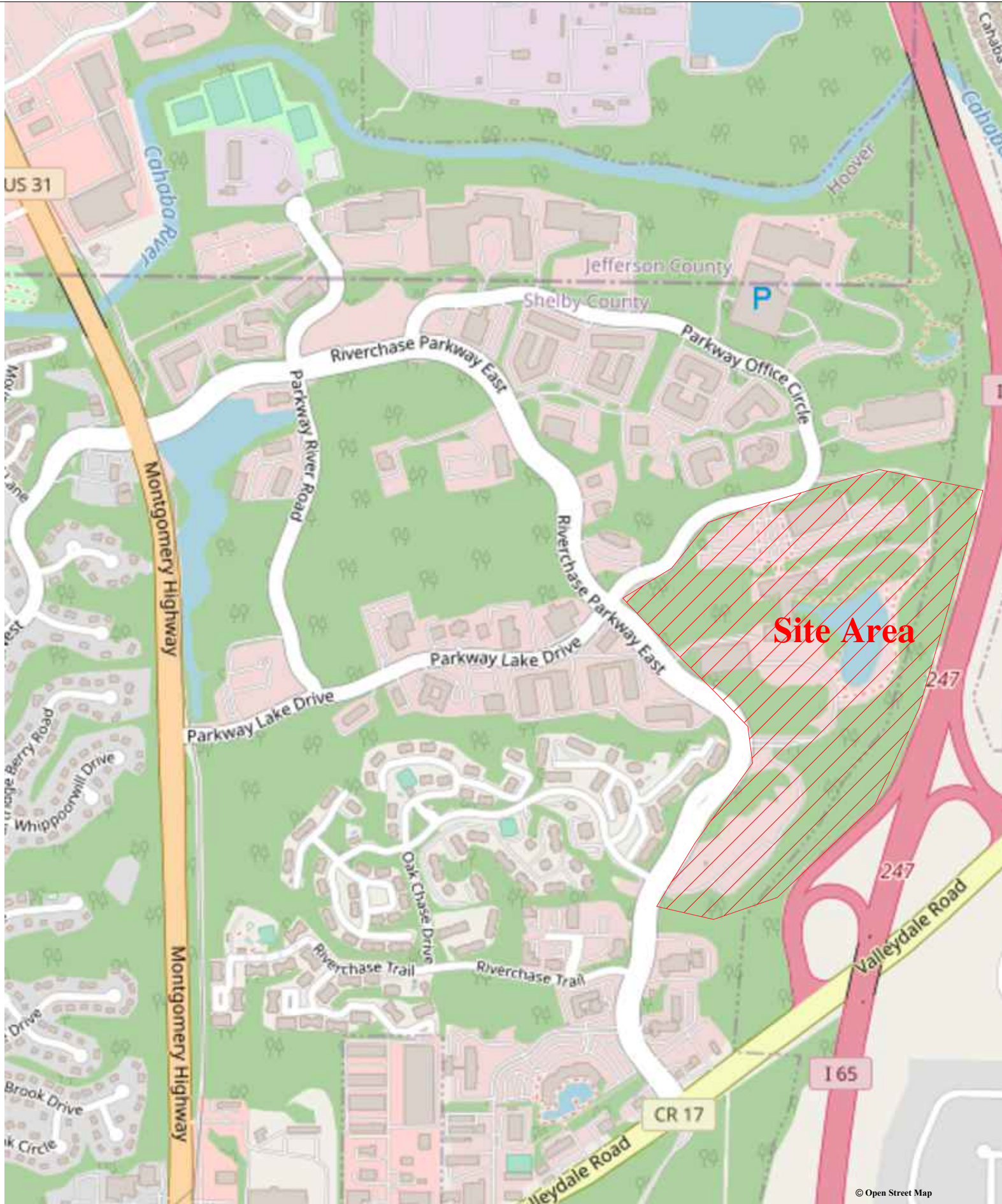
## INTRODUCTION

The purpose of this report is to present the findings of a traffic study for a proposed amendment to the Riverchase Planned Unit Development (PUD) located east of Riverchase Parkway and south of Parkway Office Circle in Hoover, Alabama. The location of the proposed development site is illustrated in **Figure 1**.

This traffic study has been conducted:

- to assess existing traffic conditions in the vicinity of the proposed development;
- to estimate the amount of traffic expected to be generated by the proposed development;
- to project background traffic growth for the study roadways and intersections;
- to predict the directional distribution of site related traffic;
- to assess the site access needs for the site;
- to evaluate the development access points to determine levels of improvement needed, and;
- to evaluate the study area roadways and determine geometric requirements to mitigate traffic impacts from the proposed amendment to the PUD.

Sources of information used in this report include: Corporate Realty, Goodwin, Mills and Caywood Incorporated, the Institute of Transportation Engineers; the Alabama Department of Transportation; the Institute of Transportation Engineers; the Transportation Research Board; the American Association of State Highway and Transportation Officials; the Federal Highway Administration; and the files and field reconnaissance efforts of Skipper Consulting, Inc.



© Open Street Map



## BACKGROUND INFORMATION

### Site Description and Access

The existing corporate campus contains three structures: one building providing 252,000 square feet of office space, another providing an additional 190,000 square feet of office space, and a parking deck. As part of the proposed PUD mixed development, one of the existing buildings will continue to be used for office space, the other will be used for medical offices. Additional commercial/retail and recreational structures are planned for a total of 584,000 square feet, 102 single-family residential units, 495 multi-family residential units, and a hotel with 135 rooms. It is estimated that the medical offices and single-family residential homes will be completed by 2025, the multifamily residential building will be completed by 2026, and retail and other structures by 2027.

Access to the development is planned using three existing accesses along Riverchase Parkway and four accesses along Parkway Office Circle that fall outside of the study area. **Appendix A** illustrates the preliminary site plan for the proposed development.

### Study Area Roadways

Based on a review of the proposed site location and scope of work defined as part of this study, the intersections described below will be evaluated and identified as study intersections.

- Valleydale Road at Riverchase Parkway (existing, signalized)
- Riverchase Parkway at Woods of Riverchase Driver (existing, signalized)
- Riverchase Parkway at Regions Drive (existing, signalized)
- Riverchase Parkway at Regions Gated Access (existing, unsignalized)
- Riverchase Parkway at Parkway Office Circle/Parkway Lake Drive (existing, signalized)

South of the site, Valleydale Road is a four- to five-lane divided roadway immediately west of I-65. The posted speeds increase from 40 miles per hour west of Riverchase Parkway to 45 miles per hour east of Riverchase Parkway. Riverchase Parkway is a four-lane median divided

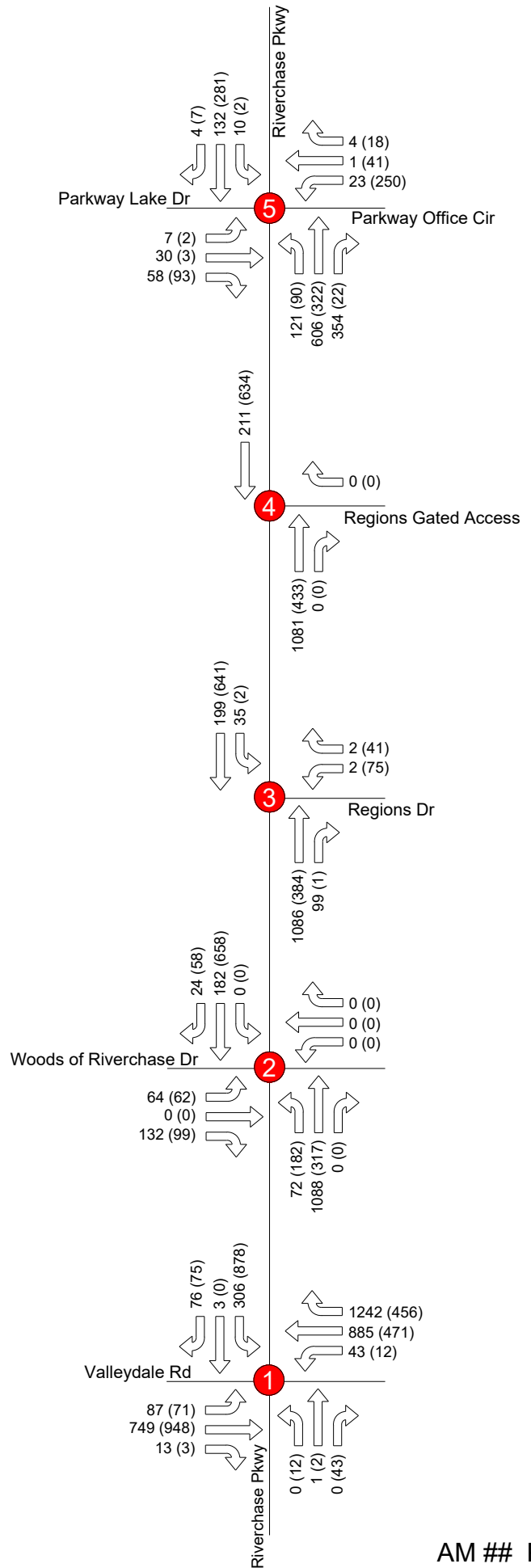
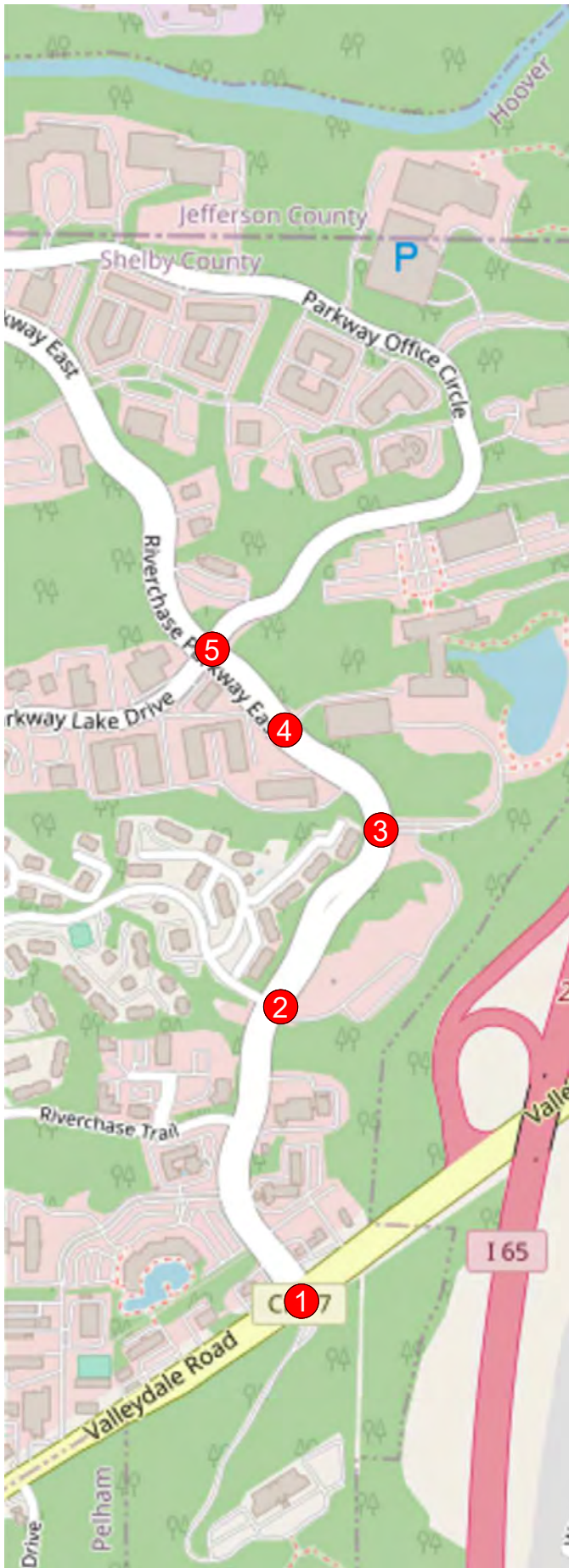


roadway with a posted speed of 30 miles per hour. Parkway Circle is a two-lane roadway with a posted speed of 30 miles per hour.

## EXISTING TRAFFIC CONDITIONS

### Existing Traffic Volumes

Turning movement traffic counts were conducted at study intersections during the morning (7-9 AM) and afternoon commuting (4-6 PM) periods. Turning count data was collected on a typical weekday, August 15, 2023. Existing peak hour traffic volumes are illustrated in **Figure 2** and detailed traffic count data are provided in **Appendix B** for reference.



AM ## PM (##)

### Existing Intersection Capacity Analysis

Using methods as outlined in the *Highway Capacity Manual*, latest edition, the existing capacity and operation of the study intersections were evaluated. According to methods of analysis, intersection capacity is expressed as levels of service, ranging from "A" (best) to "F" (worst). In general, a level of service (LOS) "C" is considered desirable, while a level of service "D" is considered acceptable during peak hours of traffic flow. The existing level of service for each approach movement is illustrated in **Table 1**.



**Table 1 - Existing Intersection Capacity Analysis**

Intersection	Approach	AM Peak LOS (movement/approach)			PM Peak LOS (movement/approach)		
		Left	Thru	Right	Left	Thru	Right
Valleydale Rd at Riverchase Pkwy (signalized)	NB Riverchase Pkwy	-	D	-	-	D	A
	SB Riverchase Pkwy	C	C	C	C	D	A
	WB Valleydale Rd	D	C	A	D	C	A
	EB Valleydale Rd	D	B	B	D	B	A
	<b>Overall LOS</b>	<b>B</b>			<b>C</b>		
Riverchase Pkwy at Woods of Riverchase Dr (signalized)	NB Riverchase Pkwy	A	A	-	A	A	-
	SB Riverchase Pkwy	-	A	-	-	B	-
	WB Woods. Dr	-	A	-	-	A	-
	EB Woods. Dr	C	B	-	C	B	-
	<b>Overall LOS</b>	<b>A</b>			<b>B</b>		
Riverchase Pkwy at Regions Dr (signalized)	NB Riverchase Pkwy	-	A	A	-	A	A
	SB Riverchase Pkwy	C	A	-	B	A	-
	WB Regions Dr	C	C	-	C	B	-
	<b>Overall LOS</b>	<b>A</b>			<b>A</b>		
Riverchase Pkwy at Regions Gated Access (unsignalized)	NB Riverchase Pkwy	--	--	--	--	-	--
	SB Riverchase Pkwy	--	--	--	--	--	--
	WB Access	-	A	-	-	A	-
Riverchase Pkwy at Parkway Office Cir / Parkway Lake Dr (signalized)	NB Riverchase Pkwy	A	A	A	A	A	A
	SB Riverchase Pkwy	A	A	-	B	B	-
	WB Parkway Office Cir	C	C	-	D	B	-
	EB Parkway Lake Dr	-	C	-	-	C	-
	<b>Overall LOS</b>	<b>A</b>			<b>C</b>		

Note: '- -' indicates that the Level of Service is not defined for unopposed movements in the *Highway Capacity Manual* unsignalized intersection analysis procedures.

As indicated in **Table 1**, the listed movement and approach levels of service for intersections in the Existing Intersection Capacity Analysis are acceptable during the morning and afternoon commuter peak hours. The overall level of service for each signalized intersection during the

peak hours is desirable under existing conditions. Capacity analysis printouts illustrating the results of the analyses for existing conditions are provided in **Appendix C** for reference.

## FUTURE TRAFFIC CONDITIONS

### Trip Generation Estimates

Trip generation estimates were determined for the proposed development based on data contained in the Trip Generation Manual, Eleventh Edition, as published by the Institute of Transportation Engineers (ITE). Trips expected to be generated by the development can be described as new trips which would not have otherwise traveled study area roadways and intersections. New trips combined with intercept trips equal the total number of trips generated by the development at full buildout. Morning and afternoon commuter peak hour trip generation estimates for the proposed development are presented in **Table 2**. Trips generated by the retail space (Variety Store) have a 34% intercept trip rate for the afternoon commuter peak hour. A 5% internal capture rate was used for a gym, retail space and residential land uses during the PM peak due to the PUD having various land uses within a mile of one another.

**Table 2 - Trip Generation Estimates**

Land Use (ITE#)	SqFt/Units	AM Peak		PM Peak	
		In	Out	In	Out
Corporate Headquarters Building (714)	252,000 ft	340	26	29	298
Medical-Dental Office Building (720)	190,000 ft	465	124	224	523
Community/Performing Arts	65,000 ft	0	0	110	0
Health/Fitness Club (492)	45,000 ft	30	29	84	63
Variety Store (814)	32,000 ft	54	44	69	66
Hotel (310)	135	35	27	41	39
Senior Adult Housing, Multifamily (252)	375	26	50	50	39
Single Family Attached (215)	102	15	34	31	24
Multifamily Housing, Low-Rise (220)	120	12	36	37	22
<b>Totals</b>		<b>977</b>	<b>370</b>	<b>675</b>	<b>1,074</b>

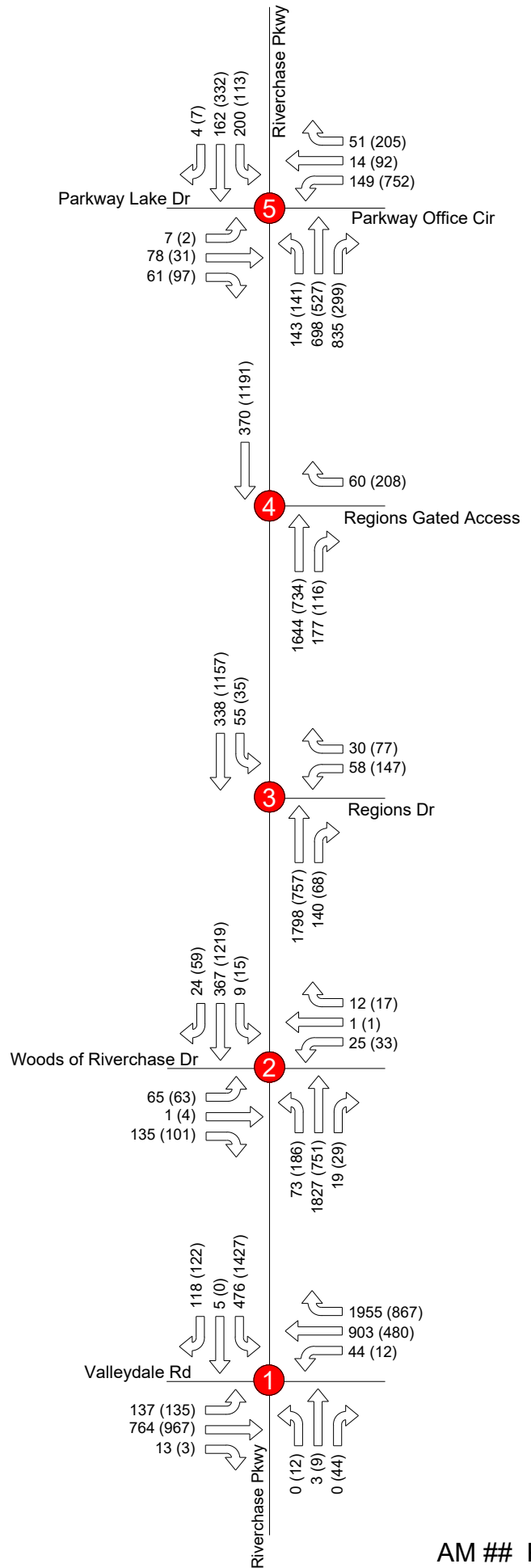
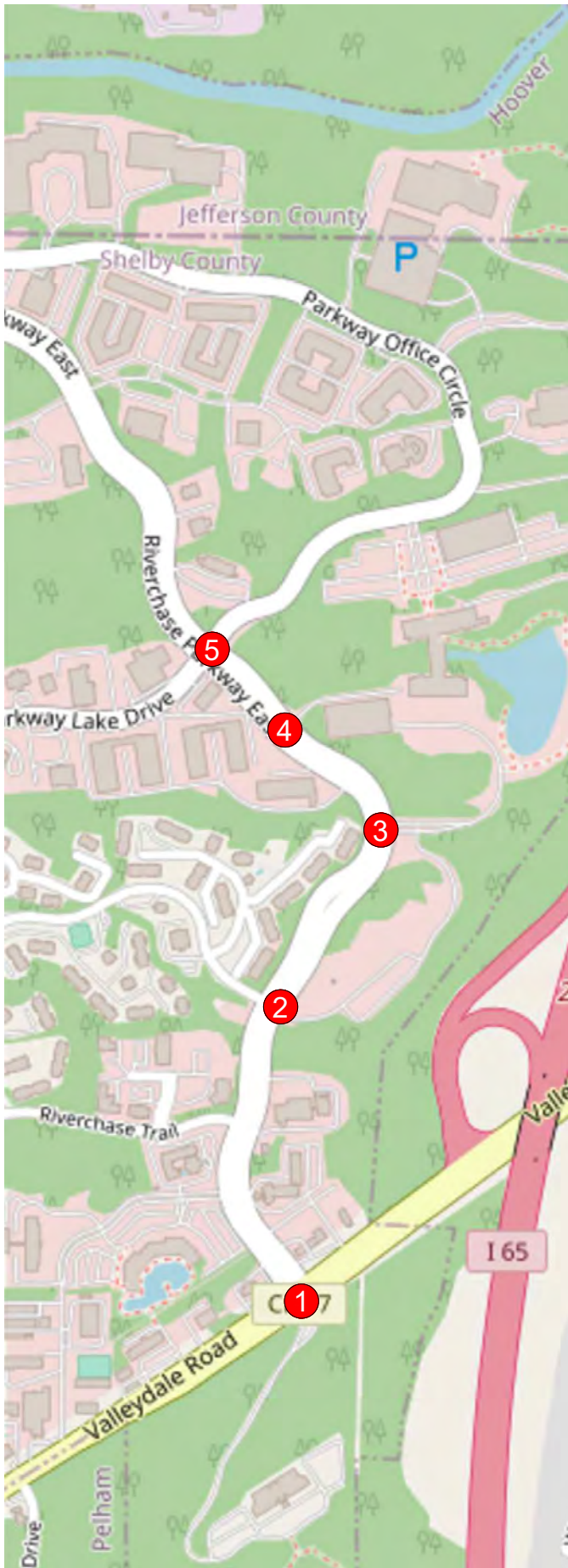
### Directional Distribution

The directional distribution of traffic generated by the proposed development was estimated based upon existing population and business concentrations, traffic patterns, access to the roadway network, and the site plan. The patterns anticipated for new trips generated by the proposed development are summarized below as approximated percentages:

- 45% travel west on Valleydale Road to Riverchase Parkway then northbound to the site,
- 20% travel east on Valleydale Road to Riverchase Parkway then northbound to the site,
- 35% travel south on Riverchase Parkway to the site.

### Future Traffic Volumes

Future traffic volumes were determined by assigning traffic to be generated by the proposed development onto the existing traffic volumes using the directional distribution patterns previously outlined. An analysis was conducted of ALDOT traffic station volume data collected near the proposed site along Valleydale Road, Riverdale Parkway, and US-31, between 2016 and 2022. During this period the average annual growth rate was approximately 1.0 percent annually. This annual growth rate was applied to existing traffic volumes over a period of 2 years to produce area background growth of 2.0 % to account for additional traffic during construction. Future traffic volumes, the sum of existing and new trips plus background growth, are used as the basis for assessing future traffic conditions. **Figure 3** illustrates future traffic volumes.



AM ## PM (##)

### Turn Lane Warrant Evaluations

Right turn lane warrant evaluations were conducted for the study intersections along Riverchase Parkway using future traffic volumes. A left turn lane warrant evaluation was also conducted for Riverchase Parkway at Woods of Riverchase Drive. The turn lane warrant evaluations were conducted by comparing peak hour traffic volumes with the criteria outlined in the *Evaluating Intersection Improvements: An Intersection Study Guide*, NCHRP Report 457, published by the Transportation Research Board. The guidelines for consideration of left turn and right turn lanes include the 85th percentile speed, if available, for the main street traffic flow, right turn volume, and advancing volume for the subject intersection.

As mentioned above, warrants for turn lanes at the study intersections were evaluated assuming future traffic volumes at build out. The results of turn lane warrant evaluations for the study intersections along Riverchase Parkway at Woods of Riverchase Drive and at Regions Gated Access found right turn lanes at each intersection are warranted by future volumes. The results of the left turn lane warrant evaluation for the intersection at Riverchase Parkway and Woods of Riverchase Drive found a left turn is warranted by future volumes. Turn lane warrant evaluation printouts are included in **Appendix D**, for reference.

### Recommended Roadway & Traffic Control Improvements

To safely accommodate the proposed development, the below roadway and traffic control improvements should be made. See **Appendix F** for suggested signal timings.

#### Valleydale Road at Riverchase Parkway

- Modify signal intersection timings for all existing signal phases.

#### Riverchase Parkway at Woods of Riverchase Drive

- Add a northbound right turn only lane.
- Add a southbound left turn only lane.

Riverchase Parkway at Regions Gateway Access

- Add a northbound right turn only lane.

Riverchase Parkway at Parkway Office Circle/Parkway Lake Drive

- Change the background signal cycle to operate at 110 seconds during the PM peak period.
- Modify signal intersection timings for all existing signal phases.

**Future Intersection Capacity Analysis**

Peak hour capacity analyses were conducted for projected future conditions at the study intersections. These capacity analyses were conducted assuming development peak hour traffic volumes and with no improvements in place. Capacity analyses were conducted using methods as previously outlined in the *Highway Capacity Manual*. The results of the capacity analyses are illustrated in **Table 4**.

**Table 4 – Future Intersection Capacity Analysis**

Intersection	Approach	AM Peak LOS (movement/approach)			PM Peak LOS (movement/approach)		
		Left	Thru	Right	Left	Thru	Right
Valleydale Rd at Riverchase Pkwy (signalized)	NB Riverchase Pkwy	-	E	-	-	D	D
	SB Riverchase Pkwy	C	C	C	F	F	C
	WB Valleydale Rd	D	C	C	D	C	A
	EB Valleydale Rd	E	B	B	E	C	B
	<b>Overall LOS</b>	<b>C</b>			<b>E</b>		
Riverchase Pkwy at Woods of Riverchase Dr (signalized)	NB Riverchase Pkwy	A	B	-	B	A	-
	SB Riverchase Pkwy	-	B	-	-	C	-
	WB Woods. Dr		C	-	-	C	-
	EB Woods. Dr	C	B	-	C	B	-
	<b>Overall LOS</b>	<b>B</b>			<b>B</b>		
Riverchase Pkwy at Regions Dr (signalized)	NB Riverchase Pkwy	-	D	A	-	A	A
	SB Riverchase Pkwy	C	A	-	C	A	-
	WB Regions Dr	C	C	-	D	C	-
	<b>Overall LOS</b>	<b>D</b>			<b>B</b>		
Riverchase Pkwy at Regions Gated Access (unsignalized)	NB Riverchase Pkwy	--	--	--	--	-	--
	SB Riverchase Pkwy	--	--	--	--	--	--
	WB Access	-	B	-	-	B	-
Riverchase Pkwy at Parkway Office Cir / Parkway Lake Dr (signalized)	NB Riverchase Pkwy	A	B	C	A	B	B
	SB Riverchase Pkwy	A	B	-	A	B	-
	WB Parkway Office Cir	E	C	-	F	C	-
	EB Parkway Lake Dr	-	F	-	-	C	-
	<b>Overall LOS</b>	<b>C</b>			<b>F</b>		

Note: '-' indicates that the Level of Service is not defined for unopposed movements in the *Highway Capacity Manual* un-signalized intersection analysis procedures.

As indicated in **Table 4**, during the afternoon commuter peak hour the overall level of service (LOS) is poor at Valleydale Road and Riverchase Parkway and failing at Riverchase Parkway and Parkway Office Circle. The intersection at Valleydale Road and Riverchase Parkway has two

southbound movements with a failing LOS during the PM peak hour and the eastbound left-turning movement is poor during the AM and PM peak hours. Findings show the intersection at Riverchase Parkway and Parkway Office Circle has a westbound left-turning movement with failing LOS during the PM peak hour and a poor LOS during the AM peak hour. The eastbound through movement has a failing level of service during the morning peak hour. Capacity analysis printouts that illustrate the results of the capacity analyses for future conditions are provided in **Appendix E** for reference.



**Table 5 – Future Improved Intersection Capacity Analysis**

Intersection	Approach	AM Peak LOS (movement/approach)			PM Peak LOS (movement/approach)		
		Left	Thru	Right	Left	Thru	Right
Valleydale Rd at Riverchase Pkwy (signalized)	NB Riverchase Pkwy	-	E	-	-	E	D
	SB Riverchase Pkwy	C	C	C	D	E	C
	WB Valleydale Rd	D	B	B	E	C	A
	EB Valleydale Rd	D	C	C	E	C	B
	<b>Overall LOS</b>	<b>C</b>			<b>C</b>		
Riverchase Pkwy at Woods of Riverchase Dr (signalized)	NB Riverchase Pkwy	A	B	A	B	A	A
	SB Riverchase Pkwy	-	B	-	-	C	-
	WB Woods. Dr		C	-	-	C	-
	EB Woods. Dr	C	B	-	C	B	-
	<b>Overall LOS</b>	<b>B</b>			<b>B</b>		
Riverchase Pkwy at Regions Dr (signalized)	NB Riverchase Pkwy	-	D	A	-	A	A
	SB Riverchase Pkwy	C	A	-	C	A	-
	WB Regions Dr	C	C	-	D	C	-
	<b>Overall LOS</b>	<b>D</b>			<b>B</b>		
Riverchase Pkwy at Regions Gated Access (unsignalized)	NB Riverchase Pkwy	--	--	--	--	-	--
	SB Riverchase Pkwy	--	--	--	--	--	--
	WB Access	-	B	-	-	B	-
Riverchase Pkwy at Parkway Office Cir / Parkway Lake Dr (signalized)	NB Riverchase Pkwy	A	B	C	D	D	D
	SB Riverchase Pkwy	B	B	-	D	D	-
	WB Parkway Office Cir	D	C	-	D	B	-
	EB Parkway Lake Dr	-	D	-	-	D	-
	<b>Overall LOS</b>	<b>C</b>			<b>D</b>		

Note: ‘- -’ indicates that the Level of Service is not defined for unopposed movements in the *Highway Capacity Manual* un-signalized intersection analysis procedures.

The Future Improved Intersection Capacity Analysis uses the existing traffic signal cycle of 90 seconds for Valleydale at Riverchase Parkway and increases the existing 95 second signal cycle

at Riverchase Parkway and Parkway Office Circle to 110 seconds during the PM peak period. Traffic signal plans for each peak hour have been modified as listed in **Recommended Roadway and Traffic Control Improvements**. **Table 5** shows that during the morning and afternoon commuter peak hours the overall level of service (LOS) for study intersections improves to acceptable for all intersections. During the AM peak hour, the LOS for the northbound through-movement at Valleydale Road and Riverchase Parkway is poor. During the PM peak hour the northbound and southbound through movements show LOS E. These movements are employed by low levels of traffic and receive lower priority than other phases of the signal cycle. The westbound and eastbound left-turning movements also have LOS E during the PM peak hour and must wait approximately 60 seconds for service. Queues forming during the control delay for these movements are cleared during the programmed green time. With Improvements, all movements of the intersection at Riverchase Parkway and Parkway Office Circle have acceptable LOS. Capacity analysis printouts that illustrate the results of the capacity analyses for future conditions are provided in **Appendix F** for reference.

## CONCLUSIONS

Based upon the analyses and evaluations presented in this report, the following conclusions can be stated:

1. The proposed development is an amendment to the Riverchase Planned Unit Development (PUD) located east of Riverchase Parkway and south of Parkway Office Circle in Hoover, Alabama. The corporate campus will be redeveloped to contain one building providing 252,000 square feet of office space, another providing an additional 190,000 square feet of office space, additional commercial/retail and recreational structures are planned for a total of 584,000 square feet, 102 single-family residential units, 495 multi-family residential units, and a hotel with 135 rooms.
2. It is estimated that the development will be built over a period of 1.5 years with a buildout horizon in 2027
3. Access to the development is planned using three existing accesses along Riverchase Parkway and four accesses along Parkway Office Circle that fall outside of the study area.
4. This traffic impact study examines the capacity and operations at the intersections at
  - Valleydale Road at Riverchase Parkway (existing, signalized)
  - Riverchase Parkway at Woods of Riverchase Driver (existing, signalized)
  - Riverchase Parkway at Regions Drive (existing, signalized)
  - Riverchase Parkway at Regions Gated Access (existing, unsignalized)
  - Riverchase Parkway at Parkway Office Circle/Parkway Lake Drive (existing, signalized)
5. Turning movement counts for a typical weekday were conducted on August 15, 2023, at the study intersections for morning and afternoon commuter periods.
6. Using methods as outlined in the Highway Capacity Manual, latest edition, the existing capacity and operation of the study intersections were evaluated. The existing intersection capacity analysis finds acceptable levels of service for each movement during the morning and afternoon commuter peak hours.
7. The proposed mixed-use development would produce approximately 1,347 trips during the morning peak hour (977 inbound and 370 outbound) and approximately 1,749 trips during the afternoon commuter peak hour (675 inbound and 1,074 outbound).
8. Future traffic volumes were determined by assigning traffic to be generated by the proposed development onto the existing traffic volumes using the directional

distribution patterns previously outlined. An analysis was conducted of ALDOT traffic station volume data collected near the proposed site and an annual growth rate of 2.0% was applied to existing traffic volumes. Future traffic volumes, the sum of existing and new trips plus background growth, are used as the basis for assessing future traffic conditions.

9. Right turn lane warrant evaluations were conducted for the study intersections along Riverchase Parkway using future traffic volumes. A left turn lane warrant evaluation was also conducted for Riverchase Parkway at Woods of Riverchase Drive using criteria outlined in the Evaluating Intersection Improvements: An Intersection Study Guide, NCHRP Report 457, published by the Transportation Research Board. Right turn lanes are warranted along Riverchase Parkway at Woods of Riverchase Drive and at Regions Gated Access. A left turn lane is warranted at Riverchase Parkway and Woods of Riverchase Drive.
10. The following roadway and traffic control improvements are recommended to safely accommodate development traffic:

Valleydale Road at Riverchase Parkway

- Modify signal intersection timings for all existing signal phases.

Riverchase Parkway at Woods of Riverchase Drive

- Add a northbound right turn only lane.
- Add a southbound left turn only lane.

Riverchase Parkway at Regions Gateway Access

- Add a northbound right turn only lane.

Riverchase Parkway at Parkway Office Circle/Parkway Lake Drive

- Change the background signal cycle to operate at 110 seconds during the PM peak period.
- Modify signal intersection timings for all existing signal phases.

11. Using methods as outlined in the Highway Capacity Manual, latest edition, the future capacity and operation of the site accesses and study intersections were evaluated with **Recommended Roadway and Traffic Control Improvements**. The results showed that shows that during the morning and afternoon commuter peak hours the overall level of service (LOS) for study intersections improves to acceptable for all intersections. During

the AM peak hour, the LOS for the northbound through-movement at Valleydale Road and Riverchase Parkway is poor. During the PM peak hour the northbound and southbound through movements show LOS E. These movements are employed by low levels of traffic and receive lower priority than other phases of the signal cycle. The westbound and eastbound left-turning movements also have LOS E during the PM peak hour and must wait approximately 60 seconds for service. Queues forming during the control delay for these movements are cleared during the programmed green time. With Improvements, all movements of the intersection at Riverchase Parkway and Parkway Office Circle have acceptable LOS.

**Appendix A**  
**Preliminary Site Plan**



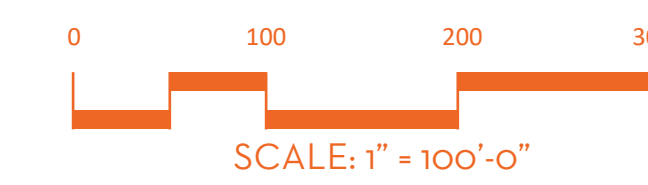


**LEGEND**

<span style="color: yellow;">■</span>	RESIDENTIAL: 102 UNITS
<span style="color: orange;">■</span>	MARKET RATE APARTMENT / ACTIVE ADULT: 375 UNITS
<span style="color: red;">■</span>	MARKET RATE MULTI-USE: 120 UNITS
<span style="color: darkred;">■</span>	RETAIL: 32000 SF
<span style="color: lightblue;">■</span>	WELLNESS: 45,000 SF (2 STORY)
<span style="color: blue;">■</span>	MEDICAL / OFFICE
<span style="color: purple;">■</span>	HOTEL: 80,000 SF (3 STORY)
<span style="color: pink;">■</span>	PERFORMING ARTS CENTER
<span style="color: grey;">■</span>	TOWN CENTER PARKING: +/-490 SPOTS

# RIVERCHASE DEVELOPMENT - SCHEMATIC

07.14.2023





**Appendix B**  
**Traffic Count Data**



# TRAFFIC DATA, LLC

PO Box 187

Cullman, AL 35056

205-824-0125

Hoover, AL

File Name : hoover11

Site Code : 00000000

Start Date : 08/15/2023

Page No : 1

Groups Printed- 1 - Unshifted

Start Time	RIVERCHASE PKWY E Southbound		REGIONS DR Westbound		RIVERCHASE PKWY E Northbound		Int. Total
	Left	Thru	Left	Right	Thru	Right	
04:00 PM	0	119	19	6	84	3	231
04:15 PM	0	110	21	4	100	1	236
04:30 PM	0	163	26	14	107	0	310
04:45 PM	0	163	13	6	83	0	265
Total	0	555	79	30	374	4	1042
05:00 PM	2	187	21	15	97	1	323
05:15 PM	0	128	15	6	97	0	246
05:30 PM	0	96	2	1	96	0	195
05:45 PM	0	64	3	2	101	1	171
Total	2	475	41	24	391	2	935
07:00 AM	2	24	1	0	152	11	190
07:15 AM	4	30	0	1	169	19	223
07:30 AM	5	54	0	1	253	28	341
07:45 AM	6	65	1	0	311	27	410
Total	17	173	2	2	885	85	1164
08:00 AM	12	41	1	1	282	27	364
08:15 AM	12	39	0	0	240	17	308
08:30 AM	6	27	0	1	203	15	252
08:45 AM	5	49	0	0	116	7	177
Total	35	156	1	2	841	66	1101
Grand Total	54	1359	123	58	2491	157	4242
Apprch %	3.8	96.2	68.0	32.0	94.1	5.9	
Total %	1.3	32.0	2.9	1.4	58.7	3.7	

Start Time	RIVERCHASE PKWY E Southbound			REGIONS DR Westbound			RIVERCHASE PKWY E Northbound			App. Total	Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total		
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1											
Intersection	04:30 PM										
Volume	2	641	643	75	41	116	384	1	385	0	1144
Percent	0.3	99.7		64.7	35.3		99.7	0.3			
05:00 Volume	2	187	189	21	15	36	97	1	98	0	323
Peak Factor										0.885	
High Int.	05:00 PM			04:30 PM			04:30 PM			3:45:00 PM	
Volume	2	187	189	26	14	40	107	0	107		
Peak Factor	0.851			0.725			0.900				
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1											
By Approach	04:30 PM			04:15 PM			05:00 PM			04:00 PM	
Volume	2	641	643	81	39	120	391	2	393	0	
Percent	0.3	99.7		67.5	32.5		99.5	0.5			
High Int.	05:00 PM			04:30 PM			05:45 PM				
Volume	2	187	189	26	14	40	101	1	102	-	-
Peak Factor	0.851			0.750			0.963				

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File Name : hoover11  
Site Code : 00000000  
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Start Time	RIVERCHASE PKWY E Southbound			REGIONS DR Westbound			RIVERCHASE PKWY E Northbound			App. Total	Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total		
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1											
Intersection	07:30 AM										
Volume	35	199	234	2	2	4	1086	99	1185	0	1423
Percent	15.0	85.0		50.0	50.0		91.6	8.4			
07:45 Volume	6	65	71	1	0	1	311	27	338	0	410
Peak Factor										0.868	
High Int.	07:45 AM			08:00 AM			07:45 AM				
Volume	6	65	71	1	1	2	311	27	338		
Peak Factor	0.824						0.500			0.876	
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1											
By Approach	07:30 AM			07:15 AM			07:30 AM			07:00 AM	
Volume	35	199	234	2	3	5	1086	99	1185	0	
Percent	15.0	85.0		40.0	60.0		91.6	8.4			
High Int.	07:45 AM			08:00 AM			07:45 AM			-	
Volume	6	65	71	1	1	2	311	27	338	-	-
Peak Factor	0.824						0.625			0.876	

# TRAFFIC DATA, LLC

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205-824-0125

Hoover, AL

File Name : hoover10  
 Site Code : 00000000  
 Start Date : 08/15/2023  
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Groups Printed- 1 - Unshifted

Start Time	RIVERCHASE PKWY E Southbound			WOODS OF RIVERCHASE DR Westbound			RIVERCHASE PKWY E Northbound				WOODS OF RIVERCHASE DR Eastbound			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	turn	Left	Thru	Right	
04:00 PM	0	132	6	0	0	0	41	74	0	0	11	0	29	293
04:15 PM	0	128	7	0	0	0	36	82	0	3	11	0	24	291
04:30 PM	0	179	16	0	0	0	33	92	0	6	16	0	21	363
04:45 PM	0	155	16	0	0	0	41	71	0	0	9	0	21	313
<b>Total</b>	<b>0</b>	<b>594</b>	<b>45</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>151</b>	<b>319</b>	<b>0</b>	<b>9</b>	<b>47</b>	<b>0</b>	<b>95</b>	<b>1260</b>
05:00 PM	0	184	14	0	0	0	42	79	0	8	21	0	31	379
05:15 PM	0	140	12	0	0	0	46	75	0	6	16	0	26	321
05:30 PM	0	75	11	0	0	0	28	92	0	1	10	0	26	243
05:45 PM	0	58	13	0	0	0	39	89	0	1	10	0	27	237
<b>Total</b>	<b>0</b>	<b>457</b>	<b>50</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>155</b>	<b>335</b>	<b>0</b>	<b>16</b>	<b>57</b>	<b>0</b>	<b>110</b>	<b>1180</b>
07:00 AM	0	19	6	0	0	0	13	149	0	0	18	0	41	246
07:15 AM	0	23	2	0	0	0	10	180	0	0	8	0	32	255
07:30 AM	0	46	6	0	0	0	11	254	0	4	20	0	43	384
07:45 AM	0	64	7	0	0	0	24	305	0	2	17	0	40	459
<b>Total</b>	<b>0</b>	<b>152</b>	<b>21</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>58</b>	<b>888</b>	<b>0</b>	<b>6</b>	<b>63</b>	<b>0</b>	<b>156</b>	<b>1344</b>
08:00 AM	0	39	6	0	0	0	9	299	0	2	10	0	29	394
08:15 AM	0	33	5	0	0	0	16	230	0	4	17	0	20	325
08:30 AM	0	26	2	0	0	0	12	200	0	1	10	0	21	272
08:45 AM	0	43	5	0	0	0	11	113	0	2	9	0	25	208
<b>Total</b>	<b>0</b>	<b>141</b>	<b>18</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>48</b>	<b>842</b>	<b>0</b>	<b>9</b>	<b>46</b>	<b>0</b>	<b>95</b>	<b>1199</b>
<b>Grand Total</b>	<b>0</b>	<b>1344</b>	<b>134</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>412</b>	<b>2384</b>	<b>0</b>	<b>40</b>	<b>213</b>	<b>0</b>	<b>456</b>	<b>4983</b>
Apprch %	0.0	90.9	9.1	0.0	0.0	0.0	14.5	84.1	0.0	1.4	31.8	0.0	68.2	
Total %	0.0	27.0	2.7	0.0	0.0	0.0	8.3	47.8	0.0	0.8	4.3	0.0	9.2	

Start Time	RIVERCHASE PKWY E Southbound				WOODS OF RIVERCHASE DR Westbound				RIVERCHASE PKWY E Northbound					WOODS OF RIVERCHASE DR Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	turn	App. Total	Left	Thru	Right	App. Total	

Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1

Intersection 04:30 PM																		
Volume	0	658	58	716	0	0	0	0	162	317	0	20	499	62	0	99	161	1376
Percent	0.0	91.9	8.1		0.0	0.0	0.0		32.5	63.5	0.0	4.0		38.5	0.0	61.5		
Volume	0	184	14	198	0	0	0	0	42	79	0	8	129	21	0	31	52	379
Peak Factor																		0.908
High Int. 05:00 PM																		
Volume	0	184	14	198	0	0	0	0	33	92	0	6	131	21	0	31	52	
Peak Factor				0.904									0.952					0.774

Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1

By Approach	04:30 PM				04:00 PM				05:00 PM					05:00 PM				
Volume	0	658	58	716	0	0	0	0	155	335	0	16	506	57	0	110	167	
Percent	0.0	91.9	8.1		-	-	-	-	30.6	66.2	0.0	3.2		34.1	0.0	65.9		
High Int.	05:00 PM																	
Volume	0	184	14	198	-	-	-	-	42	79	0	8	129	21	0	31	52	
Peak Factor				0.904									0.981					0.803

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Start Time	RIVERCHASE PKWY E Southbound				WOODS OF RIVERCHASE DR Westbound				RIVERCHASE PKWY E Northbound					WOODS OF RIVERCHASE DR Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	Turn	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																		
Intersection 07:30 AM																		
Volume	0	182	24	206	0	0	0	0	60	108	0	12	1160	64	0	132	196	1562
Percent	0.0	88.3	11.7		0.0	0.0	0.0		5.2	93.8	0.0	1.0		32.7	0.0	67.3		
07:45																		
Volume	0	64	7	71	0	0	0	0	24	305	0	2	331	17	0	40	57	459
Peak Factor	0.851																	
High Int.	07:45 AM																	
Volume	0	64	7	71	0	0	0	0	24	305	0	2	331	20	0	43	63	
Peak Factor	0.725																	
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																		
By Approach	07:30 AM				07:00 AM				07:30 AM					07:00 AM				
Volume	0	182	24	206	0	0	0	0	60	108	0	12	1160	63	0	156	219	
Percent	0.0	88.3	11.7		-	-	-		5.2	93.8	0.0	1.0		28.8	0.0	71.2		
High Int.	07:45 AM																	
Volume	0	64	7	71	-	-	-	-	24	305	0	2	331	20	0	43	63	
Peak Factor	0.869																	

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Hoover, AL

File Name : hoover09

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Groups Printed- 1 - Unshifted

Start Time	RIVERCHASE PKWY E Southbound		REGIONS GATED ACCESS Westbound		RIVERCHASE PKWY E Northbound		Int. Total
	Thru		Right		Thru	Right	
04:00 PM	116		0		91	0	207
04:15 PM	109		0		101	0	210
04:30 PM	160		0		128	0	288
04:45 PM	161		0		90	0	251
<b>Total</b>	<b>546</b>		<b>0</b>		<b>410</b>	<b>0</b>	<b>956</b>
05:00 PM	189		0		114	0	303
05:15 PM	124		0		101	0	225
05:30 PM	89		0		97	0	186
05:45 PM	63		0		103	0	166
<b>Total</b>	<b>465</b>		<b>0</b>		<b>415</b>	<b>0</b>	<b>880</b>
07:00 AM	22		0		148	0	170
07:15 AM	36		0		167	0	203
07:30 AM	53		0		245	0	298
07:45 AM	62		0		311	0	373
<b>Total</b>	<b>173</b>		<b>0</b>		<b>871</b>	<b>0</b>	<b>1044</b>
08:00 AM	49		0		285	0	334
08:15 AM	47		0		240	0	287
08:30 AM	32		0		196	0	228
08:45 AM	45		0		120	0	165
<b>Total</b>	<b>173</b>		<b>0</b>		<b>841</b>	<b>0</b>	<b>1014</b>
<b>Grand Total</b>	<b>1357</b>		<b>0</b>		<b>2537</b>	<b>0</b>	<b>3894</b>
Apprch %	100.0		0.0		100.0	0.0	
Total %	34.8		0.0		65.2	0.0	

Start Time	RIVERCHASE PKWY E Southbound		REGIONS GATED ACCESS Westbound		RIVERCHASE PKWY E Northbound			App. Total	Int. Total
	Thru	App. Total	Right	App. Total	Thru	Right	App. Total		
<b>Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1</b>									
Intersection	04:30 PM								
Volume	634	634	0	0	433	0	433	0	1067
Percent	100.0		0.0		100.0	0.0			
05:00 Volume	189	189	0	0	114	0	114	0	303
Peak Factor								0.880	
High Int.	05:00 PM		3:45:00 PM		04:30 PM			3:45:00 PM	
Volume	189	189	0	0	128	0	128		
Peak Factor		0.839					0.846		
<b>Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1</b>									
By Approach	04:30 PM		04:00 PM		04:15 PM			04:00 PM	
Volume	634	634	0	0	433	0	433	0	
Percent	100.0		-	-	100.0	0.0		-	
High Int.	05:00 PM		-	-	04:30 PM			-	
Volume	189	189	-	-	128	0	128	-	
Peak Factor		0.839	-	-			0.846	-	

# TRAFFIC DATA, LLC

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File Name : hoover09  
Site Code : 00000000  
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	RIVERCHASE PKWY E Southbound		REGIONS GATED ACCESS Westbound		RIVERCHASE PKWY E Northbound			App. Total	Int. Total
	Start Time	Thru	App. Total	Right	App. Total	Thru	Right		
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1									
Intersection	07:30 AM								
Volume	211	211	0	0	1081	0	1081	0	1292
Percent	100.0		0.0		100.0	0.0			
07:45 Volume	62	62	0	0	311	0	311	0	373
Peak Factor								0.866	
High Int.	07:45 AM				07:45 AM				
Volume	62	62	0	0	311	0	311		
Peak Factor		0.851					0.869		
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1									
By Approach	07:30 AM		07:00 AM		07:30 AM		07:00 AM		
Volume	211	211	0	0	1081	0	1081	0	
Percent	100.0		-		100.0	0.0			
High Int.	07:45 AM		-		07:45 AM		-		
Volume	62	62	-	-	311	0	311	-	
Peak Factor		0.851					0.869		

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Hoover, AL

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Groups Printed- 1 - Unshifted

Start Time	RIVERCHASE PKWY E Southbound			PARKWAY OFFICE CIR Westbound			RIVERCHASE PKWY E Northbound				PARKWAY LAKE DR Eastbound			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	urn	Left	Thru	Right	
04:00 PM	1	55	5	45	5	1	16	74	4	1	1	2	18	228
04:15 PM	0	51	1	43	10	2	21	79	2	0	1	0	12	222
04:30 PM	0	63	4	67	10	6	31	90	4	0	0	0	28	303
04:45 PM	1	72	1	68	9	2	15	69	10	0	0	1	17	265
<b>Total</b>	<b>2</b>	<b>241</b>	<b>11</b>	<b>223</b>	<b>34</b>	<b>11</b>	<b>83</b>	<b>312</b>	<b>20</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>75</b>	<b>1018</b>
05:00 PM	1	90	1	77	15	7	23	83	6	0	0	2	21	326
05:15 PM	0	56	1	38	7	3	20	80	2	1	2	0	27	237
05:30 PM	0	46	2	32	6	2	22	69	2	2	1	2	12	198
05:45 PM	0	45	4	11	5	0	13	88	5	0	1	1	9	182
<b>Total</b>	<b>1</b>	<b>237</b>	<b>8</b>	<b>158</b>	<b>33</b>	<b>12</b>	<b>78</b>	<b>320</b>	<b>15</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>69</b>	<b>943</b>
07:00 AM	3	12	0	2	0	0	20	87	40	2	2	9	8	185
07:15 AM	3	20	1	5	2	1	19	86	57	0	0	8	10	212
07:30 AM	2	29	0	5	0	1	23	128	100	2	0	9	19	318
07:45 AM	0	41	2	8	0	0	36	164	107	1	2	7	15	383
<b>Total</b>	<b>8</b>	<b>102</b>	<b>3</b>	<b>20</b>	<b>2</b>	<b>2</b>	<b>98</b>	<b>465</b>	<b>304</b>	<b>5</b>	<b>4</b>	<b>33</b>	<b>52</b>	<b>1098</b>
08:00 AM	4	35	2	2	0	1	28	176	79	4	3	8	14	356
08:15 AM	4	27	0	8	1	2	24	138	68	3	2	6	10	293
08:30 AM	1	19	1	3	2	0	29	126	47	2	0	6	10	246
08:45 AM	1	34	2	5	3	0	24	76	21	1	1	1	9	178
<b>Total</b>	<b>10</b>	<b>115</b>	<b>5</b>	<b>18</b>	<b>6</b>	<b>3</b>	<b>105</b>	<b>516</b>	<b>215</b>	<b>10</b>	<b>6</b>	<b>21</b>	<b>43</b>	<b>1073</b>
<b>Grand Total</b>	<b>21</b>	<b>695</b>	<b>27</b>	<b>419</b>	<b>75</b>	<b>28</b>	<b>364</b>	<b>1613</b>	<b>554</b>	<b>19</b>	<b>16</b>	<b>62</b>	<b>239</b>	<b>4132</b>
<b>Apprch %</b>	<b>2.8</b>	<b>93.5</b>	<b>3.6</b>	<b>80.3</b>	<b>14.4</b>	<b>5.4</b>	<b>14.3</b>	<b>63.3</b>	<b>21.7</b>	<b>0.7</b>	<b>5.0</b>	<b>19.6</b>	<b>75.4</b>	
<b>Total %</b>	<b>0.5</b>	<b>16.8</b>	<b>0.7</b>	<b>10.1</b>	<b>1.8</b>	<b>0.7</b>	<b>8.8</b>	<b>39.0</b>	<b>13.4</b>	<b>0.5</b>	<b>0.4</b>	<b>1.5</b>	<b>5.8</b>	

Start Time	RIVERCHASE PKWY E Southbound				PARKWAY OFFICE CIR Westbound				RIVERCHASE PKWY E Northbound					PARKWAY LAKE DR Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	urn	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																		
Intersection 04:30 PM																		
Volume	2	281	7	290	250	41	18	309	89	322	22	1	434	2	3	93	98	1131
Percent	0.7	96.9	2.4		80.9	13.3	5.8		20.5	74.2	5.1	0.2		2.0	3.1	94.9		
05:00	1	90	1	92	77	15	7	99	23	83	6	0	112	0	2	21	23	326
Peak Factor																		0.867
High Int.	05:00 PM				05:00 PM				04:30 PM					05:15 PM				
Volume	1	90	1	92	77	15	7	99	31	90	4	0	125	2	0	27	29	
Peak Factor				0.788				0.780					0.868				0.845	
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																		
By Approach 04:30 PM																		
Volume	2	281	7	290	255	44	17	316	89	322	22	1	434	2	3	93	98	
Percent	0.7	96.9	2.4		80.7	13.9	5.4		20.5	74.2	5.1	0.2		2.0	3.1	94.9		
High Int.	05:00 PM				05:00 PM				04:30 PM					05:15 PM				
Volume	1	90	1	92	77	15	7	99	31	90	4	0	125	2	0	27	29	
Peak Factor				0.788				0.798					0.868				0.845	



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Start Time	RIVERCHASE PKWY E Southbound				PARKWAY OFFICE CIR Westbound				RIVERCHASE PKWY E Northbound					PARKWAY LAKE DR Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	Turn	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																		
Intersection	07:30 AM																	
Volume	10	132	4	146	23	1	4	28	111	606	354	10	1081	7	30	58	95	1350
Percent	6.8	90.4	2.7		82.1	3.6	14.3		10.3	56.1	32.7	0.9		7.4	31.6	61.1		
07:45	0	41	2	43	8	0	0	8	36	164	107	1	308	2	7	15	24	383
Peak Factor																		0.881
High Int.	07:45 AM				08:15 AM				07:45 AM					07:30 AM				
Volume	0	41	2	43	8	1	2	11	36	164	107	1	308	0	9	19	28	
Peak Factor	0.849								0.636					0.877				0.848
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																		
By Approach	07:30 AM				07:30 AM				07:30 AM					07:15 AM				
Volume	10	132	4	146	23	1	4	28	111	606	354	10	1081	5	32	58	95	
Percent	6.8	90.4	2.7		82.1	3.6	14.3		10.3	56.1	32.7	0.9		5.3	33.7	61.1		
High Int.	07:45 AM				08:15 AM				07:45 AM					07:30 AM				
Volume	0	41	2	43	8	1	2	11	36	164	107	1	308	0	9	19	28	
Peak Factor	0.849								0.636					0.877				0.848



# TRAFFIC DATA, LLC

PO Box 187

Cullman, AL 35056

205-824-0125

Hoover, AL

File Name : hoover07

Site Code : 00000000

Start Date : 08/15/2023

Page No : 1

Groups Printed- Unshifted

Start Time	RIVERCHASE PKWY E Southbound			VALLEYDALE RD Westbound				RIVERCHASE PKWY S Northbound			VALLEYDALE RD Eastbound			Int. Total
	Left	Thru	Right	Left	Thru	Right	turn	Left	Thru	Right	Left	Thru	Right	
04:00 PM	184	2	13	1	167	123	1	0	0	1	19	231	0	742
04:15 PM	165	1	11	2	161	124	4	1	1	2	22	215	0	709
04:30 PM	229	0	19	1	107	122	4	3	0	6	10	216	1	718
04:45 PM	192	0	22	0	122	102	3	1	1	2	18	221	1	685
<b>Total</b>	<b>770</b>	<b>3</b>	<b>65</b>	<b>4</b>	<b>557</b>	<b>471</b>	<b>12</b>	<b>5</b>	<b>2</b>	<b>11</b>	<b>69</b>	<b>883</b>	<b>2</b>	<b>2854</b>
05:00 PM	236	0	21	0	123	118	0	6	0	19	15	288	0	826
05:15 PM	221	0	13	2	119	114	2	2	1	16	28	223	1	742
05:30 PM	128	0	14	0	123	120	5	0	0	3	21	181	0	595
05:45 PM	91	0	16	0	119	100	3	0	0	2	24	167	0	522
<b>Total</b>	<b>676</b>	<b>0</b>	<b>64</b>	<b>2</b>	<b>484</b>	<b>452</b>	<b>10</b>	<b>8</b>	<b>1</b>	<b>40</b>	<b>88</b>	<b>859</b>	<b>1</b>	<b>2685</b>
07:00 AM	76	0	29	3	137	163	1	0	0	0	15	231	0	655
07:15 AM	62	0	15	5	167	182	0	1	0	0	17	195	3	647
07:30 AM	88	1	14	8	227	279	1	0	0	0	20	200	6	844
07:45 AM	90	0	20	16	200	375	2	0	0	0	28	211	4	946
<b>Total</b>	<b>316</b>	<b>1</b>	<b>78</b>	<b>32</b>	<b>731</b>	<b>999</b>	<b>4</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>80</b>	<b>837</b>	<b>13</b>	<b>3092</b>
08:00 AM	78	1	20	9	232	336	2	0	0	0	13	170	0	861
08:15 AM	50	1	22	4	226	252	1	0	1	0	26	168	3	754
08:30 AM	40	0	15	3	206	194	1	0	1	0	13	197	1	671
08:45 AM	54	1	17	1	184	143	0	0	1	0	7	154	0	562
<b>Total</b>	<b>222</b>	<b>3</b>	<b>74</b>	<b>17</b>	<b>848</b>	<b>925</b>	<b>4</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>59</b>	<b>689</b>	<b>4</b>	<b>2848</b>
<b>Grand Total</b>	<b>1984</b>	<b>7</b>	<b>281</b>	<b>55</b>	<b>2620</b>	<b>2847</b>	<b>30</b>	<b>14</b>	<b>6</b>	<b>51</b>	<b>296</b>	<b>3268</b>	<b>20</b>	<b>11479</b>
Apprch %	87.3	0.3	12.4	1.0	47.2	51.3	0.5	19.7	8.5	71.8	8.3	91.2	0.6	
Total %	17.3	0.1	2.4	0.5	22.8	24.8	0.3	0.1	0.1	0.4	2.6	28.5	0.2	

Start Time	RIVERCHASE PKWY E Southbound				VALLEYDALE RD Westbound					RIVERCHASE PKWY S Northbound				VALLEYDALE RD Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	turn	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	

Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1

Intersection	04:30 PM																	
Volume	878	0	75	953	3	471	456	9	939	12	2	43	57	71	948	3	1022	2971
Percent	92.1	0.0	7.9		0.3	50.2	48.6	1.0		21.1	3.5	75.4		6.9	92.8	0.3		
Volume	05:00 PM																	
Volume	236	0	21	257	0	123	118	0	241	6	0	19	25	15	288	0	303	826
Peak Factor																		0.899
High Int.	05:00 PM				05:00 PM					05:00 PM				05:00 PM				
Volume	236	0	21	257	0	123	118	0	241	6	0	19	25	15	288	0	303	
Peak Factor	0.927				0.974					0.570				0.843				

Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1

By Approach	04:30 PM				04:00 PM					04:30 PM				04:30 PM				
Volume	878	0	75	953	4	557	471	12	1044	12	2	43	57	71	948	3	1022	
Percent	92.1	0.0	7.9		0.4	53.4	45.1	1.1		21.1	3.5	75.4		6.9	92.8	0.3		
High Int.	05:00 PM				04:00 PM					05:00 PM				05:00 PM				
Volume	236	0	21	257	1	167	123	1	292	6	0	19	25	15	288	0	303	
Peak Factor	0.927				0.894					0.570				0.843				

# TRAFFIC DATA, LLC

PO Box 187  
Cullman, AL 35056  
205-824-0125

File Name : hoover07  
Site Code : 00000000  
Start Date : 08/15/2023  
Page No : 2

Start Time	RIVERCHASE PKWY E Southbound				VALLEYDALE RD Westbound					RIVERCHASE PKWY S Northbound				VALLEYDALE RD Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	Turn	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																		
Intersection 07:30 AM																		
Volume	306	3	76	385	37	885	124	6	2170	0	1	0	1	87	749	13	849	3405
Percent	79.5	0.8	19.7		1.7	40.8	57.2	0.3		0.0	100.0	0.0		10.2	88.2	1.5		
07:45 Volume	90	0	20	110	16	200	375	2	593	0	0	0	0	28	211	4	243	946
Peak Factor																		0.900
High Int.	07:45 AM				07:45 AM					08:15 AM				07:45 AM				
Volume	90	0	20	110	16	200	375	2	593	0	1	0	1	28	211	4	243	
Peak Factor	0.875				0.915					0.250				0.873				
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																		
By Approach																		
Volume	07:00 AM				07:30 AM					08:00 AM				07:00 AM				
Volume	316	1	78	395	37	885	124	6	2170	0	3	0	3	80	837	13	930	
Percent	80.0	0.3	19.7		1.7	40.8	57.2	0.3		0.0	100.0	0.0		8.6	90.0	1.4		
High Int.	07:45 AM				07:45 AM					08:15 AM				07:00 AM				
Volume	90	0	20	110	16	200	375	2	593	0	1	0	1	15	231	0	246	
Peak Factor	0.898				0.915					0.750				0.945				

**Appendix C**  
**Existing Conditions Capacity Analysis Printouts**

Timings  
1: Valleydale Rd & Riverchase Pkwy

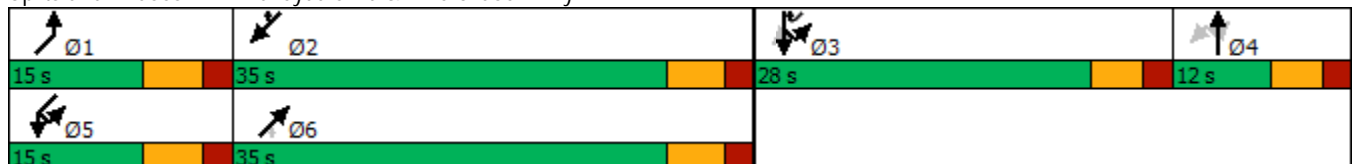
Existing AM  
09/06/2023

	↑	↙	↓	↘	↗	↖	↘	↙	↗	↖
Lane Group	NBT	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↖	↖↖	↖	↖	↖	↖↖↖	↖	↘	↖↖	↖↖
Traffic Volume (vph)	1	306	3	76	87	749	13	37	885	1242
Future Volume (vph)	1	306	3	76	87	749	13	37	885	1242
Turn Type	NA	Split	NA	Perm	Prot	NA	Perm	Prot	NA	pt+ov
Protected Phases	4	3	3		1	6		5	2	2 3
Permitted Phases				3			6			
Detector Phase	4	3	3	3	1	6	6	5	2	2 3
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	10.0	20.0	20.0	20.0	10.0	26.0	26.0	12.0	26.0	
Total Split (s)	12.0	28.0	28.0	28.0	15.0	35.0	35.0	15.0	35.0	
Total Split (%)	13.3%	31.1%	31.1%	31.1%	16.7%	38.9%	38.9%	16.7%	38.9%	
Yellow Time (s)	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.5	5.5	5.5	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	Min	Min	None	Min	
Act Effect Green (s)	6.6	22.1	22.1	22.1	8.7	32.1	32.1	8.1	29.0	58.3
Actuated g/C Ratio	0.09	0.29	0.29	0.29	0.11	0.42	0.42	0.11	0.38	0.77
v/c Ratio	0.02	0.25	0.25	0.15	0.50	0.40	0.02	0.25	0.71	0.57
Control Delay	37.0	23.6	25.3	0.5	44.1	18.1	0.1	37.9	25.8	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.0	23.6	25.3	0.5	44.1	18.1	0.1	37.9	25.8	2.3
LOS	D	C	C	A	D	B	A	D	C	A
Approach Delay	37.0		19.6			20.5			12.6	
Approach LOS	D		B			C			B	

Intersection Summary





























Cycle Length: 90  
 Actuated Cycle Length: 76.2  
 Natural Cycle: 70  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.71  
 Intersection Signal Delay: 15.5  
 Intersection LOS: B  
 Intersection Capacity Utilization 66.2%  
 ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 1: Valleydale Rd & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
1: Valleydale Rd & Riverchase Pkwy

Existing AM  
09/06/2023

													
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWU	SWL	SWT	
Lane Configurations				  				  			 	 	
Traffic Volume (vph)	0	1	0	306	3	76	87	749	13	6	37	885	
Future Volume (vph)	0	1	0	306	3	76	87	749	13	6	37	885	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.5		5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00		0.91	0.91	1.00	1.00	0.91	1.00		1.00	0.95	
Frt		1.00		1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)		1863		3221	1616	1583	1770	5085	1583		1770	3539	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (perm)		1863		3221	1616	1583	1770	5085	1583		1770	3539	
Peak-hour factor, PHF	0.25	0.25	0.25	0.88	0.88	0.88	0.87	0.87	0.87	0.92	0.92	0.92	
Adj. Flow (vph)	0	4	0	348	3	86	100	861	15	7	40	962	
RTOR Reduction (vph)	0	0	0	0	0	63	0	0	9	0	0	0	
Lane Group Flow (vph)	0	4	0	233	118	23	100	861	6	0	47	962	
Turn Type		NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	
Protected Phases		4		3	3		1	6		5	5	2	
Permitted Phases	4		4			3			6				
Actuated Green, G (s)		1.1		22.1	22.1	22.1	6.8	32.1	32.1		4.9	30.2	
Effective Green, g (s)		1.1		22.1	22.1	22.1	6.8	32.1	32.1		4.9	30.2	
Actuated g/C Ratio		0.01		0.27	0.27	0.27	0.08	0.39	0.39		0.06	0.36	
Clearance Time (s)		5.5		5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0		4.0	4.0	4.0	4.0	3.0	3.0		4.0	3.0	
Lane Grp Cap (vph)		24		855	429	420	144	1961	610		104	1284	
v/s Ratio Prot		c0.00		0.07	0.07		c0.06	0.17			0.03	c0.27	
v/s Ratio Perm						0.01			0.00				
v/c Ratio		0.17		0.27	0.28	0.05	0.69	0.44	0.01		0.45	0.75	
Uniform Delay, d1		40.6		24.2	24.2	22.8	37.2	18.9	15.8		37.9	23.2	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		4.4		0.2	0.5	0.1	14.5	0.2	0.0		4.2	2.4	
Delay (s)		45.0		24.4	24.7	22.8	51.7	19.1	15.8		42.1	25.6	
Level of Service		D		C	C	C	D	B	B		D	C	
Approach Delay (s)		45.0			24.2			22.3				14.8	
Approach LOS		D			C			C				B	
<b>Intersection Summary</b>													
HCM 2000 Control Delay			17.9		HCM 2000 Level of Service				B				
HCM 2000 Volume to Capacity ratio			0.67										
Actuated Cycle Length (s)			83.2		Sum of lost time (s)				23.0				
Intersection Capacity Utilization			66.2%		ICU Level of Service				C				
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 1: Valleydale Rd & Riverchase Pkwy

Existing AM  
 09/06/2023



Movement	SWR
Lane Configurations	TT
Traffic Volume (vph)	1242
Future Volume (vph)	1242
Ideal Flow (vphpl)	1900
Total Lost time (s)	6.0
Lane Util. Factor	0.88
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	2787
Flt Permitted	1.00
Satd. Flow (perm)	2787
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	1350
RTOR Reduction (vph)	315
Lane Group Flow (vph)	1035
Turn Type	pt+ov
Protected Phases	2 3
Permitted Phases	
Actuated Green, G (s)	58.3
Effective Green, g (s)	58.3
Actuated g/C Ratio	0.70
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	1952
v/s Ratio Prot	c0.37
v/s Ratio Perm	
v/c Ratio	0.53
Uniform Delay, d1	5.9
Progression Factor	1.00
Incremental Delay, d2	0.3
Delay (s)	6.2
Level of Service	A
Approach Delay (s)	
Approach LOS	
Intersection Summary	

# Timings

## 2: Riverchase Pkwy & Woods of Riverchase Dr

Existing AM  
09/06/2023



Lane Group	EBL	EBT	NBU	NBL	NBT	SBT	Ø8
Lane Configurations							
Traffic Volume (vph)	64	0	12	60	1088	182	
Future Volume (vph)	64	0	12	60	1088	182	
Turn Type	Perm	NA	pm+pt	pm+pt	NA	NA	
Protected Phases		4	1	1	6	2	8
Permitted Phases	4		6	6			
Detector Phase	4	4	1	1	6	2	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	10.0	10.0	10.0
Minimum Split (s)	9.0	9.0	9.0	9.0	20.0	20.0	15.0
Total Split (s)	20.0	20.0	12.0	12.0	40.0	28.0	20.0
Total Split (%)	33.3%	33.3%	20.0%	20.0%	66.7%	46.7%	33%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	
Lead/Lag			Lead	Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	Max	Max	Max	Max	None
Act Effect Green (s)	9.5	9.5		36.1	37.3	23.9	
Actuated g/C Ratio	0.18	0.18		0.69	0.71	0.46	
v/c Ratio	0.32	0.22		0.11	0.49	0.18	
Control Delay	22.8	0.6		4.3	5.8	9.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	
Total Delay	22.8	0.6		4.3	5.8	9.2	
LOS	C	A		A	A	A	
Approach Delay		7.9			5.7	9.2	
Approach LOS		A			A	A	

### Intersection Summary

Cycle Length: 60	
Actuated Cycle Length: 52.2	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.49	
Intersection Signal Delay: 6.5	Intersection LOS: A
Intersection Capacity Utilization 57.8%	ICU Level of Service B
Analysis Period (min) 15	

### Splits and Phases: 2: Riverchase Pkwy & Woods of Riverchase Dr



# HCM Signalized Intersection Capacity Analysis

## 2: Riverchase Pkwy & Woods of Riverchase Dr

Existing AM  
09/06/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	64	0	132	0	0	0	12	60	1088	0	0	182
Future Volume (vph)	64	0	132	0	0	0	12	60	1088	0	0	182
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5						4.5	4.5			4.5
Lane Util. Factor	1.00	1.00						1.00	0.95			0.95
Frt	1.00	0.85						1.00	1.00			0.98
Flt Protected	0.95	1.00						0.95	1.00			1.00
Satd. Flow (prot)	1770	1583						1770	3539			3477
Flt Permitted	0.76	1.00						0.49	1.00			1.00
Satd. Flow (perm)	1410	1583						908	3539			3477
Peak-hour factor, PHF	0.78	0.78	0.78	0.92	0.92	0.92	0.88	0.88	0.88	0.88	0.73	0.73
Adj. Flow (vph)	82	0	169	0	0	0	14	68	1236	0	0	249
RTOR Reduction (vph)	0	143	0	0	0	0	0	0	0	0	0	15
Lane Group Flow (vph)	82	26	0	0	0	0	0	82	1236	0	0	267
Turn Type	Perm	NA					pm+pt	pm+pt	NA			NA
Protected Phases		4			8		1	1	6			2
Permitted Phases	4			8			6	6			2	
Actuated Green, G (s)	8.1	8.1						36.1	36.1			24.0
Effective Green, g (s)	8.1	8.1						36.1	36.1			24.0
Actuated g/C Ratio	0.15	0.15						0.68	0.68			0.45
Clearance Time (s)	4.5	4.5						4.5	4.5			4.5
Vehicle Extension (s)	3.0	3.0						3.0	5.0			5.0
Lane Grp Cap (vph)	214	241						739	2401			1568
v/s Ratio Prot		0.02						0.02	c0.35			0.08
v/s Ratio Perm	c0.06							0.06				
v/c Ratio	0.38	0.11						0.11	0.51			0.17
Uniform Delay, d1	20.3	19.4						3.1	4.2			8.7
Progression Factor	1.00	1.00						1.00	1.00			1.00
Incremental Delay, d2	1.1	0.2						0.3	0.8			0.2
Delay (s)	21.4	19.6						3.4	5.0			8.9
Level of Service	C	B						A	A			A
Approach Delay (s)		20.2			0.0				4.9			8.9
Approach LOS		C			A				A			A

### Intersection Summary

HCM 2000 Control Delay	7.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	53.2	Sum of lost time (s)	13.5
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



HCM Signalized Intersection Capacity Analysis  
 2: Riverchase Pkwy & Woods of Riverchase Dr

Existing AM  
 09/06/2023



Movement	SBR
Lane Configurations	
Traffic Volume (vph)	24
Future Volume (vph)	24
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.73
Adj. Flow (vph)	33
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Timings  
3: Riverchase Pkwy & Regions Dr

Existing AM  
09/06/2023

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	2	2	1086	99	35	199
Future Volume (vph)	2	2	1086	99	35	199
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	
Permitted Phases		4		6		2
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	15.0	15.0	25.0	25.0	4.0	25.0
Minimum Split (s)	20.0	20.0	30.0	30.0	20.0	30.0
Total Split (s)	12.0	12.0	36.0	36.0	12.0	48.0
Total Split (%)	20.0%	20.0%	60.0%	60.0%	20.0%	80.0%
Yellow Time (s)	3.2	3.2	3.9	3.9	3.2	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
Act Effect Green (s)	7.9	7.9	30.2	30.2	6.6	45.3
Actuated g/C Ratio	0.16	0.16	0.63	0.63	0.14	0.94
v/c Ratio	0.01	0.02	0.55	0.11	0.17	0.07
Control Delay	20.5	15.0	7.2	2.2	22.2	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.5	15.0	7.2	2.2	22.2	0.9
LOS	C	B	A	A	C	A
Approach Delay	17.8		6.8			4.1
Approach LOS	B		A			A

Intersection Summary

Cycle Length: 60  
 Actuated Cycle Length: 48  
 Natural Cycle: 70  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.55  
 Intersection Signal Delay: 6.4  
 Intersection Capacity Utilization 50.1%  
 Analysis Period (min) 15  
 Intersection LOS: A  
 ICU Level of Service A

Splits and Phases: 3: Riverchase Pkwy & Regions Dr



# HCM Signalized Intersection Capacity Analysis

## 3: Riverchase Pkwy & Regions Dr

Existing AM  
09/06/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↵	↵	↕↕	↵	↵	↕↕
Traffic Volume (vph)	2	2	1086	99	35	199
Future Volume (vph)	2	2	1086	99	35	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.50	0.50	0.88	0.88	0.84	0.84
Adj. Flow (vph)	4	4	1234	112	42	237
RTOR Reduction (vph)	0	4	0	41	0	0
Lane Group Flow (vph)	4	0	1234	72	42	237
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	
Permitted Phases		4		6		2
Actuated Green, G (s)	1.2	1.2	30.3	30.3	6.6	41.1
Effective Green, g (s)	1.2	1.2	30.3	30.3	6.6	41.1
Actuated g/C Ratio	0.02	0.02	0.59	0.59	0.13	0.80
Clearance Time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Vehicle Extension (s)	3.0	3.0	6.0	6.0	3.0	6.0
Lane Grp Cap (vph)	41	36	2086	933	227	2829
v/s Ratio Prot	c0.00		c0.35		c0.02	
v/s Ratio Perm		0.00		0.05		0.07
v/c Ratio	0.10	0.00	0.59	0.08	0.19	0.08
Uniform Delay, d1	24.6	24.5	6.6	4.5	20.0	1.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.0	0.8	0.1	0.4	0.0
Delay (s)	25.6	24.5	7.5	4.6	20.4	1.1
Level of Service	C	C	A	A	C	A
Approach Delay (s)	25.1		7.2			4.0
Approach LOS	C		A			A

### Intersection Summary

HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	51.4	Sum of lost time (s)	13.3
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 4: Riverchase Pkwy & Regions Gated Access

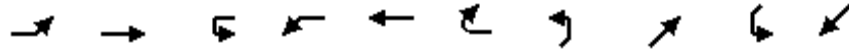
Existing AM  
09/06/2023



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑↑	↑↑			↗
Traffic Volume (veh/h)	0	211	1081	0	0	0
Future Volume (Veh/h)	0	211	1081	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	229	1175	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		586	794			
pX, platoon unblocked	0.79				0.79	0.79
vC, conflicting volume	1175				1290	588
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	697				842	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	709				240	859
Direction, Lane #	SE 1	SE 2	NW 1	NW 2	SW 1	
Volume Total	114	114	783	392	0	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	0	
cSH	1700	1700	1700	1700	1700	
Volume to Capacity	0.07	0.07	0.46	0.23	0.00	
Queue Length 95th (ft)	0	0	0	0	0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS						A
Approach Delay (s)	0.0		0.0		0.0	
Approach LOS						A
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			33.2%		ICU Level of Service	A
Analysis Period (min)			15			

Timings  
5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

Existing AM  
09/06/2023

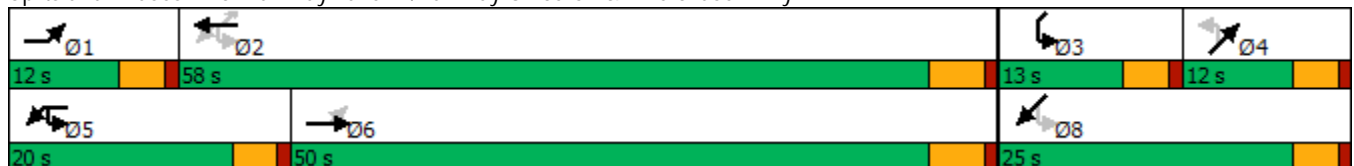


Lane Group	EBL	EBT	WBU	WBL	WBT	WBR	NEL	NET	SWL	SWT
Lane Configurations										
Traffic Volume (vph)	10	132	10	111	606	354	7	30	23	1
Future Volume (vph)	10	132	10	111	606	354	7	30	23	1
Turn Type	pm+pt	NA	pm+pt	pm+pt	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases	1	6	5	5	2			4	3	8
Permitted Phases	6		2	2		2	4		8	
Detector Phase	1	6	5	5	2	2	4	4	3	8
Switch Phase										
Minimum Initial (s)	4.0	25.0	4.0	4.0	15.0	15.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	30.0	12.0	12.0	30.0	30.0	12.0	12.0	9.0	12.0
Total Split (s)	12.0	50.0	20.0	20.0	58.0	58.0	12.0	12.0	13.0	25.0
Total Split (%)	12.6%	52.6%	21.1%	21.1%	61.1%	61.1%	12.6%	12.6%	13.7%	26.3%
Yellow Time (s)	3.2	3.9	3.2	3.2	3.9	3.9	3.2	3.2	3.2	3.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.2	4.9		4.2	4.9	4.9		4.2	4.2	4.2
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	Min	None	None	Min	Min	None	None	None	None
Act Effect Green (s)	39.5	35.9		44.6	44.1	44.1		7.6	11.4	11.2
Actuated g/C Ratio	0.64	0.58		0.72	0.71	0.71		0.12	0.18	0.18
v/c Ratio	0.02	0.08		0.16	0.27	0.32		0.43	0.14	0.03
Control Delay	5.0	10.1		4.9	6.3	1.8		22.5	25.4	17.6
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	5.0	10.1		4.9	6.3	1.8		22.5	25.4	17.6
LOS	A	B		A	A	A		C	C	B
Approach Delay		9.7			4.6			22.5		24.0
Approach LOS		A			A			C		C

Intersection Summary

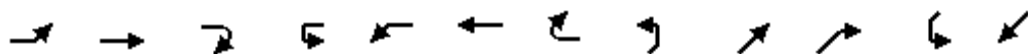
Cycle Length: 95  
 Actuated Cycle Length: 61.9  
 Natural Cycle: 65  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.43  
 Intersection Signal Delay: 7.0  
 Intersection Capacity Utilization 50.1%  
 Analysis Period (min) 15  
 Intersection LOS: A  
 ICU Level of Service A

Splits and Phases: 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

Existing AM  
 09/06/2023



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT
Lane Configurations												
Traffic Volume (vph)	10	132	4	10	111	606	354	7	30	58	23	1
Future Volume (vph)	10	132	4	10	111	606	354	7	30	58	23	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9			4.2	4.9	4.9		4.2		4.2	4.2
Lane Util. Factor	1.00	0.95			1.00	0.95	1.00		1.00		1.00	1.00
Frt	1.00	1.00			1.00	1.00	0.85		0.92		1.00	0.89
Flt Protected	0.95	1.00			0.95	1.00	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1770	3523			1770	3539	1583		1703		1770	1653
Flt Permitted	0.39	1.00			0.58	1.00	1.00		0.97		0.41	1.00
Satd. Flow (perm)	726	3523			1088	3539	1583		1663		760	1653
Peak-hour factor, PHF	0.85	0.85	0.85	0.88	0.88	0.88	0.88	0.85	0.85	0.85	0.64	0.64
Adj. Flow (vph)	12	155	5	11	126	689	402	8	35	68	36	2
RTOR Reduction (vph)	0	2	0	0	0	0	154	0	60	0	0	5
Lane Group Flow (vph)	12	158	0	0	137	689	248	0	51	0	36	3
Turn Type	pm+pt	NA		pm+pt	pm+pt	NA	Perm	Perm	NA		pm+pt	NA
Protected Phases	1	6		5	5	2			4		3	8
Permitted Phases	6			2	2		2	4			8	
Actuated Green, G (s)	37.8	37.0			47.6	42.6	42.6		5.6		12.3	12.3
Effective Green, g (s)	37.8	37.0			47.6	42.6	42.6		5.6		12.3	12.3
Actuated g/C Ratio	0.55	0.54			0.69	0.62	0.62		0.08		0.18	0.18
Clearance Time (s)	4.2	4.9			4.2	4.9	4.9		4.2		4.2	4.2
Vehicle Extension (s)	3.0	6.0			3.0	6.0	6.0		3.5		3.5	3.0
Lane Grp Cap (vph)	409	1889			813	2184	977		134		172	294
v/s Ratio Prot	0.00	0.04			c0.02	c0.19					c0.01	0.00
v/s Ratio Perm	0.02				0.10		0.16		c0.03		0.03	
v/c Ratio	0.03	0.08			0.17	0.32	0.25		0.38		0.21	0.01
Uniform Delay, d1	7.1	7.8			3.7	6.3	6.0		30.1		24.0	23.3
Progression Factor	1.00	1.00			1.00	1.00	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.0	0.1			0.1	0.2	0.4		2.1		0.7	0.0
Delay (s)	7.1	7.8			3.8	6.5	6.4		32.2		24.7	23.4
Level of Service	A	A			A	A	A		C		C	C
Approach Delay (s)		7.8				6.2			32.2			24.5
Approach LOS		A				A			C			C

Intersection Summary

HCM 2000 Control Delay	8.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	69.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	SWR
Lane Configurations	
Traffic Volume (vph)	4
Future Volume (vph)	4
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.64
Adj. Flow (vph)	6
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	



Timings  
1: Valleydale Rd & Riverchase Pkwy

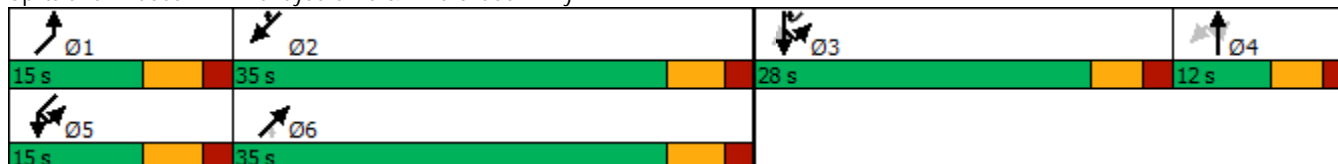
Existing PM  
09/06/2023

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	12	2	43	878	0	75	71	948	3	3	471	456
Future Volume (vph)	12	2	43	878	0	75	71	948	3	3	471	456
Turn Type	Perm	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	pt+ov
Protected Phases		4		3	3		1	6		5	2	2 3
Permitted Phases	4		4			3			6			
Detector Phase	4	4	4	3	3	3	1	6	6	5	2	2 3
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	10.0	10.0	10.0	20.0	20.0	20.0	10.0	26.0	26.0	12.0	26.0	
Total Split (s)	12.0	12.0	12.0	28.0	28.0	28.0	15.0	35.0	35.0	15.0	35.0	
Total Split (%)	13.3%	13.3%	13.3%	31.1%	31.1%	31.1%	16.7%	38.9%	38.9%	16.7%	38.9%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Act Effect Green (s)		6.8	6.8	21.9	21.9	21.9	8.7	31.2	31.2	7.4	22.7	52.2
Actuated g/C Ratio		0.09	0.09	0.29	0.29	0.29	0.11	0.41	0.41	0.10	0.30	0.68
v/c Ratio		0.20	0.25	0.69	0.68	0.14	0.42	0.54	0.01	0.07	0.46	0.23
Control Delay		41.1	2.0	31.1	36.2	0.5	42.7	19.7	0.0	36.8	25.9	1.0
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		41.1	2.0	31.1	36.2	0.5	42.7	19.7	0.0	36.8	25.9	1.0
LOS		D	A	C	D	A	D	B	A	D	C	A
Approach Delay		11.8			30.2			21.2			13.9	
Approach LOS		B			C			C			B	

Intersection Summary





























Cycle Length: 90  
 Actuated Cycle Length: 76.4  
 Natural Cycle: 70  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.69  
 Intersection Signal Delay: 21.6  
 Intersection LOS: C  
 Intersection Capacity Utilization 60.8%  
 ICU Level of Service B  
 Analysis Period (min) 15

Splits and Phases: 1: Valleydale Rd & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
1: Valleydale Rd & Riverchase Pkwy

Existing PM  
09/06/2023

													
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWU	SWL	SWT	
Lane Configurations				  				  			 	 	
Traffic Volume (vph)	12	2	43	878	0	75	71	948	3	9	3	471	
Future Volume (vph)	12	2	43	878	0	75	71	948	3	9	3	471	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00	0.91	0.91	1.00	1.00	0.91	1.00		1.00	0.95	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	
Flt Protected		0.96	1.00	0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)		1788	1583	3221	1610	1583	1770	5085	1583		1770	3539	
Flt Permitted		0.77	1.00	0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (perm)		1428	1583	3221	1610	1583	1770	5085	1583		1770	3539	
Peak-hour factor, PHF	0.57	0.57	0.57	0.93	0.93	0.93	0.84	0.84	0.84	0.97	0.97	0.97	
Adj. Flow (vph)	21	4	75	944	0	81	85	1129	4	9	3	486	
RTOR Reduction (vph)	0	0	71	0	0	59	0	0	2	0	0	0	
Lane Group Flow (vph)	0	25	4	632	312	22	85	1129	2	0	12	486	
Turn Type	Perm	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	
Protected Phases		4		3	3		1	6		5	5	2	
Permitted Phases	4		4			3			6				
Actuated Green, G (s)		4.8	4.8	21.9	21.9	21.9	6.6	31.2	31.2		1.4	26.0	
Effective Green, g (s)		4.8	4.8	21.9	21.9	21.9	6.6	31.2	31.2		1.4	26.0	
Actuated g/C Ratio		0.06	0.06	0.27	0.27	0.27	0.08	0.38	0.38		0.02	0.32	
Clearance Time (s)		5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0		4.0	3.0	
Lane Grp Cap (vph)		83	92	857	428	421	141	1927	600		30	1118	
v/s Ratio Prot				c0.20	0.19		c0.05	c0.22			0.01	0.14	
v/s Ratio Perm		c0.02	0.00			0.01			0.00				
v/c Ratio		0.30	0.05	0.74	0.73	0.05	0.60	0.59	0.00		0.40	0.43	
Uniform Delay, d1		37.1	36.6	27.6	27.5	22.5	36.6	20.4	15.9		40.0	22.3	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.8	0.3	3.6	6.5	0.1	8.2	0.5	0.0		11.5	0.3	
Delay (s)		39.9	36.9	31.1	34.0	22.5	44.7	20.9	15.9		51.5	22.6	
Level of Service		D	D	C	C	C	D	C	B		D	C	
Approach Delay (s)		37.6			31.3			22.5				14.7	
Approach LOS		D			C			C				B	
<b>Intersection Summary</b>													
HCM 2000 Control Delay			23.4		HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.65										
Actuated Cycle Length (s)			82.3		Sum of lost time (s)				23.0				
Intersection Capacity Utilization			60.8%		ICU Level of Service				B				
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 1: Valleydale Rd & Riverchase Pkwy

Existing PM  
 09/06/2023



Movement	SWR
Lane Configurations	TT
Traffic Volume (vph)	456
Future Volume (vph)	456
Ideal Flow (vphpl)	1900
Total Lost time (s)	6.0
Lane Util. Factor	0.88
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	2787
Flt Permitted	1.00
Satd. Flow (perm)	2787
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	470
RTOR Reduction (vph)	162
Lane Group Flow (vph)	308
Turn Type	pt+ov
Protected Phases	2 3
Permitted Phases	
Actuated Green, G (s)	53.9
Effective Green, g (s)	53.9
Actuated g/C Ratio	0.65
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	1825
v/s Ratio Prot	0.11
v/s Ratio Perm	
v/c Ratio	0.17
Uniform Delay, d1	5.5
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	5.6
Level of Service	A
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Timings  
2: Riverchase Pkwy & Woods of Riverchase Dr

Existing PM  
09/06/2023



Lane Group	EBL	EBT	NBU	NBL	NBT	SBT	Ø8
Lane Configurations							
Traffic Volume (vph)	62	0	20	162	317	658	
Future Volume (vph)	62	0	20	162	317	658	
Turn Type	Perm	NA	pm+pt	pm+pt	NA	NA	
Protected Phases		4	1	1	6	2	8
Permitted Phases	4		6	6			
Detector Phase	4	4	1	1	6	2	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	10.0	10.0	10.0
Minimum Split (s)	9.0	9.0	9.0	9.0	20.0	20.0	15.0
Total Split (s)	20.0	20.0	12.0	12.0	40.0	28.0	20.0
Total Split (%)	33.3%	33.3%	20.0%	20.0%	66.7%	46.7%	33%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	
Lead/Lag			Lead	Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	Max	Max	Max	Max	None
Act Effect Green (s)	9.3	9.3		36.1	37.3	23.9	
Actuated g/C Ratio	0.18	0.18		0.69	0.72	0.46	
v/c Ratio	0.32	0.24		0.38	0.13	0.49	
Control Delay	23.0	1.1		6.2	3.8	12.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	
Total Delay	23.0	1.1		6.2	3.8	12.0	
LOS	C	A		A	A	B	
Approach Delay		9.5			4.7	12.0	
Approach LOS		A			A	B	

Intersection Summary

Cycle Length: 60	
Actuated Cycle Length: 52	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.49	
Intersection Signal Delay: 9.2	Intersection LOS: A
Intersection Capacity Utilization 47.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Riverchase Pkwy & Woods of Riverchase Dr



HCM Signalized Intersection Capacity Analysis  
2: Riverchase Pkwy & Woods of Riverchase Dr

Existing PM  
09/06/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	62	0	99	0	0	0	20	162	317	0	0	658
Future Volume (vph)	62	0	99	0	0	0	20	162	317	0	0	658
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5						4.5	4.5			4.5
Lane Util. Factor	1.00	1.00						1.00	0.95			0.95
Frt	1.00	0.85						1.00	1.00			0.99
Flt Protected	0.95	1.00						0.95	1.00			1.00
Satd. Flow (prot)	1770	1583						1770	3539			3496
Flt Permitted	0.76	1.00						0.24	1.00			1.00
Satd. Flow (perm)	1410	1583						452	3539			3496
Peak-hour factor, PHF	0.77	0.77	0.77	0.92	0.92	0.92	0.95	0.95	0.95	0.95	0.90	0.90
Adj. Flow (vph)	81	0	129	0	0	0	21	171	334	0	0	731
RTOR Reduction (vph)	0	110	0	0	0	0	0	0	0	0	0	10
Lane Group Flow (vph)	81	19	0	0	0	0	0	192	334	0	0	785
Turn Type	Perm	NA					pm+pt	pm+pt	NA			NA
Protected Phases		4			8		1	1	6			2
Permitted Phases	4			8			6	6			2	
Actuated Green, G (s)	7.9	7.9						36.1	36.1			24.0
Effective Green, g (s)	7.9	7.9						36.1	36.1			24.0
Actuated g/C Ratio	0.15	0.15						0.68	0.68			0.45
Clearance Time (s)	4.5	4.5						4.5	4.5			4.5
Vehicle Extension (s)	3.0	3.0						3.0	5.0			5.0
Lane Grp Cap (vph)	210	235						496	2410			1583
v/s Ratio Prot		0.01						c0.06	0.09			c0.22
v/s Ratio Perm	c0.06							0.21				
v/c Ratio	0.39	0.08						0.39	0.14			0.50
Uniform Delay, d1	20.4	19.4						4.1	3.0			10.2
Progression Factor	1.00	1.00						1.00	1.00			1.00
Incremental Delay, d2	1.2	0.2						2.3	0.1			1.1
Delay (s)	21.5	19.6						6.3	3.1			11.3
Level of Service	C	B						A	A			B
Approach Delay (s)		20.3			0.0				4.3			11.3
Approach LOS		C			A				A			B

Intersection Summary		
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.46	B
Actuated Cycle Length (s)	53.0	Sum of lost time (s)
Intersection Capacity Utilization	47.5%	13.5
Analysis Period (min)	15	ICU Level of Service
		A

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 2: Riverchase Pkwy & Woods of Riverchase Dr

Existing PM  
 09/06/2023



Movement	SBR
Lane Configurations	
Traffic Volume (vph)	58
Future Volume (vph)	58
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.90
Adj. Flow (vph)	64
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Timings  
3: Riverchase Pkwy & Regions Dr

Existing PM  
09/06/2023



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↑↑	↗	↙	↑↑
Traffic Volume (vph)	75	41	384	1	2	641
Future Volume (vph)	75	41	384	1	2	641
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	
Permitted Phases		4		6		2
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	15.0	15.0	25.0	25.0	4.0	25.0
Minimum Split (s)	20.0	20.0	30.0	30.0	20.0	30.0
Total Split (s)	12.0	12.0	36.0	36.0	12.0	48.0
Total Split (%)	20.0%	20.0%	60.0%	60.0%	20.0%	80.0%
Yellow Time (s)	3.2	3.2	3.9	3.9	3.2	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
Act Effct Green (s)	7.9	7.9	25.3	25.3	5.7	36.4
Actuated g/C Ratio	0.16	0.16	0.51	0.51	0.12	0.74
v/c Ratio	0.36	0.19	0.24	0.00	0.01	0.29
Control Delay	24.1	8.7	8.0	6.0	20.5	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.1	8.7	8.0	6.0	20.5	3.5
LOS	C	A	A	A	C	A
Approach Delay	18.7		8.0			3.6
Approach LOS	B		A			A

Intersection Summary

Cycle Length: 60  
 Actuated Cycle Length: 49.3  
 Natural Cycle: 70  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.36  
 Intersection Signal Delay: 6.7  
 Intersection Capacity Utilization 40.9%  
 Analysis Period (min) 15  
 Intersection LOS: A  
 ICU Level of Service A

Splits and Phases: 3: Riverchase Pkwy & Regions Dr





HCM Signalized Intersection Capacity Analysis  
3: Riverchase Pkwy & Regions Dr

Existing PM  
09/06/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	75	41	384	1	2	641
Future Volume (vph)	75	41	384	1	2	641
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.73	0.73	0.90	0.90	0.85	0.85
Adj. Flow (vph)	103	56	427	1	2	754
RTOR Reduction (vph)	0	49	0	0	0	0
Lane Group Flow (vph)	103	7	427	1	2	754
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	
Permitted Phases		4		6		2
Actuated Green, G (s)	5.9	5.9	25.3	25.3	5.7	35.2
Effective Green, g (s)	5.9	5.9	25.3	25.3	5.7	35.2
Actuated g/C Ratio	0.12	0.12	0.50	0.50	0.11	0.70
Clearance Time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Vehicle Extension (s)	3.0	3.0	6.0	6.0	3.0	6.0
Lane Grp Cap (vph)	208	186	1783	797	200	2481
v/s Ratio Prot	c0.06		0.12		0.00	
v/s Ratio Perm		0.00		0.00		c0.21
v/c Ratio	0.50	0.04	0.24	0.00	0.01	0.30
Uniform Delay, d1	20.8	19.6	7.0	6.2	19.7	2.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	0.1	0.2	0.0	0.0	0.2
Delay (s)	22.6	19.7	7.2	6.2	19.8	3.0
Level of Service	C	B	A	A	B	A
Approach Delay (s)	21.6		7.2			3.1
Approach LOS	C		A			A

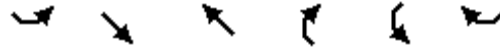
Intersection Summary

HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	50.2	Sum of lost time (s)	13.3
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
 4: Riverchase Pkwy & Regions Gated Access

Existing PM  
 09/06/2023



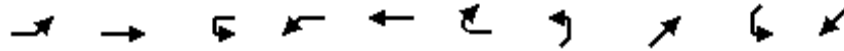
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑↑	↑↑			↗
Traffic Volume (veh/h)	0	634	433	0	0	0
Future Volume (Veh/h)	0	634	433	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.84	0.84	0.85	0.85	0.92	0.92
Hourly flow rate (vph)	0	755	509	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		586	794			
pX, platoon unblocked					0.98	
vC, conflicting volume	509				886	254
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	509				845	254
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1052				296	745
Direction, Lane #	SE 1	SE 2	NW 1	NW 2	SW 1	
Volume Total	378	378	339	170	0	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	0	
cSH	1700	1700	1700	1700	1700	
Volume to Capacity	0.22	0.22	0.20	0.10	0.00	
Queue Length 95th (ft)	0	0	0	0	0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS					A	
Approach Delay (s)	0.0		0.0		0.0	
Approach LOS					A	
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			20.9%		ICU Level of Service	A
Analysis Period (min)			15			

Timings

Existing PM

5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

09/06/2023



Lane Group	EBL	EBT	WBU	WBL	WBT	WBR	NEL	NET	SWL	SWT
Lane Configurations										
Traffic Volume (vph)	2	281	1	89	322	22	2	3	250	41
Future Volume (vph)	2	281	1	89	322	22	2	3	250	41
Turn Type	pm+pt	NA	pm+pt	pm+pt	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases	1	6	5	5	2			4	3	8
Permitted Phases	6		2	2		2	4		8	
Detector Phase	1	6	5	5	2	2	4	4	3	8
Switch Phase										
Minimum Initial (s)	4.0	25.0	4.0	4.0	15.0	15.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	30.0	12.0	12.0	30.0	30.0	12.0	12.0	9.0	12.0
Total Split (s)	12.0	50.0	20.0	20.0	58.0	58.0	12.0	12.0	13.0	25.0
Total Split (%)	12.6%	52.6%	21.1%	21.1%	61.1%	61.1%	12.6%	12.6%	13.7%	26.3%
Yellow Time (s)	3.2	3.9	3.2	3.2	3.9	3.9	3.2	3.2	3.2	3.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.2	4.9		4.2	4.9	4.9		4.2	4.2	4.2
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	Min	None	None	Min	Min	None	None	None	None
Act Effect Green (s)	30.7	25.8		36.2	33.7	33.7		6.9	17.3	17.3
Actuated g/C Ratio	0.49	0.41		0.58	0.54	0.54		0.11	0.28	0.28
v/c Ratio	0.01	0.25		0.17	0.19	0.03		0.42	0.88	0.15
Control Delay	6.5	14.6		7.2	9.0	0.0		12.8	49.1	14.4
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	6.5	14.6		7.2	9.0	0.0		12.8	49.1	14.4
LOS	A	B		A	A	A		B	D	B
Approach Delay		14.5			8.1			12.8		42.5
Approach LOS		B			A			B		D

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 62.2

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 20.1

Intersection LOS: C

Intersection Capacity Utilization 57.4%

ICU Level of Service B

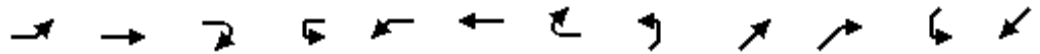
Analysis Period (min) 15

Splits and Phases: 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

Existing PM  
 09/06/2023



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT
Lane Configurations												
Traffic Volume (vph)	2	281	7	1	89	322	22	2	3	93	250	41
Future Volume (vph)	2	281	7	1	89	322	22	2	3	93	250	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9			4.2	4.9	4.9		4.2		4.2	4.2
Lane Util. Factor	1.00	0.95			1.00	0.95	1.00		1.00		1.00	1.00
Frt	1.00	1.00			1.00	1.00	0.85		0.87		1.00	0.95
Flt Protected	0.95	1.00			0.95	1.00	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1770	3526			1770	3539	1583		1623		1770	1778
Flt Permitted	0.53	1.00			0.46	1.00	1.00		0.99		0.43	1.00
Satd. Flow (perm)	990	3526			866	3539	1583		1612		801	1778
Peak-hour factor, PHF	0.79	0.79	0.79	0.87	0.87	0.87	0.87	0.85	0.85	0.85	0.78	0.78
Adj. Flow (vph)	3	356	9	1	102	370	25	2	4	109	321	53
RTOR Reduction (vph)	0	2	0	0	0	0	12	0	101	0	0	15
Lane Group Flow (vph)	3	363	0	0	103	370	13	0	14	0	321	61
Turn Type	pm+pt	NA		pm+pt	pm+pt	NA	Perm	Perm	NA		pm+pt	NA
Protected Phases	1	6		5	5	2			4		3	8
Permitted Phases	6			2	2		2	4			8	
Actuated Green, G (s)	29.1	28.1			38.9	33.7	33.7		5.1		18.4	18.4
Effective Green, g (s)	29.1	28.1			38.9	33.7	33.7		5.1		18.4	18.4
Actuated g/C Ratio	0.44	0.42			0.59	0.51	0.51		0.08		0.28	0.28
Clearance Time (s)	4.2	4.9			4.2	4.9	4.9		4.2		4.2	4.2
Vehicle Extension (s)	3.0	6.0			3.0	6.0	6.0		3.5		3.5	3.0
Lane Grp Cap (vph)	445	1492			597	1796	803		123		354	492
v/s Ratio Prot	0.00	c0.10			c0.02	0.10					c0.12	0.03
v/s Ratio Perm	0.00				0.08		0.01		0.01		c0.13	
v/c Ratio	0.01	0.24			0.17	0.21	0.02		0.12		0.91	0.12
Uniform Delay, d1	10.5	12.3			6.2	9.0	8.1		28.6		22.1	18.0
Progression Factor	1.00	1.00			1.00	1.00	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.0	0.2			0.1	0.2	0.0		0.5		26.2	0.1
Delay (s)	10.5	12.6			6.3	9.2	8.1		29.1		48.3	18.1
Level of Service	B	B			A	A	A		C		D	B
Approach Delay (s)		12.5				8.5			29.1			42.5
Approach LOS		B				A			C			D

Intersection Summary

HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	66.4	Sum of lost time (s)	17.5
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	SWR
Lane Configurations	
Traffic Volume (vph)	18
Future Volume (vph)	18
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.78
Adj. Flow (vph)	23
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

**Appendix D**  
**Turn Lane Warrant Evaluation Printouts**

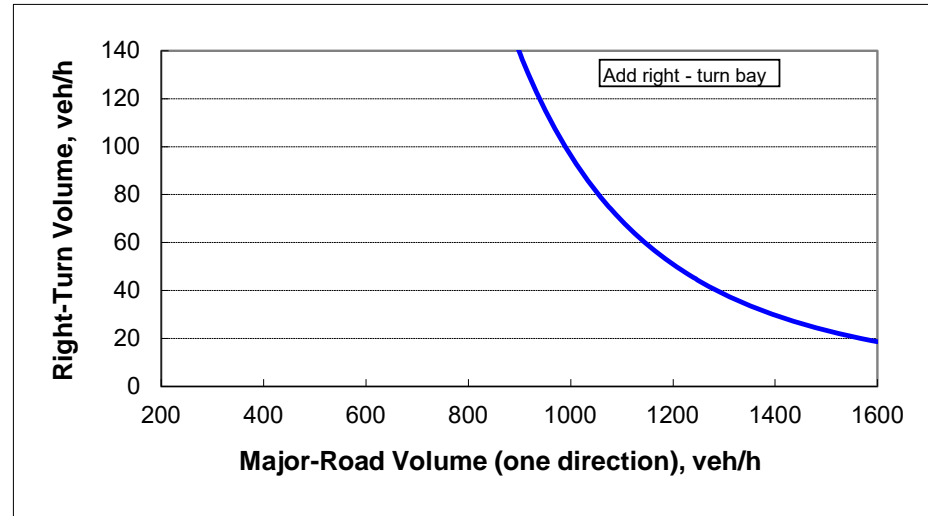
**Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.**

INPUT

Roadway geometry:	4-lane roadway
Variable	Value
Major-road speed, mph:	30
Major-road volume (one direction), veh/h:	1821
Right-turn volume, veh/h:	177

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	12
<b>Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:</b>	
<b>Add right-turn bay.</b>	





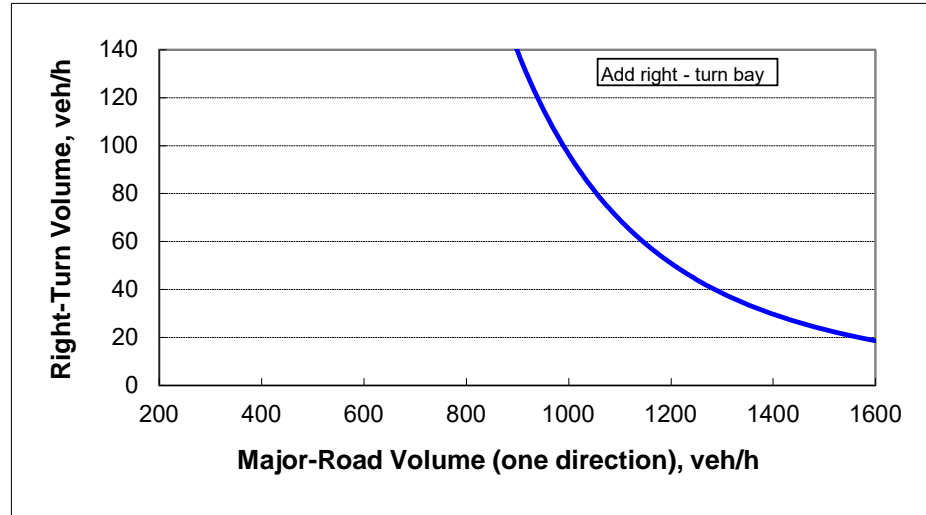
**Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.**

INPUT

Roadway geometry:	4-lane roadway
Variable	Value
Major-road speed, mph:	30
Major-road volume (one direction), veh/h:	1919
Right-turn volume, veh/h:	19

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	10
<b>Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:</b>	
<b>Add right-turn bay.</b>	



**Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.**

**4-lane roadway**

**INPUT**

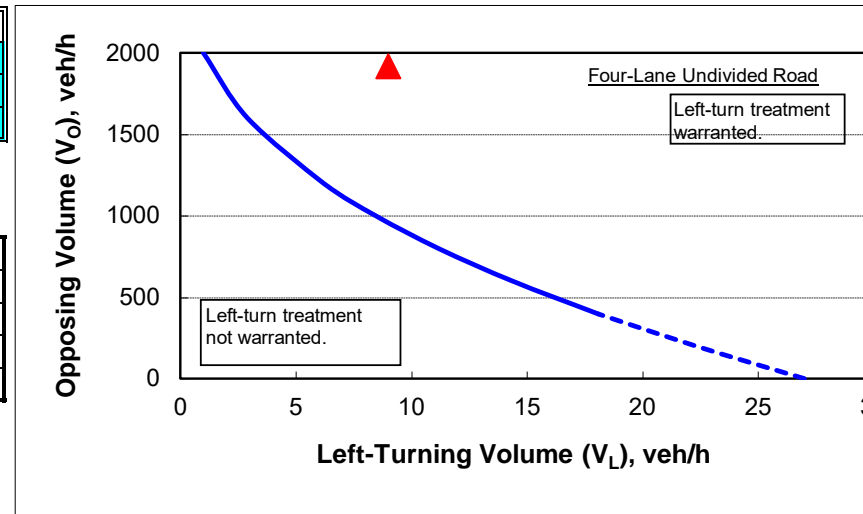
Variable	Value
Left-turning volume ( $V_L$ ), veh/h:	9
Advancing volume ( $V_A$ ), veh/h:	400
Opposing volume ( $V_O$ ), veh/h:	1919

**OUTPUT**

Variable	Message
Opposing volume ( $V_O$ ) check:	O.K.
Combined volume ( $V_A$ and $V_O$ ) check:	O.K.
<b>Guidance for determining the need for a major-road left-turn bay:</b>	
Left-turn treatment warranted.	

**CALIBRATION CONSTANTS**

Variable	Value
Average time for making left-turn, s:	4.0
Critical headway, s:	6.0



Note: When  $V_O < 400$  veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume ( $V_A$ ) in the same direction as the left-turning traffic exceeds 400 veh/h ( $V_A > 400$  veh/h).

**Appendix E**  
**Future Intersection Capacity Analysis Printouts**

Timings  
1: Valleydale Rd & Riverchase Pkwy

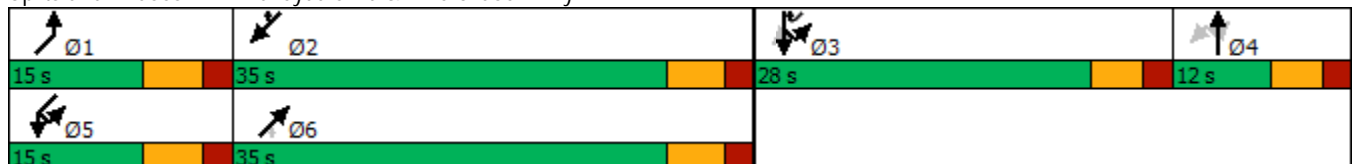
Future AM  
09/06/2023

	↑	↙	↓	↘	↗	↖	↘	↙	↗	↖
Lane Group	NBT	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↖	↙↘	↖	↗	↙	↖↖↖	↗	↘	↖↖	↗↗
Traffic Volume (vph)	3	476	5	118	137	764	13	38	903	1955
Future Volume (vph)	3	476	5	118	137	764	13	38	903	1955
Turn Type	NA	Split	NA	Perm	Prot	NA	Perm	Prot	NA	pt+ov
Protected Phases	4	3	3		1	6		5	2	2 3
Permitted Phases				3			6			
Detector Phase	4	3	3	3	1	6	6	5	2	2 3
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	10.0	20.0	20.0	20.0	10.0	26.0	26.0	12.0	26.0	
Total Split (s)	12.0	28.0	28.0	28.0	15.0	35.0	35.0	15.0	35.0	
Total Split (%)	13.3%	31.1%	31.1%	31.1%	16.7%	38.9%	38.9%	16.7%	38.9%	
Yellow Time (s)	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.5	5.5	5.5	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	Min	Min	None	Min	
Act Effect Green (s)	6.5	22.6	22.6	22.6	9.0	35.4	35.4	8.1	29.1	57.2
Actuated g/C Ratio	0.08	0.28	0.28	0.28	0.11	0.44	0.44	0.10	0.36	0.71
v/c Ratio	0.08	0.40	0.41	0.24	0.79	0.39	0.02	0.27	0.77	0.96
Control Delay	37.7	25.7	27.7	3.0	64.5	18.0	0.1	38.5	28.4	20.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.7	25.7	27.7	3.0	64.5	18.0	0.1	38.5	28.4	20.4
LOS	D	C	C	A	E	B	A	D	C	C
Approach Delay	37.7		21.8			24.7			23.2	
Approach LOS	D		C			C			C	

Intersection Summary




























Cycle Length: 90  
 Actuated Cycle Length: 80.4  
 Natural Cycle: 90  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.96  
 Intersection Signal Delay: 23.3  
 Intersection LOS: C  
 Intersection Capacity Utilization 93.9%  
 ICU Level of Service F  
 Analysis Period (min) 15

Splits and Phases: 1: Valleydale Rd & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
1: Valleydale Rd & Riverchase Pkwy

Future AM  
09/06/2023

													
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWU	SWL	SWT	
Lane Configurations				  				  				 	
Traffic Volume (vph)	0	3	0	476	5	118	137	764	13	6	38	903	
Future Volume (vph)	0	3	0	476	5	118	137	764	13	6	38	903	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.5		5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00		0.91	0.91	1.00	1.00	0.91	1.00		1.00	0.95	
Frt		1.00		1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)		1863		3221	1617	1583	1770	5085	1583		1770	3539	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (perm)		1863		3221	1617	1583	1770	5085	1583		1770	3539	
Peak-hour factor, PHF	0.25	0.25	0.25	0.88	0.88	0.88	0.87	0.87	0.87	0.92	0.92	0.92	
Adj. Flow (vph)	0	12	0	541	6	134	157	878	15	7	41	982	
RTOR Reduction (vph)	0	0	0	0	0	99	0	0	9	0	0	0	
Lane Group Flow (vph)	0	12	0	362	185	35	157	878	6	0	48	982	
Turn Type		NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	
Protected Phases		4		3	3		1	6		5	5	2	
Permitted Phases	4		4			3			6				
Actuated Green, G (s)		1.2		22.6	22.6	22.6	9.0	35.4	35.4		5.2	31.6	
Effective Green, g (s)		1.2		22.6	22.6	22.6	9.0	35.4	35.4		5.2	31.6	
Actuated g/C Ratio		0.01		0.26	0.26	0.26	0.10	0.41	0.41		0.06	0.36	
Clearance Time (s)		5.5		5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0		4.0	4.0	4.0	4.0	3.0	3.0		4.0	3.0	
Lane Grp Cap (vph)		25		832	418	409	182	2059	641		105	1279	
v/s Ratio Prot		c0.01		0.11	0.11		c0.09	c0.17			0.03	0.28	
v/s Ratio Perm						0.02			0.00				
v/c Ratio		0.48		0.44	0.44	0.08	0.86	0.43	0.01		0.46	0.77	
Uniform Delay, d1		42.8		27.1	27.1	24.6	38.6	18.7	15.5		39.7	24.7	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		18.5		0.5	1.0	0.1	32.7	0.1	0.0		4.3	2.8	
Delay (s)		61.3		27.6	28.1	24.7	71.3	18.8	15.5		44.0	27.5	
Level of Service		E		C	C	C	E	B	B		D	C	
Approach Delay (s)		61.3			27.2			26.6				28.5	
Approach LOS		E			C			C				C	
<b>Intersection Summary</b>													
HCM 2000 Control Delay			28.0		HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			1.05										
Actuated Cycle Length (s)			87.4		Sum of lost time (s)				23.0				
Intersection Capacity Utilization			93.9%		ICU Level of Service				F				
Analysis Period (min)			15										

c Critical Lane Group





Movement	SWR
Lane Configurations	TT
Traffic Volume (vph)	1955
Future Volume (vph)	1955
Ideal Flow (vphpl)	1900
Total Lost time (s)	6.0
Lane Util. Factor	0.88
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	2787
Flt Permitted	1.00
Satd. Flow (perm)	2787
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	2125
RTOR Reduction (vph)	246
Lane Group Flow (vph)	1879
Turn Type	pt+ov
Protected Phases	2 3
Permitted Phases	
Actuated Green, G (s)	60.2
Effective Green, g (s)	60.2
Actuated g/C Ratio	0.69
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	1919
v/s Ratio Prot	c0.67
v/s Ratio Perm	
v/c Ratio	0.98
Uniform Delay, d1	13.0
Progression Factor	1.00
Incremental Delay, d2	15.6
Delay (s)	28.6
Level of Service	C
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Timings  
2: Riverchase Pkwy & Woods of Riverchase Dr

Future AM  
09/06/2023



Lane Group	EBL	EBT	WBL	WBT	NBU	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	65	1	25	1	12	61	1827	9	367
Future Volume (vph)	65	1	25	1	12	61	1827	9	367
Turn Type	Perm	NA	Perm	NA	pm+pt	pm+pt	NA	Perm	NA
Protected Phases		4		8	1	1	6		2
Permitted Phases	4		8		6	6		2	
Detector Phase	4	4	8	8	1	1	6	2	2
Switch Phase									
Minimum Initial (s)	4.0	4.0	10.0	10.0	4.0	4.0	10.0	10.0	10.0
Minimum Split (s)	9.0	9.0	15.0	15.0	9.0	9.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	20.0	20.0	12.0	12.0	40.0	28.0	28.0
Total Split (%)	33.3%	33.3%	33.3%	33.3%	20.0%	20.0%	66.7%	46.7%	46.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0		0.0
Total Lost Time (s)	4.5	4.5		4.5		4.5	4.5		4.5
Lead/Lag					Lead	Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max
Act Effect Green (s)	9.6	9.6		10.8		36.1	37.3		23.9
Actuated g/C Ratio	0.18	0.18		0.21		0.69	0.71		0.46
v/c Ratio	0.33	0.40		0.15		0.13	0.83		0.38
Control Delay	23.1	7.1		16.9		4.5	13.0		11.4
Queue Delay	0.0	0.0		0.0		0.0	0.0		0.0
Total Delay	23.1	7.1		16.9		4.5	13.0		11.4
LOS	C	A		B		A	B		B
Approach Delay		12.3		16.9			12.7		11.4
Approach LOS		B		B			B		B

Intersection Summary

Cycle Length: 60  
 Actuated Cycle Length: 52.3  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.83  
 Intersection Signal Delay: 12.5  
 Intersection LOS: B  
 Intersection Capacity Utilization 88.7%  
 ICU Level of Service E  
 Analysis Period (min) 15

Splits and Phases: 2: Riverchase Pkwy & Woods of Riverchase Dr



# HCM Signalized Intersection Capacity Analysis

## 2: Riverchase Pkwy & Woods of Riverchase Dr

Future AM  
09/06/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	65	1	135	25	1	12	12	61	1827	19	9	367
Future Volume (vph)	65	1	135	25	1	12	12	61	1827	19	9	367
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5			4.5	4.5			4.5
Lane Util. Factor	1.00	1.00			1.00			1.00	0.95			0.95
Frt	1.00	0.85			0.96			1.00	1.00			0.99
Flt Protected	0.95	1.00			0.97			0.95	1.00			1.00
Satd. Flow (prot)	1770	1585			1726			1770	3534			3503
Flt Permitted	0.73	1.00			0.72			0.36	1.00			0.88
Satd. Flow (perm)	1360	1585			1283			670	3534			3099
Peak-hour factor, PHF	0.78	0.78	0.78	0.92	0.92	0.92	0.88	0.88	0.88	0.88	0.73	0.73
Adj. Flow (vph)	83	1	173	27	1	13	14	69	2076	22	12	503
RTOR Reduction (vph)	0	146	0	0	8	0	0	0	1	0	0	7
Lane Group Flow (vph)	83	28	0	0	33	0	0	83	2097	0	0	541
Turn Type	Perm	NA		Perm	NA		pm+pt	pm+pt	NA		Perm	NA
Protected Phases		4			8		1	1	6			2
Permitted Phases	4			8			6	6			2	
Actuated Green, G (s)	8.2	8.2			8.2			36.1	36.1			24.0
Effective Green, g (s)	8.2	8.2			8.2			36.1	36.1			24.0
Actuated g/C Ratio	0.15	0.15			0.15			0.68	0.68			0.45
Clearance Time (s)	4.5	4.5			4.5			4.5	4.5			4.5
Vehicle Extension (s)	3.0	3.0			3.0			3.0	5.0			5.0
Lane Grp Cap (vph)	209	243			197			610	2393			1395
v/s Ratio Prot		0.02						0.02	c0.59			
v/s Ratio Perm	c0.06				0.03			0.07				0.17
v/c Ratio	0.40	0.11			0.17			0.14	0.88			0.39
Uniform Delay, d1	20.3	19.4			19.6			3.2	6.8			9.8
Progression Factor	1.00	1.00			1.00			1.00	1.00			1.00
Incremental Delay, d2	1.2	0.2			0.4			0.5	4.9			0.8
Delay (s)	21.6	19.6			20.0			3.7	11.7			10.6
Level of Service	C	B			C			A	B			B
Approach Delay (s)		20.3			20.0				11.4			10.6
Approach LOS		C			C				B			B

### Intersection Summary

HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	53.3	Sum of lost time (s)	13.5
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR
Lane Configurations	
Traffic Volume (vph)	24
Future Volume (vph)	24
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.73
Adj. Flow (vph)	33
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

# Timings

## 3: Riverchase Pkwy & Regions Dr

Future AM  
09/06/2023

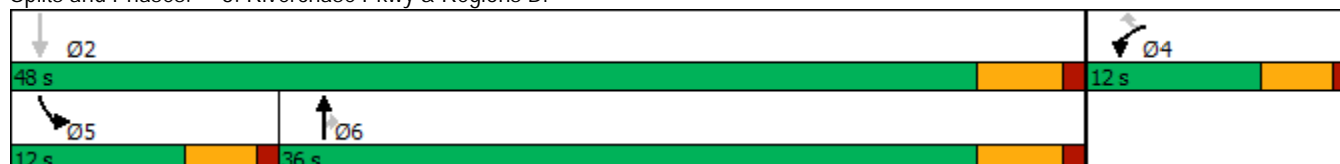


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↕	↗	↙	↕
Traffic Volume (vph)	58	30	1798	140	55	338
Future Volume (vph)	58	30	1798	140	55	338
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	
Permitted Phases		4		6		2
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	15.0	15.0	25.0	25.0	4.0	25.0
Minimum Split (s)	20.0	20.0	30.0	30.0	20.0	30.0
Total Split (s)	12.0	12.0	36.0	36.0	12.0	48.0
Total Split (%)	20.0%	20.0%	60.0%	60.0%	20.0%	80.0%
Yellow Time (s)	3.2	3.2	3.9	3.9	3.2	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
Act Effect Green (s)	7.9	7.9	31.4	31.4	7.0	43.9
Actuated g/C Ratio	0.14	0.14	0.55	0.55	0.12	0.77
v/c Ratio	0.47	0.22	1.04	0.17	0.30	0.15
Control Delay	31.3	10.0	50.1	4.6	27.7	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.3	10.0	50.1	4.6	27.7	2.6
LOS	C	A	D	A	C	A
Approach Delay	24.0		46.9			6.1
Approach LOS	C		D			A

### Intersection Summary

Cycle Length: 60  
 Actuated Cycle Length: 56.8  
 Natural Cycle: 100  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.04  
 Intersection Signal Delay: 38.8  
 Intersection LOS: D  
 Intersection Capacity Utilization 69.8%  
 ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 3: Riverchase Pkwy & Regions Dr





# HCM Signalized Intersection Capacity Analysis

## 3: Riverchase Pkwy & Regions Dr

Future AM  
09/06/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	58	30	1798	140	55	338
Future Volume (vph)	58	30	1798	140	55	338
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.50	0.50	0.88	0.88	0.84	0.84
Adj. Flow (vph)	116	60	2043	159	65	402
RTOR Reduction (vph)	0	54	0	39	0	0
Lane Group Flow (vph)	116	6	2043	120	65	402
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	
Permitted Phases		4		6		2
Actuated Green, G (s)	5.9	5.9	31.5	31.5	7.0	42.7
Effective Green, g (s)	5.9	5.9	31.5	31.5	7.0	42.7
Actuated g/C Ratio	0.10	0.10	0.55	0.55	0.12	0.74
Clearance Time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Vehicle Extension (s)	3.0	3.0	6.0	6.0	3.0	6.0
Lane Grp Cap (vph)	180	161	1932	864	214	2618
v/s Ratio Prot	c0.07		c0.58		c0.04	
v/s Ratio Perm		0.00		0.08		0.11
v/c Ratio	0.64	0.04	1.06	0.14	0.30	0.15
Uniform Delay, d1	24.9	23.3	13.1	6.4	23.1	2.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.7	0.1	37.6	0.2	0.8	0.1
Delay (s)	32.6	23.4	50.7	6.6	23.9	2.3
Level of Service	C	C	D	A	C	A
Approach Delay (s)	29.5		47.6			5.3
Approach LOS	C		D			A

### Intersection Summary

HCM 2000 Control Delay	39.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	57.7	Sum of lost time (s)	13.3
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 4: Riverchase Pkwy & Regions Gated Access

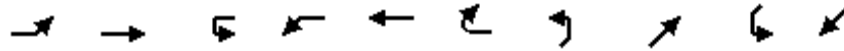
Future AM  
09/06/2023



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑↑	↑↑			↑
Traffic Volume (veh/h)	0	370	1644	177	0	60
Future Volume (Veh/h)	0	370	1644	177	0	60
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	402	1787	192	0	65
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		586	794			
pX, platoon unblocked	0.48				0.48	0.48
vC, conflicting volume	1979				2084	990
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	867				1086	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	87
cM capacity (veh/h)	370				101	519
Direction, Lane #	SE 1	SE 2	NW 1	NW 2	SW 1	
Volume Total	201	201	1191	788	65	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	192	65	
cSH	1700	1700	1700	1700	519	
Volume to Capacity	0.12	0.12	0.70	0.46	0.13	
Queue Length 95th (ft)	0	0	0	0	11	
Control Delay (s)	0.0	0.0	0.0	0.0	12.9	
Lane LOS					B	
Approach Delay (s)	0.0		0.0		12.9	
Approach LOS					B	
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			61.5%		ICU Level of Service	B
Analysis Period (min)			15			

Timings  
5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

Future AM  
09/06/2023



Lane Group	EBL	EBT	WBU	WBL	WBT	WBR	NEL	NET	SWL	SWT
Lane Configurations										
Traffic Volume (vph)	200	162	10	133	698	835	7	78	149	14
Future Volume (vph)	200	162	10	133	698	835	7	78	149	14
Turn Type	pm+pt	NA	pm+pt	pm+pt	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases	1	6	5	5	2			4	3	8
Permitted Phases	6		2	2		2	4		8	
Detector Phase	1	6	5	5	2	2	4	4	3	8
Switch Phase										
Minimum Initial (s)	4.0	25.0	4.0	4.0	15.0	15.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	30.0	12.0	12.0	30.0	30.0	12.0	12.0	9.0	12.0
Total Split (s)	12.0	50.0	20.0	20.0	58.0	58.0	12.0	12.0	13.0	25.0
Total Split (%)	12.6%	52.6%	21.1%	21.1%	61.1%	61.1%	12.6%	12.6%	13.7%	26.3%
Yellow Time (s)	3.2	3.9	3.2	3.2	3.9	3.9	3.2	3.2	3.2	3.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.2	4.9		4.2	4.9	4.9		4.2	4.2	4.2
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	Min	None	None	Min	Min	None	None	None	None
Act Effect Green (s)	59.4	50.9		60.7	51.6	51.6		7.8	20.8	20.8
Actuated g/C Ratio	0.64	0.54		0.65	0.55	0.55		0.08	0.22	0.22
v/c Ratio	0.51	0.10		0.20	0.41	0.84		1.01	0.95	0.24
Control Delay	9.8	10.4		5.7	12.8	14.8		109.6	81.7	12.1
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	9.8	10.4		5.7	12.8	14.8		109.6	81.7	12.1
LOS	A	B		A	B	B		F	F	B
Approach Delay		10.0			13.2			109.6		60.5
Approach LOS		B			B			F		E

Intersection Summary

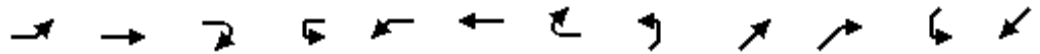
Cycle Length: 95  
 Actuated Cycle Length: 93.5  
 Natural Cycle: 75  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.01  
 Intersection Signal Delay: 24.1  
 Intersection Capacity Utilization 82.1%  
 Analysis Period (min) 15  
 Intersection LOS: C  
 ICU Level of Service E

Splits and Phases: 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

Future AM  
 09/06/2023



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT
Lane Configurations												
Traffic Volume (vph)	200	162	4	10	133	698	835	7	78	61	149	14
Future Volume (vph)	200	162	4	10	133	698	835	7	78	61	149	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9			4.2	4.9	4.9		4.2		4.2	4.2
Lane Util. Factor	1.00	0.95			1.00	0.95	1.00		1.00		1.00	1.00
Frt	1.00	1.00			1.00	1.00	0.85		0.94		1.00	0.88
Flt Protected	0.95	1.00			0.95	1.00	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1770	3526			1770	3539	1583		1753		1770	1644
Flt Permitted	0.30	1.00			0.62	1.00	1.00		0.98		0.33	1.00
Satd. Flow (perm)	565	3526			1155	3539	1583		1723		621	1644
Peak-hour factor, PHF	0.85	0.85	0.85	0.88	0.88	0.88	0.88	0.85	0.85	0.85	0.64	0.64
Adj. Flow (vph)	235	191	5	11	151	793	949	8	92	72	233	22
RTOR Reduction (vph)	0	2	0	0	0	0	255	0	27	0	0	62
Lane Group Flow (vph)	235	194	0	0	162	793	694	0	145	0	233	40
Turn Type	pm+pt	NA		pm+pt	pm+pt	NA	Perm	Perm	NA		pm+pt	NA
Protected Phases	1	6		5	5	2			4		3	8
Permitted Phases	6			2	2		2	4			8	
Actuated Green, G (s)	58.6	50.9			60.0	51.6	51.6		7.8		20.8	20.8
Effective Green, g (s)	58.6	50.9			60.0	51.6	51.6		7.8		20.8	20.8
Actuated g/C Ratio	0.63	0.54			0.64	0.55	0.55		0.08		0.22	0.22
Clearance Time (s)	4.2	4.9			4.2	4.9	4.9		4.2		4.2	4.2
Vehicle Extension (s)	3.0	6.0			3.0	6.0	6.0		3.5		3.5	3.0
Lane Grp Cap (vph)	453	1921			797	1955	874		143		246	366
v/s Ratio Prot	c0.04	0.06			0.02	0.22					c0.09	0.02
v/s Ratio Perm	0.28				0.11		c0.44		0.08		c0.12	
v/c Ratio	0.52	0.10			0.20	0.41	0.79		1.01		0.95	0.11
Uniform Delay, d1	7.9	10.2			6.6	12.1	16.7		42.8		34.3	28.9
Progression Factor	1.00	1.00			1.00	1.00	1.00		1.00		1.00	1.00
Incremental Delay, d2	1.0	0.1			0.1	0.4	6.1		78.1		42.9	0.1
Delay (s)	8.9	10.3			6.7	12.4	22.8		120.9		77.2	29.0
Level of Service	A	B			A	B	C		F		E	C
Approach Delay (s)		9.5				17.1			120.9			62.5
Approach LOS		A				B			F			E

Intersection Summary

HCM 2000 Control Delay	27.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	93.4	Sum of lost time (s)	17.5
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	SWR
Lane Configurations	
Traffic Volume (vph)	51
Future Volume (vph)	51
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.64
Adj. Flow (vph)	80
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	



Timings  
1: Valleydale Rd & Riverchase Pkwy

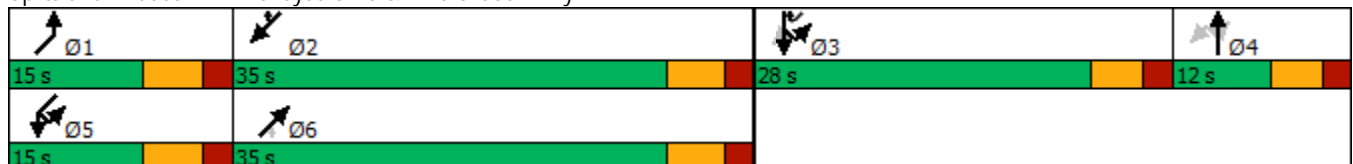
Future PM  
09/06/2023

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	12	9	44	1427	0	122	135	967	3	3	480	867
Future Volume (vph)	12	9	44	1427	0	122	135	967	3	3	480	867
Turn Type	Perm	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	pt+ov
Protected Phases		4		3	3		1	6		5	2	2 3
Permitted Phases	4		4			3			6			
Detector Phase	4	4	4	3	3	3	1	6	6	5	2	2 3
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	10.0	10.0	10.0	20.0	20.0	20.0	10.0	26.0	26.0	12.0	26.0	
Total Split (s)	12.0	12.0	12.0	28.0	28.0	28.0	15.0	35.0	35.0	15.0	35.0	
Total Split (%)	13.3%	13.3%	13.3%	31.1%	31.1%	31.1%	16.7%	38.9%	38.9%	16.7%	38.9%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Act Effect Green (s)		6.6	6.6	22.7	22.7	22.7	9.1	35.9	35.9	7.2	23.4	51.7
Actuated g/C Ratio		0.08	0.08	0.28	0.28	0.28	0.11	0.44	0.44	0.09	0.29	0.63
v/c Ratio		0.40	0.27	1.16	1.14	0.23	0.83	0.52	0.01	0.08	0.49	0.44
Control Delay		52.0	2.3	112.9	117.5	2.9	71.5	19.2	0.0	38.1	26.6	2.1
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		52.0	2.3	112.9	117.5	2.9	71.5	19.2	0.0	38.1	26.6	2.1
LOS		D	A	F	F	A	E	B	A	D	C	A
Approach Delay		18.4			105.6			25.5			11.1	
Approach LOS		B			F			C			B	

Intersection Summary





























Cycle Length: 90  
 Actuated Cycle Length: 82.1  
 Natural Cycle: 80  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.16  
 Intersection Signal Delay: 50.5  
 Intersection LOS: D  
 Intersection Capacity Utilization 72.5%  
 ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 1: Valleydale Rd & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
1: Valleydale Rd & Riverchase Pkwy

Future PM  
09/06/2023

													
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWU	SWL	SWT	
Lane Configurations				  				  			 	 	
Traffic Volume (vph)	12	9	44	1427	0	122	135	967	3	9	3	480	
Future Volume (vph)	12	9	44	1427	0	122	135	967	3	9	3	480	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00	0.91	0.91	1.00	1.00	0.91	1.00		1.00	0.95	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	
Flt Protected		0.97	1.00	0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)		1811	1583	3221	1610	1583	1770	5085	1583		1770	3539	
Flt Permitted		0.63	1.00	0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (perm)		1168	1583	3221	1610	1583	1770	5085	1583		1770	3539	
Peak-hour factor, PHF	0.57	0.57	0.57	0.93	0.93	0.93	0.84	0.84	0.84	0.97	0.97	0.97	
Adj. Flow (vph)	21	16	77	1534	0	131	161	1151	4	9	3	495	
RTOR Reduction (vph)	0	0	73	0	0	97	0	0	2	0	0	0	
Lane Group Flow (vph)	0	37	4	1028	506	34	161	1151	2	0	12	495	
Turn Type	Perm	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	
Protected Phases		4		3	3		1	6		5	5	2	
Permitted Phases	4		4			3			6				
Actuated Green, G (s)		5.0	5.0	22.7	22.7	22.7	9.1	35.9	35.9		1.5	28.3	
Effective Green, g (s)		5.0	5.0	22.7	22.7	22.7	9.1	35.9	35.9		1.5	28.3	
Actuated g/C Ratio		0.06	0.06	0.26	0.26	0.26	0.10	0.41	0.41		0.02	0.32	
Clearance Time (s)		5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0		4.0	3.0	
Lane Grp Cap (vph)		66	89	829	414	407	182	2072	645		30	1136	
v/s Ratio Prot				c0.32	0.31		c0.09	c0.23			0.01	0.14	
v/s Ratio Perm		c0.03	0.00			0.02			0.00				
v/c Ratio		0.56	0.05	1.24	1.22	0.08	0.88	0.56	0.00		0.40	0.44	
Uniform Delay, d1		40.5	39.3	32.7	32.7	24.8	39.0	20.0	15.5		42.9	23.6	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		12.6	0.3	118.3	119.9	0.1	36.9	0.3	0.0		11.5	0.3	
Delay (s)		53.0	39.6	151.0	152.6	24.9	75.9	20.3	15.5		54.4	23.9	
Level of Service		D	D	F	F	C	E	C	B		D	C	
Approach Delay (s)		44.0			141.6			27.1				13.5	
Approach LOS		D			F			C				B	
<b>Intersection Summary</b>													
HCM 2000 Control Delay			65.7		HCM 2000 Level of Service				E				
HCM 2000 Volume to Capacity ratio			0.86										
Actuated Cycle Length (s)			88.1		Sum of lost time (s)				23.0				
Intersection Capacity Utilization			72.5%		ICU Level of Service				C				
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis  
 1: Valleydale Rd & Riverchase Pkwy

Future PM  
 09/06/2023



Movement	SWR
Lane Configurations	TT
Traffic Volume (vph)	867
Future Volume (vph)	867
Ideal Flow (vphpl)	1900
Total Lost time (s)	6.0
Lane Util. Factor	0.88
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	2787
Flt Permitted	1.00
Satd. Flow (perm)	2787
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	894
RTOR Reduction (vph)	261
Lane Group Flow (vph)	633
Turn Type	pt+ov
Protected Phases	2 3
Permitted Phases	
Actuated Green, G (s)	57.0
Effective Green, g (s)	57.0
Actuated g/C Ratio	0.65
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	1803
v/s Ratio Prot	0.23
v/s Ratio Perm	
v/c Ratio	0.35
Uniform Delay, d1	7.1
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	7.2
Level of Service	A
Approach Delay (s)	
Approach LOS	
Intersection Summary	

# Timings

## 2: Riverchase Pkwy & Woods of Riverchase Dr

Future PM  
09/06/2023



Lane Group	EBL	EBT	WBL	WBT	NBU	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	63	4	33	1	20	166	751	15	1219
Future Volume (vph)	63	4	33	1	20	166	751	15	1219
Turn Type	Perm	NA	Perm	NA	pm+pt	pm+pt	NA	Perm	NA
Protected Phases		4		8	1	1	6		2
Permitted Phases	4		8		6	6		2	
Detector Phase	4	4	8	8	1	1	6	2	2
Switch Phase									
Minimum Initial (s)	4.0	4.0	10.0	10.0	4.0	4.0	10.0	10.0	10.0
Minimum Split (s)	9.0	9.0	15.0	15.0	9.0	9.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	20.0	20.0	12.0	12.0	40.0	28.0	28.0
Total Split (%)	33.3%	33.3%	33.3%	33.3%	20.0%	20.0%	66.7%	46.7%	46.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0		0.0
Total Lost Time (s)	4.5	4.5		4.5		4.5	4.5		4.5
Lead/Lag					Lead	Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max
Act Effect Green (s)	9.4	9.4		10.6		36.1	37.3		23.9
Actuated g/C Ratio	0.18	0.18		0.20		0.69	0.72		0.46
v/c Ratio	0.34	0.34		0.20		0.49	0.33		0.94
Control Delay	23.5	7.6		16.0		10.0	4.5		30.9
Queue Delay	0.0	0.0		0.0		0.0	0.0		0.0
Total Delay	23.5	7.6		16.0		10.0	4.5		30.9
LOS	C	A		B		A	A		C
Approach Delay		13.6		16.0			5.6		30.9
Approach LOS		B		B			A		C

### Intersection Summary

Cycle Length: 60  
 Actuated Cycle Length: 52.1  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.94  
 Intersection Signal Delay: 19.8  
 Intersection LOS: B  
 Intersection Capacity Utilization 78.5%  
 ICU Level of Service D  
 Analysis Period (min) 15

### Splits and Phases: 2: Riverchase Pkwy & Woods of Riverchase Dr



HCM Signalized Intersection Capacity Analysis  
2: Riverchase Pkwy & Woods of Riverchase Dr

Future PM  
09/06/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	63	4	101	33	1	17	20	166	751	29	15	1219
Future Volume (vph)	63	4	101	33	1	17	20	166	751	29	15	1219
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5			4.5	4.5			4.5
Lane Util. Factor	1.00	1.00			1.00			1.00	0.95			0.95
Frt	1.00	0.86			0.96			1.00	0.99			0.99
Flt Protected	0.95	1.00			0.97			0.95	1.00			1.00
Satd. Flow (prot)	1770	1594			1724			1770	3519			3513
Flt Permitted	0.72	1.00			0.72			0.14	1.00			0.94
Satd. Flow (perm)	1343	1594			1285			261	3519			3311
Peak-hour factor, PHF	0.77	0.77	0.77	0.92	0.92	0.92	0.95	0.95	0.95	0.95	0.90	0.90
Adj. Flow (vph)	82	5	131	36	1	18	21	175	791	31	17	1354
RTOR Reduction (vph)	0	111	0	0	15	0	0	0	4	0	0	5
Lane Group Flow (vph)	82	25	0	0	40	0	0	196	818	0	0	1432
Turn Type	Perm	NA		Perm	NA		pm+pt	pm+pt	NA		Perm	NA
Protected Phases		4			8		1	1	6			2
Permitted Phases	4			8			6	6			2	
Actuated Green, G (s)	8.0	8.0			8.0			36.1	36.1			24.0
Effective Green, g (s)	8.0	8.0			8.0			36.1	36.1			24.0
Actuated g/C Ratio	0.15	0.15			0.15			0.68	0.68			0.45
Clearance Time (s)	4.5	4.5			4.5			4.5	4.5			4.5
Vehicle Extension (s)	3.0	3.0			3.0			3.0	5.0			5.0
Lane Grp Cap (vph)	202	240			193			393	2392			1496
v/s Ratio Prot		0.02						c0.07	0.23			
v/s Ratio Perm	c0.06				0.03			0.27				c0.43
v/c Ratio	0.41	0.10			0.21			0.50	0.34			0.96
Uniform Delay, d1	20.4	19.5			19.8			8.3	3.5			14.1
Progression Factor	1.00	1.00			1.00			1.00	1.00			1.00
Incremental Delay, d2	1.3	0.2			0.5			4.5	0.4			15.1
Delay (s)	21.7	19.6			20.3			12.7	3.9			29.2
Level of Service	C	B			C			B	A			C
Approach Delay (s)		20.4			20.3				5.6			29.2
Approach LOS		C			C				A			C

Intersection Summary

HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	53.1	Sum of lost time (s)	13.5
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group





Movement	SBR
Lane Configurations	
Traffic Volume (vph)	59
Future Volume (vph)	59
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.90
Adj. Flow (vph)	66
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

# Timings

## 3: Riverchase Pkwy & Regions Dr

Future PM  
09/06/2023



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	147	77	757	68	35	1157
Future Volume (vph)	147	77	757	68	35	1157
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	
Permitted Phases		4		6		2
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	15.0	15.0	25.0	25.0	4.0	25.0
Minimum Split (s)	20.0	20.0	30.0	30.0	20.0	30.0
Total Split (s)	12.0	12.0	36.0	36.0	12.0	48.0
Total Split (%)	20.0%	20.0%	60.0%	60.0%	20.0%	80.0%
Yellow Time (s)	3.2	3.2	3.9	3.9	3.2	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
Act Effect Green (s)	7.8	7.8	30.4	30.4	6.7	41.3
Actuated g/C Ratio	0.13	0.13	0.52	0.52	0.11	0.71
v/c Ratio	0.85	0.35	0.46	0.09	0.20	0.54
Control Delay	59.6	9.8	9.8	2.5	26.3	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.6	9.8	9.8	2.5	26.3	4.9
LOS	E	A	A	A	C	A
Approach Delay	42.5		9.2			5.5
Approach LOS	D		A			A

### Intersection Summary

Cycle Length: 60  
 Actuated Cycle Length: 58.3  
 Natural Cycle: 70  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.85  
 Intersection Signal Delay: 11.1  
 Intersection Capacity Utilization 52.1%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service A

Splits and Phases: 3: Riverchase Pkwy & Regions Dr



# HCM Signalized Intersection Capacity Analysis

## 3: Riverchase Pkwy & Regions Dr

Future PM  
09/06/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	147	77	757	68	35	1157
Future Volume (vph)	147	77	757	68	35	1157
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.73	0.73	0.90	0.90	0.85	0.85
Adj. Flow (vph)	201	105	841	76	41	1361
RTOR Reduction (vph)	0	91	0	36	0	0
Lane Group Flow (vph)	201	14	841	40	41	1361
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	
Permitted Phases		4		6		2
Actuated Green, G (s)	7.8	7.8	30.5	30.5	6.7	41.4
Effective Green, g (s)	7.8	7.8	30.5	30.5	6.7	41.4
Actuated g/C Ratio	0.13	0.13	0.52	0.52	0.11	0.71
Clearance Time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Vehicle Extension (s)	3.0	3.0	6.0	6.0	3.0	6.0
Lane Grp Cap (vph)	236	211	1851	828	203	2513
v/s Ratio Prot	c0.11		0.24		0.02	
v/s Ratio Perm		0.01		0.03		c0.38
v/c Ratio	0.85	0.07	0.45	0.05	0.20	0.54
Uniform Delay, d1	24.7	22.1	8.7	6.8	23.4	4.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	24.4	0.1	0.5	0.1	0.5	0.5
Delay (s)	49.1	22.2	9.2	6.9	23.9	4.5
Level of Service	D	C	A	A	C	A
Approach Delay (s)	39.8		9.0			5.1
Approach LOS	D		A			A

### Intersection Summary

HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	58.3	Sum of lost time (s)	13.3
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 4: Riverchase Pkwy & Regions Gated Access

Future PM  
09/06/2023



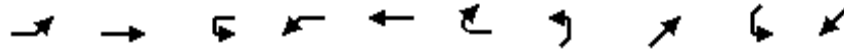
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑↑	↑↑			↗
Traffic Volume (veh/h)	0	1191	734	116	0	208
Future Volume (Veh/h)	0	1191	734	116	0	208
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.84	0.84	0.85	0.85	0.92	0.92
Hourly flow rate (vph)	0	1418	864	136	0	226
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		586	794			
pX, platoon unblocked	0.87				0.90	0.87
vC, conflicting volume	1000				1641	500
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	714				1266	143
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	71
cM capacity (veh/h)	772				144	769
Direction, Lane #	SE 1	SE 2	NW 1	NW 2	SW 1	
Volume Total	709	709	576	424	226	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	136	226	
cSH	1700	1700	1700	1700	769	
Volume to Capacity	0.42	0.42	0.34	0.25	0.29	
Queue Length 95th (ft)	0	0	0	0	31	
Control Delay (s)	0.0	0.0	0.0	0.0	11.6	
Lane LOS					B	
Approach Delay (s)	0.0		0.0		11.6	
Approach LOS					B	
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			43.5%		ICU Level of Service	A
Analysis Period (min)			15			

Timings

Future PM

5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

09/06/2023



Lane Group	EBL	EBT	WBU	WBL	WBT	WBR	NEL	NET	SWL	SWT
Lane Configurations										
Traffic Volume (vph)	113	332	1	140	527	299	2	31	752	92
Future Volume (vph)	113	332	1	140	527	299	2	31	752	92
Turn Type	pm+pt	NA	pm+pt	pm+pt	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases	1	6	5	5	2			4	3	8
Permitted Phases	6		2	2		2	4		8	
Detector Phase	1	6	5	5	2	2	4	4	3	8
Switch Phase										
Minimum Initial (s)	4.0	25.0	4.0	4.0	15.0	15.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	30.0	12.0	12.0	30.0	30.0	12.0	12.0	9.0	12.0
Total Split (s)	12.0	50.0	20.0	20.0	58.0	58.0	12.0	12.0	13.0	25.0
Total Split (%)	12.6%	52.6%	21.1%	21.1%	61.1%	61.1%	12.6%	12.6%	13.7%	26.3%
Yellow Time (s)	3.2	3.9	3.2	3.2	3.9	3.9	3.2	3.2	3.2	3.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.2	4.9		4.2	4.9	4.9		4.2	4.2	4.2
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	Min	None	None	Min	Min	None	None	None	None
Act Effect Green (s)	40.5	32.3		42.6	33.4	33.4		7.2	20.4	20.4
Actuated g/C Ratio	0.54	0.43		0.57	0.45	0.45		0.10	0.27	0.27
v/c Ratio	0.29	0.28		0.27	0.38	0.38		0.58	3.09	0.71
Control Delay	7.6	13.8		7.1	14.2	2.6		22.4	963.6	28.3
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	7.6	13.8		7.1	14.2	2.6		22.4	963.6	28.3
LOS	A	B		A	B	A		C	F	C
Approach Delay		12.3			9.6			22.4		698.6
Approach LOS		B			A			C		F

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 74.8

Natural Cycle: 110

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 3.09

Intersection Signal Delay: 302.0

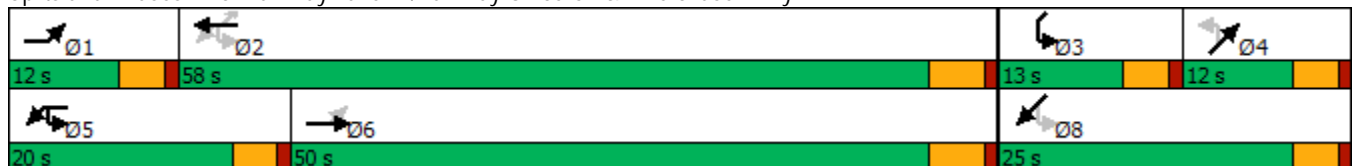
Intersection LOS: F

Intersection Capacity Utilization 92.6%

ICU Level of Service F

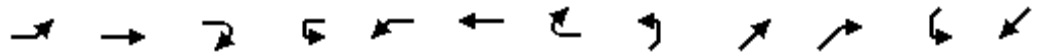
Analysis Period (min) 15

Splits and Phases: 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

Future PM  
 09/06/2023



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT
Lane Configurations												
Traffic Volume (vph)	113	332	7	1	140	527	299	2	31	97	752	92
Future Volume (vph)	113	332	7	1	140	527	299	2	31	97	752	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9			4.2	4.9	4.9		4.2		4.2	4.2
Lane Util. Factor	1.00	0.95			1.00	0.95	1.00		1.00		1.00	1.00
Frt	1.00	1.00			1.00	1.00	0.85		0.90		1.00	0.90
Flt Protected	0.95	1.00			0.95	1.00	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1770	3528			1770	3539	1583		1673		1770	1670
Flt Permitted	0.39	1.00			0.47	1.00	1.00		0.99		0.35	1.00
Satd. Flow (perm)	718	3528			872	3539	1583		1658		654	1670
Peak-hour factor, PHF	0.79	0.79	0.79	0.87	0.87	0.87	0.87	0.85	0.85	0.85	0.78	0.78
Adj. Flow (vph)	143	420	9	1	161	606	344	2	36	114	964	118
RTOR Reduction (vph)	0	2	0	0	0	0	190	0	103	0	0	78
Lane Group Flow (vph)	143	427	0	0	162	606	154	0	49	0	964	303
Turn Type	pm+pt	NA		pm+pt	pm+pt	NA	Perm	Perm	NA		pm+pt	NA
Protected Phases	1	6		5	5	2			4		3	8
Permitted Phases	6			2	2		2	4			8	
Actuated Green, G (s)	39.7	32.3			41.9	33.4	33.4		7.2		20.4	20.4
Effective Green, g (s)	39.7	32.3			41.9	33.4	33.4		7.2		20.4	20.4
Actuated g/C Ratio	0.53	0.43			0.56	0.45	0.45		0.10		0.27	0.27
Clearance Time (s)	4.2	4.9			4.2	4.9	4.9		4.2		4.2	4.2
Vehicle Extension (s)	3.0	6.0			3.0	6.0	6.0		3.5		3.5	3.0
Lane Grp Cap (vph)	487	1529			592	1586	709		160		313	457
v/s Ratio Prot	0.03	0.12			c0.03	c0.17					c0.37	0.18
v/s Ratio Perm	0.13				0.12		0.10		0.03		c0.47	
v/c Ratio	0.29	0.28			0.27	0.38	0.22		0.31		3.08	0.66
Uniform Delay, d1	8.9	13.6			7.9	13.7	12.6		31.3		25.8	24.0
Progression Factor	1.00	1.00			1.00	1.00	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.3	0.3			0.3	0.4	0.4		1.3		944.4	3.6
Delay (s)	9.2	13.9			8.1	14.1	13.0		32.6		970.1	27.6
Level of Service	A	B			A	B	B		C		F	C
Approach Delay (s)		12.7				12.9			32.6			703.1
Approach LOS		B				B			C			F

Intersection Summary

HCM 2000 Control Delay	305.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	74.5	Sum of lost time (s)	17.5
Intersection Capacity Utilization	92.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



HCM Signalized Intersection Capacity Analysis  
 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

Future PM  
 09/06/2023



Movement	SWR
Lane Configurations	
Traffic Volume (vph)	205
Future Volume (vph)	205
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.78
Adj. Flow (vph)	263
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

## **Appendix F**

### **Future Intersection Capacity Analysis with Improvements, Printouts**

Timings  
1: Valleydale Rd & Riverchase Pkwy

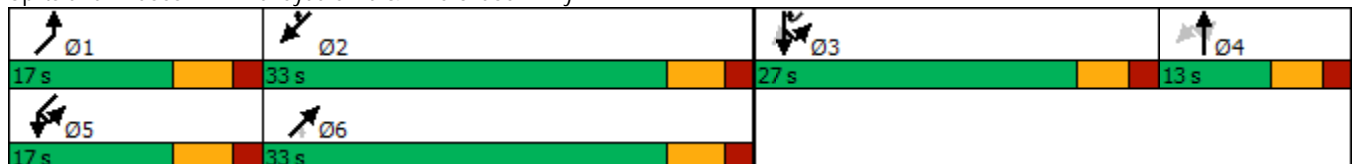
Future AM Imp  
09/06/2023

	↑	↙	↓	↘	↗	↖	↘	↙	↗	↖
Lane Group	NBT	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↖	↙↘	↖	↗	↘	↖↗↘	↗	↘	↖↗	↖↗
Traffic Volume (vph)	3	476	5	118	137	764	13	38	903	1955
Future Volume (vph)	3	476	5	118	137	764	13	38	903	1955
Turn Type	NA	Split	NA	Perm	Prot	NA	Perm	Prot	NA	pt+ov
Protected Phases	4	3	3		1	6		5	2	2 3
Permitted Phases				3			6			
Detector Phase	4	3	3	3	1	6	6	5	2	2 3
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	10.0	20.0	20.0	20.0	10.0	26.0	26.0	12.0	26.0	
Total Split (s)	13.0	27.0	27.0	27.0	17.0	33.0	33.0	17.0	33.0	
Total Split (%)	14.4%	30.0%	30.0%	30.0%	18.9%	36.7%	36.7%	18.9%	36.7%	
Yellow Time (s)	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.5	5.5	5.5	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	Min	Min	None	Min	
Act Effect Green (s)	7.0	21.6	21.6	21.6	10.7	34.7	34.7	8.5	27.1	54.2
Actuated g/C Ratio	0.09	0.27	0.27	0.27	0.14	0.44	0.44	0.11	0.34	0.68
v/c Ratio	0.07	0.41	0.42	0.24	0.66	0.39	0.02	0.25	0.81	0.98
Control Delay	36.3	26.2	28.4	3.1	48.6	18.2	0.1	36.8	31.3	23.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.3	26.2	28.4	3.1	48.6	18.2	0.1	36.8	31.3	23.4
LOS	D	C	C	A	D	B	A	D	C	C
Approach Delay	36.3		22.3			22.5			26.1	
Approach LOS	D		C			C			C	

Intersection Summary




























Cycle Length: 90  
 Actuated Cycle Length: 79.2  
 Natural Cycle: 90  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.98  
 Intersection Signal Delay: 24.8  
 Intersection LOS: C  
 Intersection Capacity Utilization 93.9%  
 ICU Level of Service F  
 Analysis Period (min) 15

Splits and Phases: 1: Valleydale Rd & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
1: Valleydale Rd & Riverchase Pkwy

Future AM Imp  
09/06/2023

													
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWU	SWL	SWT	
Lane Configurations				  				  				 	
Traffic Volume (vph)	0	3	0	476	5	118	137	764	13	6	38	903	
Future Volume (vph)	0	3	0	476	5	118	137	764	13	6	38	903	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.5		5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00		0.91	0.91	1.00	1.00	0.91	1.00		1.00	0.95	
Frt		1.00		1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)		1863		3221	1617	1583	1770	5085	1583		1770	3539	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (perm)		1863		3221	1617	1583	1770	5085	1583		1770	3539	
Peak-hour factor, PHF	0.25	0.25	0.25	0.88	0.88	0.88	0.87	0.87	0.87	0.92	0.92	0.92	
Adj. Flow (vph)	0	12	0	541	6	134	157	878	15	7	41	982	
RTOR Reduction (vph)	0	0	0	0	0	100	0	0	9	0	0	0	
Lane Group Flow (vph)	0	12	0	362	185	34	157	878	6	0	48	982	
Turn Type		NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	
Protected Phases		4		3	3		1	6		5	5	2	
Permitted Phases	4		4			3			6				
Actuated Green, G (s)		1.3		21.6	21.6	21.6	10.7	34.7	34.7		5.6	29.6	
Effective Green, g (s)		1.3		21.6	21.6	21.6	10.7	34.7	34.7		5.6	29.6	
Actuated g/C Ratio		0.02		0.25	0.25	0.25	0.12	0.40	0.40		0.06	0.34	
Clearance Time (s)		5.5		5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0		4.0	4.0	4.0	4.0	3.0	3.0		4.0	3.0	
Lane Grp Cap (vph)		28		807	405	396	219	2046	637		114	1215	
v/s Ratio Prot		c0.01		0.11	0.11		c0.09	c0.17			0.03	0.28	
v/s Ratio Perm						0.02			0.00				
v/c Ratio		0.43		0.45	0.46	0.08	0.72	0.43	0.01		0.42	0.81	
Uniform Delay, d1		42.1		27.3	27.3	24.7	36.3	18.6	15.4		38.7	25.7	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		13.7		0.5	1.1	0.1	11.4	0.1	0.0		3.4	4.1	
Delay (s)		55.8		27.8	28.5	24.9	47.6	18.7	15.4		42.1	29.8	
Level of Service		E		C	C	C	D	B	B		D	C	
Approach Delay (s)		55.8			27.4			23.0				32.4	
Approach LOS		E			C			C				C	
<b>Intersection Summary</b>													
HCM 2000 Control Delay			29.8		HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			1.03										
Actuated Cycle Length (s)			86.2		Sum of lost time (s)				23.0				
Intersection Capacity Utilization			93.9%		ICU Level of Service				F				
Analysis Period (min)			15										

c Critical Lane Group



Movement	SWR
Lane Configurations	FF
Traffic Volume (vph)	1955
Future Volume (vph)	1955
Ideal Flow (vphpl)	1900
Total Lost time (s)	6.0
Lane Util. Factor	0.88
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	2787
Flt Permitted	1.00
Satd. Flow (perm)	2787
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	2125
RTOR Reduction (vph)	289
Lane Group Flow (vph)	1836
Turn Type	pt+ov
Protected Phases	2 3
Permitted Phases	
Actuated Green, G (s)	57.2
Effective Green, g (s)	57.2
Actuated g/C Ratio	0.66
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	1849
v/s Ratio Prot	c0.66
v/s Ratio Perm	
v/c Ratio	0.99
Uniform Delay, d1	14.3
Progression Factor	1.00
Incremental Delay, d2	19.1
Delay (s)	33.4
Level of Service	C
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Timings  
2: Riverchase Pkwy & Woods of Riverchase Dr

Future AM Imp  
09/06/2023



Lane Group	EBL	EBT	WBL	WBT	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	65	1	25	1	12	61	1827	19	9	367
Future Volume (vph)	65	1	25	1	12	61	1827	19	9	367
Turn Type	Perm	NA	Perm	NA	pm+pt	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		8	1	1	6			2
Permitted Phases	4		8		6	6		6	2	
Detector Phase	4	4	8	8	1	1	6	6	2	2
Switch Phase										
Minimum Initial (s)	4.0	4.0	10.0	10.0	4.0	4.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.0	9.0	15.0	15.0	9.0	9.0	20.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	20.0	20.0	12.0	12.0	40.0	40.0	28.0	28.0
Total Split (%)	33.3%	33.3%	33.3%	33.3%	20.0%	20.0%	66.7%	66.7%	46.7%	46.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0	0.0		0.0
Total Lost Time (s)	4.5	4.5		4.5		4.5	4.5	4.5		4.5
Lead/Lag					Lead	Lead			Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	9.6	9.6		10.8		36.1	37.3	37.3		23.9
Actuated g/C Ratio	0.18	0.18		0.21		0.69	0.71	0.71		0.46
v/c Ratio	0.33	0.40		0.15		0.13	0.82	0.02		0.38
Control Delay	23.1	7.1		16.9		4.5	12.6	1.8		11.4
Queue Delay	0.0	0.0		0.0		0.0	0.0	0.0		0.0
Total Delay	23.1	7.1		16.9		4.5	12.6	1.8		11.4
LOS	C	A		B		A	B	A		B
Approach Delay		12.3		16.9			12.2			11.4
Approach LOS		B		B			B			B

Intersection Summary

Cycle Length: 60  
 Actuated Cycle Length: 52.3  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.82  
 Intersection Signal Delay: 12.1  
 Intersection LOS: B  
 Intersection Capacity Utilization 88.7%  
 ICU Level of Service E  
 Analysis Period (min) 15

Splits and Phases: 2: Riverchase Pkwy & Woods of Riverchase Dr





# HCM Signalized Intersection Capacity Analysis

## 2: Riverchase Pkwy & Woods of Riverchase Dr

Future AM Imp  
09/06/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	65	1	135	25	1	12	12	61	1827	19	9	367
Future Volume (vph)	65	1	135	25	1	12	12	61	1827	19	9	367
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5			4.5	4.5	4.5		4.5
Lane Util. Factor	1.00	1.00			1.00			1.00	0.95	1.00		0.95
Frt	1.00	0.85			0.96			1.00	1.00	0.85		0.99
Flt Protected	0.95	1.00			0.97			0.95	1.00	1.00		1.00
Satd. Flow (prot)	1770	1585			1726			1770	3539	1583		3503
Flt Permitted	0.73	1.00			0.72			0.36	1.00	1.00		0.88
Satd. Flow (perm)	1360	1585			1283			670	3539	1583		3103
Peak-hour factor, PHF	0.78	0.78	0.78	0.92	0.92	0.92	0.88	0.88	0.88	0.88	0.73	0.73
Adj. Flow (vph)	83	1	173	27	1	13	14	69	2076	22	12	503
RTOR Reduction (vph)	0	146	0	0	8	0	0	0	0	7	0	7
Lane Group Flow (vph)	83	28	0	0	33	0	0	83	2076	15	0	541
Turn Type	Perm	NA		Perm	NA		pm+pt	pm+pt	NA	Perm	Perm	NA
Protected Phases		4			8		1	1	6			2
Permitted Phases	4			8			6	6		6	2	
Actuated Green, G (s)	8.2	8.2			8.2			36.1	36.1	36.1		24.0
Effective Green, g (s)	8.2	8.2			8.2			36.1	36.1	36.1		24.0
Actuated g/C Ratio	0.15	0.15			0.15			0.68	0.68	0.68		0.45
Clearance Time (s)	4.5	4.5			4.5			4.5	4.5	4.5		4.5
Vehicle Extension (s)	3.0	3.0			3.0			3.0	5.0	5.0		5.0
Lane Grp Cap (vph)	209	243			197			610	2396	1072		1397
v/s Ratio Prot		0.02						0.02	c0.59			
v/s Ratio Perm	c0.06				0.03			0.07		0.01		0.17
v/c Ratio	0.40	0.11			0.17			0.14	0.87	0.01		0.39
Uniform Delay, d1	20.3	19.4			19.6			3.2	6.7	2.8		9.8
Progression Factor	1.00	1.00			1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2	1.2	0.2			0.4			0.5	4.5	0.0		0.8
Delay (s)	21.6	19.6			20.0			3.7	11.2	2.8		10.6
Level of Service	C	B			C			A	B	A		B
Approach Delay (s)		20.3			20.0				10.9			10.6
Approach LOS		C			C				B			B

### Intersection Summary

HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	53.3	Sum of lost time (s)	13.5
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR
Lane Configurations	
Traffic Volume (vph)	24
Future Volume (vph)	24
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.73
Adj. Flow (vph)	33
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Timings  
3: Riverchase Pkwy & Regions Dr



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	58	30	1798	140	55	338
Future Volume (vph)	58	30	1798	140	55	338
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	
Permitted Phases		4		6		2
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	15.0	15.0	25.0	25.0	4.0	25.0
Minimum Split (s)	20.0	20.0	30.0	30.0	20.0	30.0
Total Split (s)	12.0	12.0	36.0	36.0	12.0	48.0
Total Split (%)	20.0%	20.0%	60.0%	60.0%	20.0%	80.0%
Yellow Time (s)	3.2	3.2	3.9	3.9	3.2	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
Act Effect Green (s)	7.9	7.9	31.4	31.4	7.0	43.9
Actuated g/C Ratio	0.14	0.14	0.55	0.55	0.12	0.77
v/c Ratio	0.47	0.22	1.04	0.17	0.30	0.15
Control Delay	31.3	10.0	50.1	4.6	27.7	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.3	10.0	50.1	4.6	27.7	2.6
LOS	C	A	D	A	C	A
Approach Delay	24.0		46.9			6.1
Approach LOS	C		D			A

Intersection Summary

Cycle Length: 60  
 Actuated Cycle Length: 56.8  
 Natural Cycle: 100  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.04  
 Intersection Signal Delay: 38.8  
 Intersection LOS: D  
 Intersection Capacity Utilization 69.8%  
 ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 3: Riverchase Pkwy & Regions Dr



# HCM Signalized Intersection Capacity Analysis

## 3: Riverchase Pkwy & Regions Dr

Future AM Imp  
09/06/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	58	30	1798	140	55	338
Future Volume (vph)	58	30	1798	140	55	338
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.50	0.50	0.88	0.88	0.84	0.84
Adj. Flow (vph)	116	60	2043	159	65	402
RTOR Reduction (vph)	0	54	0	39	0	0
Lane Group Flow (vph)	116	6	2043	120	65	402
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	
Permitted Phases		4		6		2
Actuated Green, G (s)	5.9	5.9	31.5	31.5	7.0	42.7
Effective Green, g (s)	5.9	5.9	31.5	31.5	7.0	42.7
Actuated g/C Ratio	0.10	0.10	0.55	0.55	0.12	0.74
Clearance Time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Vehicle Extension (s)	3.0	3.0	6.0	6.0	3.0	6.0
Lane Grp Cap (vph)	180	161	1932	864	214	2618
v/s Ratio Prot	c0.07		c0.58		c0.04	
v/s Ratio Perm		0.00		0.08		0.11
v/c Ratio	0.64	0.04	1.06	0.14	0.30	0.15
Uniform Delay, d1	24.9	23.3	13.1	6.4	23.1	2.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.7	0.1	37.6	0.2	0.8	0.1
Delay (s)	32.6	23.4	50.7	6.6	23.9	2.3
Level of Service	C	C	D	A	C	A
Approach Delay (s)	29.5		47.6			5.3
Approach LOS	C		D			A

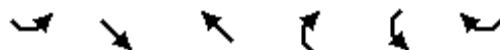
### Intersection Summary

HCM 2000 Control Delay	39.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	57.7	Sum of lost time (s)	13.3
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
4: Riverchase Pkwy & Regions Gated Access

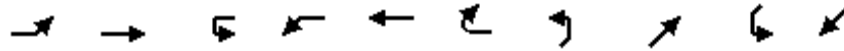
Future AM Imp  
09/06/2023



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑↑	↑↑	↗		↗
Traffic Volume (veh/h)	0	370	1644	177	0	60
Future Volume (Veh/h)	0	370	1644	177	0	60
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	402	1787	192	0	65
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		586	794			
pX, platoon unblocked	0.50				0.50	0.50
vC, conflicting volume	1979				1988	894
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	964				982	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	88
cM capacity (veh/h)	356				124	544
Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NW 3	SW 1
Volume Total	201	201	894	894	192	65
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	192	65
cSH	1700	1700	1700	1700	1700	544
Volume to Capacity	0.12	0.12	0.53	0.53	0.11	0.12
Queue Length 95th (ft)	0	0	0	0	0	10
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	12.5
Lane LOS						B
Approach Delay (s)	0.0		0.0			12.5
Approach LOS						B
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			55.8%		ICU Level of Service	B
Analysis Period (min)			15			

Timings  
5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

Future AM Imp  
09/06/2023

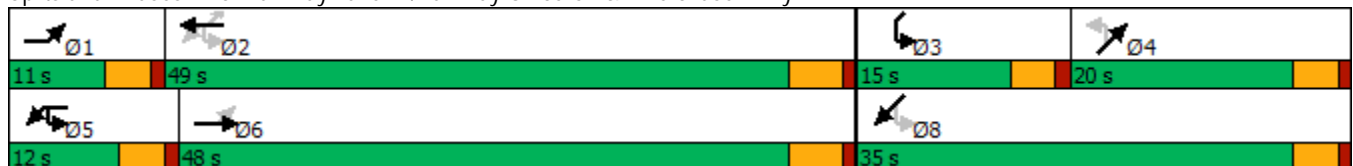


Lane Group	EBL	EBT	WBU	WBL	WBT	WBR	NEL	NET	SWL	SWT
Lane Configurations										
Traffic Volume (vph)	200	162	10	133	698	835	7	78	149	14
Future Volume (vph)	200	162	10	133	698	835	7	78	149	14
Turn Type	pm+pt	NA	pm+pt	pm+pt	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases	1	6	5	5	2			4	3	8
Permitted Phases	6		2	2		2	4		8	
Detector Phase	1	6	5	5	2	2	4	4	3	8
Switch Phase										
Minimum Initial (s)	4.0	25.0	4.0	4.0	15.0	15.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	30.0	12.0	12.0	30.0	30.0	12.0	12.0	9.0	12.0
Total Split (s)	11.0	48.0	12.0	12.0	49.0	49.0	20.0	20.0	15.0	35.0
Total Split (%)	11.6%	50.5%	12.6%	12.6%	51.6%	51.6%	21.1%	21.1%	15.8%	36.8%
Yellow Time (s)	3.2	3.9	3.2	3.2	3.9	3.9	3.2	3.2	3.2	3.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.2	4.9		4.2	4.9	4.9		4.2	4.2	4.2
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	Min	None	None	Min	Min	None	None	None	None
Act Effect Green (s)	50.9	43.4		52.4	44.1	44.1		12.6	27.5	27.5
Actuated g/C Ratio	0.55	0.47		0.57	0.48	0.48		0.14	0.30	0.30
v/c Ratio	0.62	0.12		0.23	0.47	0.86		0.65	0.77	0.19
Control Delay	17.6	14.1		9.3	17.5	16.3		42.0	44.5	8.8
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	17.6	14.1		9.3	17.5	16.3		42.0	44.5	8.8
LOS	B	B		A	B	B		D	D	A
Approach Delay		16.0			16.2			42.0		33.7
Approach LOS		B			B			D		C

Intersection Summary

Cycle Length: 95  
 Actuated Cycle Length: 91.8  
 Natural Cycle: 75  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.86  
 Intersection Signal Delay: 19.8  
 Intersection LOS: B  
 Intersection Capacity Utilization 82.1%  
 ICU Level of Service E  
 Analysis Period (min) 15

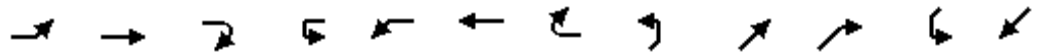
Splits and Phases: 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy





HCM Signalized Intersection Capacity Analysis  
 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

Future AM Imp  
 09/06/2023



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT
Lane Configurations												
Traffic Volume (vph)	200	162	4	10	133	698	835	7	78	61	149	14
Future Volume (vph)	200	162	4	10	133	698	835	7	78	61	149	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9			4.2	4.9	4.9		4.2		4.2	4.2
Lane Util. Factor	1.00	0.95			1.00	0.95	1.00		1.00		1.00	1.00
Frt	1.00	1.00			1.00	1.00	0.85		0.94		1.00	0.88
Flt Protected	0.95	1.00			0.95	1.00	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1770	3526			1770	3539	1583		1753		1770	1644
Flt Permitted	0.28	1.00			0.62	1.00	1.00		0.99		0.28	1.00
Satd. Flow (perm)	524	3526			1150	3539	1583		1732		521	1644
Peak-hour factor, PHF	0.85	0.85	0.85	0.88	0.88	0.88	0.88	0.85	0.85	0.85	0.64	0.64
Adj. Flow (vph)	235	191	5	11	151	793	949	8	92	72	233	22
RTOR Reduction (vph)	0	2	0	0	0	0	341	0	28	0	0	56
Lane Group Flow (vph)	235	194	0	0	162	793	608	0	144	0	233	46
Turn Type	pm+pt	NA		pm+pt	pm+pt	NA	Perm	Perm	NA		pm+pt	NA
Protected Phases	1	6		5	5	2			4		3	8
Permitted Phases	6			2	2		2	4			8	
Actuated Green, G (s)	50.2	43.4			51.8	44.2	44.2		12.6		27.6	27.6
Effective Green, g (s)	50.2	43.4			51.8	44.2	44.2		12.6		27.6	27.6
Actuated g/C Ratio	0.55	0.47			0.56	0.48	0.48		0.14		0.30	0.30
Clearance Time (s)	4.2	4.9			4.2	4.9	4.9		4.2		4.2	4.2
Vehicle Extension (s)	3.0	6.0			3.0	6.0	6.0		3.5		3.5	3.0
Lane Grp Cap (vph)	378	1665			699	1702	761		237		303	493
v/s Ratio Prot	c0.05	0.05			0.02	0.22					c0.09	0.03
v/s Ratio Perm	0.29				0.11		c0.38		0.08		c0.14	
v/c Ratio	0.62	0.12			0.23	0.47	0.80		0.61		0.77	0.09
Uniform Delay, d1	11.6	13.5			9.6	16.0	20.1		37.3		26.9	23.1
Progression Factor	1.00	1.00			1.00	1.00	1.00		1.00		1.00	1.00
Incremental Delay, d2	3.2	0.1			0.2	0.6	7.1		4.5		11.5	0.1
Delay (s)	14.7	13.6			9.8	16.5	27.2		41.9		38.4	23.2
Level of Service	B	B			A	B	C		D		D	C
Approach Delay (s)		14.2				21.3			41.9			33.8
Approach LOS		B				C			D			C

Intersection Summary

HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	91.9	Sum of lost time (s)	17.5
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	SWR
Lane Configurations	
Traffic Volume (vph)	51
Future Volume (vph)	51
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.64
Adj. Flow (vph)	80
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Timings  
1: Valleydale Rd & Riverchase Pkwy

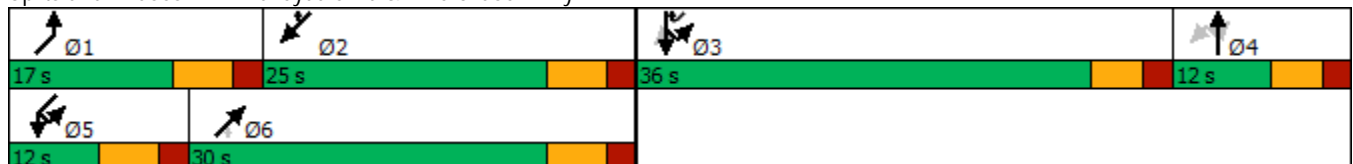
Future PM Imp  
09/06/2023

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	12	9	44	1427	0	122	135	967	3	3	480	867
Future Volume (vph)	12	9	44	1427	0	122	135	967	3	3	480	867
Turn Type	Perm	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	pt+ov
Protected Phases		4		3	3		1	6		5	2	2 3
Permitted Phases	4		4			3			6			
Detector Phase	4	4	4	3	3	3	1	6	6	5	2	2 3
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	10.0	10.0	10.0	20.0	20.0	20.0	10.0	26.0	26.0	12.0	26.0	
Total Split (s)	12.0	12.0	12.0	36.0	36.0	36.0	17.0	30.0	30.0	12.0	25.0	
Total Split (%)	13.3%	13.3%	13.3%	40.0%	40.0%	40.0%	18.9%	33.3%	33.3%	13.3%	27.8%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Act Effect Green (s)		6.5	6.5	30.6	30.6	30.6	10.7	33.5	33.5	6.0	19.1	55.2
Actuated g/C Ratio		0.07	0.07	0.35	0.35	0.35	0.12	0.38	0.38	0.07	0.22	0.63
v/c Ratio		0.43	0.27	0.91	0.90	0.20	0.75	0.59	0.01	0.10	0.64	0.43
Control Delay		55.6	2.4	41.2	49.1	2.2	60.0	24.6	0.0	41.4	36.1	1.2
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		55.6	2.4	41.2	49.1	2.2	60.0	24.6	0.0	41.4	36.1	1.2
LOS		E	A	D	D	A	E	C	A	D	D	A
Approach Delay		19.7			40.5			28.8			13.9	
Approach LOS		B			D			C			B	

Intersection Summary




























Cycle Length: 90  
 Actuated Cycle Length: 87.3  
 Natural Cycle: 80  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.91  
 Intersection Signal Delay: 28.3  
 Intersection LOS: C  
 Intersection Capacity Utilization 72.5%  
 ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 1: Valleydale Rd & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
1: Valleydale Rd & Riverchase Pkwy

Future PM Imp  
09/06/2023

													
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWU	SWL	SWT	
Lane Configurations				  				  				 	
Traffic Volume (vph)	12	9	44	1427	0	122	135	967	3	9	3	480	
Future Volume (vph)	12	9	44	1427	0	122	135	967	3	9	3	480	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00	0.91	0.91	1.00	1.00	0.91	1.00		1.00	0.95	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	
Flt Protected		0.97	1.00	0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)		1811	1583	3221	1610	1583	1770	5085	1583		1770	3539	
Flt Permitted		0.63	1.00	0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (perm)		1168	1583	3221	1610	1583	1770	5085	1583		1770	3539	
Peak-hour factor, PHF	0.57	0.57	0.57	0.93	0.93	0.93	0.84	0.84	0.84	0.97	0.97	0.97	
Adj. Flow (vph)	21	16	77	1534	0	131	161	1151	4	9	3	495	
RTOR Reduction (vph)	0	0	73	0	0	88	0	0	3	0	0	0	
Lane Group Flow (vph)	0	37	4	1028	506	43	161	1151	1	0	12	495	
Turn Type	Perm	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	
Protected Phases		4		3	3		1	6		5	5	2	
Permitted Phases	4		4			3			6				
Actuated Green, G (s)		5.0	5.0	30.6	30.6	30.6	10.7	33.5	33.5		1.2	24.0	
Effective Green, g (s)		5.0	5.0	30.6	30.6	30.6	10.7	33.5	33.5		1.2	24.0	
Actuated g/C Ratio		0.05	0.05	0.33	0.33	0.33	0.11	0.36	0.36		0.01	0.26	
Clearance Time (s)		5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0		4.0	3.0	
Lane Grp Cap (vph)		62	84	1056	528	519	202	1825	568		22	910	
v/s Ratio Prot				c0.32	0.31		c0.09	c0.23			0.01	0.14	
v/s Ratio Perm		c0.03	0.00			0.03			0.00				
v/c Ratio		0.60	0.05	0.97	0.96	0.08	0.80	0.63	0.00		0.55	0.54	
Uniform Delay, d1		43.2	41.9	30.9	30.7	21.7	40.2	24.8	19.2		45.8	29.9	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		16.8	0.3	21.4	28.8	0.1	20.2	0.7	0.0		30.4	0.7	
Delay (s)		59.9	42.2	52.4	59.5	21.7	60.5	25.5	19.2		76.2	30.6	
Level of Service		E	D	D	E	C	E	C	B		E	C	
Approach Delay (s)		48.0			52.1			29.8				16.1	
Approach LOS		D			D			C				B	
<b>Intersection Summary</b>													
HCM 2000 Control Delay			34.3		HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.82										
Actuated Cycle Length (s)			93.3		Sum of lost time (s)				23.0				
Intersection Capacity Utilization			72.5%		ICU Level of Service				C				
Analysis Period (min)			15										
c Critical Lane Group													



Movement	SWR
Lane Configurations	TT
Traffic Volume (vph)	867
Future Volume (vph)	867
Ideal Flow (vphpl)	1900
Total Lost time (s)	6.0
Lane Util. Factor	0.88
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	2787
Flt Permitted	1.00
Satd. Flow (perm)	2787
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	894
RTOR Reduction (vph)	313
Lane Group Flow (vph)	581
Turn Type	pt+ov
Protected Phases	2 3
Permitted Phases	
Actuated Green, G (s)	60.6
Effective Green, g (s)	60.6
Actuated g/C Ratio	0.65
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	1810
v/s Ratio Prot	0.21
v/s Ratio Perm	
v/c Ratio	0.32
Uniform Delay, d1	7.2
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	7.3
Level of Service	A
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Timings  
2: Riverchase Pkwy & Woods of Riverchase Dr

Future PM Imp  
09/06/2023



Lane Group	EBL	EBT	WBL	WBT	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	63	4	33	1	20	166	751	29	15	1219
Future Volume (vph)	63	4	33	1	20	166	751	29	15	1219
Turn Type	Perm	NA	Perm	NA	pm+pt	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		8	1	1	6			2
Permitted Phases	4		8		6	6		6	2	
Detector Phase	4	4	8	8	1	1	6	6	2	2
Switch Phase										
Minimum Initial (s)	4.0	4.0	10.0	10.0	4.0	4.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.0	9.0	15.0	15.0	9.0	9.0	20.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	20.0	20.0	12.0	12.0	40.0	40.0	28.0	28.0
Total Split (%)	33.3%	33.3%	33.3%	33.3%	20.0%	20.0%	66.7%	66.7%	46.7%	46.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0	0.0		0.0
Total Lost Time (s)	4.5	4.5		4.5		4.5	4.5	4.5		4.5
Lead/Lag					Lead	Lead			Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	9.4	9.4		10.6		36.1	37.3	37.3		23.9
Actuated g/C Ratio	0.18	0.18		0.20		0.69	0.72	0.72		0.46
v/c Ratio	0.34	0.34		0.20		0.49	0.31	0.03		0.94
Control Delay	23.5	7.6		16.0		10.0	4.5	1.8		30.7
Queue Delay	0.0	0.0		0.0		0.0	0.0	0.0		0.0
Total Delay	23.5	7.6		16.0		10.0	4.5	1.8		30.7
LOS	C	A		B		A	A	A		C
Approach Delay		13.6		16.0			5.5			30.7
Approach LOS		B		B			A			C

Intersection Summary

Cycle Length: 60  
 Actuated Cycle Length: 52.1  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.94  
 Intersection Signal Delay: 19.6  
 Intersection Capacity Utilization 77.6%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service D

Splits and Phases: 2: Riverchase Pkwy & Woods of Riverchase Dr





# HCM Signalized Intersection Capacity Analysis

## 2: Riverchase Pkwy & Woods of Riverchase Dr

Future PM Imp  
09/06/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	63	4	101	33	1	17	20	166	751	29	15	1219
Future Volume (vph)	63	4	101	33	1	17	20	166	751	29	15	1219
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5			4.5	4.5	4.5		4.5
Lane Util. Factor	1.00	1.00			1.00			1.00	0.95	1.00		0.95
Frt	1.00	0.86			0.96			1.00	1.00	0.85		0.99
Flt Protected	0.95	1.00			0.97			0.95	1.00	1.00		1.00
Satd. Flow (prot)	1770	1594			1724			1770	3539	1583		3513
Flt Permitted	0.72	1.00			0.72			0.14	1.00	1.00		0.94
Satd. Flow (perm)	1343	1594			1285			261	3539	1583		3313
Peak-hour factor, PHF	0.77	0.77	0.77	0.92	0.92	0.92	0.95	0.95	0.95	0.95	0.90	0.90
Adj. Flow (vph)	82	5	131	36	1	18	21	175	791	31	17	1354
RTOR Reduction (vph)	0	111	0	0	15	0	0	0	0	10	0	5
Lane Group Flow (vph)	82	25	0	0	40	0	0	196	791	21	0	1432
Turn Type	Perm	NA		Perm	NA		pm+pt	pm+pt	NA	Perm	Perm	NA
Protected Phases		4			8		1	1	6			2
Permitted Phases	4			8			6	6		6	2	
Actuated Green, G (s)	8.0	8.0			8.0			36.1	36.1	36.1		24.0
Effective Green, g (s)	8.0	8.0			8.0			36.1	36.1	36.1		24.0
Actuated g/C Ratio	0.15	0.15			0.15			0.68	0.68	0.68		0.45
Clearance Time (s)	4.5	4.5			4.5			4.5	4.5	4.5		4.5
Vehicle Extension (s)	3.0	3.0			3.0			3.0	5.0	5.0		5.0
Lane Grp Cap (vph)	202	240			193			393	2405	1076		1497
v/s Ratio Prot		0.02						c0.07	0.22			
v/s Ratio Perm	c0.06				0.03			0.27		0.01		c0.43
v/c Ratio	0.41	0.10			0.21			0.50	0.33	0.02		0.96
Uniform Delay, d1	20.4	19.5			19.8			8.3	3.5	2.8		14.0
Progression Factor	1.00	1.00			1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2	1.3	0.2			0.5			4.5	0.4	0.0		15.0
Delay (s)	21.7	19.6			20.3			12.7	3.9	2.8		29.0
Level of Service	C	B			C			B	A	A		C
Approach Delay (s)		20.4			20.3				5.5			29.0
Approach LOS		C			C				A			C

### Intersection Summary

HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	53.1	Sum of lost time (s)	13.5
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR
Lane Configurations	
Traffic Volume (vph)	59
Future Volume (vph)	59
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.90
Adj. Flow (vph)	66
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Timings  
3: Riverchase Pkwy & Regions Dr



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	147	77	757	68	35	1157
Future Volume (vph)	147	77	757	68	35	1157
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	
Permitted Phases		4		6		2
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	15.0	15.0	25.0	25.0	4.0	25.0
Minimum Split (s)	20.0	20.0	30.0	30.0	20.0	30.0
Total Split (s)	12.0	12.0	36.0	36.0	12.0	48.0
Total Split (%)	20.0%	20.0%	60.0%	60.0%	20.0%	80.0%
Yellow Time (s)	3.2	3.2	3.9	3.9	3.2	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
Act Effect Green (s)	7.8	7.8	30.4	30.4	6.7	41.3
Actuated g/C Ratio	0.13	0.13	0.52	0.52	0.11	0.71
v/c Ratio	0.85	0.35	0.46	0.09	0.20	0.54
Control Delay	59.6	9.8	9.8	2.5	26.3	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.6	9.8	9.8	2.5	26.3	4.9
LOS	E	A	A	A	C	A
Approach Delay	42.5		9.2			5.5
Approach LOS	D		A			A

Intersection Summary

Cycle Length: 60  
 Actuated Cycle Length: 58.3  
 Natural Cycle: 70  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.85  
 Intersection Signal Delay: 11.1  
 Intersection Capacity Utilization 52.1%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service A

Splits and Phases: 3: Riverchase Pkwy & Regions Dr



# HCM Signalized Intersection Capacity Analysis

## 3: Riverchase Pkwy & Regions Dr

Future PM Imp  
09/06/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	147	77	757	68	35	1157
Future Volume (vph)	147	77	757	68	35	1157
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.73	0.73	0.90	0.90	0.85	0.85
Adj. Flow (vph)	201	105	841	76	41	1361
RTOR Reduction (vph)	0	91	0	36	0	0
Lane Group Flow (vph)	201	14	841	40	41	1361
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	
Permitted Phases		4		6		2
Actuated Green, G (s)	7.8	7.8	30.5	30.5	6.7	41.4
Effective Green, g (s)	7.8	7.8	30.5	30.5	6.7	41.4
Actuated g/C Ratio	0.13	0.13	0.52	0.52	0.11	0.71
Clearance Time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Vehicle Extension (s)	3.0	3.0	6.0	6.0	3.0	6.0
Lane Grp Cap (vph)	236	211	1851	828	203	2513
v/s Ratio Prot	c0.11		0.24		0.02	
v/s Ratio Perm		0.01		0.03		c0.38
v/c Ratio	0.85	0.07	0.45	0.05	0.20	0.54
Uniform Delay, d1	24.7	22.1	8.7	6.8	23.4	4.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	24.4	0.1	0.5	0.1	0.5	0.5
Delay (s)	49.1	22.2	9.2	6.9	23.9	4.5
Level of Service	D	C	A	A	C	A
Approach Delay (s)	39.8		9.0			5.1
Approach LOS	D		A			A

### Intersection Summary

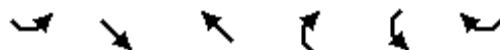
HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	58.3	Sum of lost time (s)	13.3
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 4: Riverchase Pkwy & Regions Gated Access

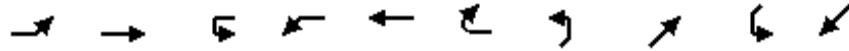
Future PM Imp  
09/06/2023



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑↑	↑↑	↗		↗
Traffic Volume (veh/h)	0	1191	734	116	0	208
Future Volume (Veh/h)	0	1191	734	116	0	208
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.84	0.84	0.85	0.85	0.92	0.92
Hourly flow rate (vph)	0	1418	864	136	0	226
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		586	794			
pX, platoon unblocked	0.92				0.95	0.92
vC, conflicting volume	1000				1573	432
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	818				1094	198
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	70
cM capacity (veh/h)	739				197	742
Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NW 3	SW 1
Volume Total	709	709	432	432	136	226
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	136	226
cSH	1700	1700	1700	1700	1700	742
Volume to Capacity	0.42	0.42	0.25	0.25	0.08	0.30
Queue Length 95th (ft)	0	0	0	0	0	32
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	12.0
Lane LOS						B
Approach Delay (s)	0.0		0.0			12.0
Approach LOS						B
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			39.8%		ICU Level of Service	A
Analysis Period (min)			15			

Timings  
5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

Future PM Imp  
09/06/2023



Lane Group	EBL	EBT	WBU	WBL	WBT	WBR	NEL	NET	SWL	SWT
Lane Configurations										
Traffic Volume (vph)	113	332	1	140	527	299	2	31	752	92
Future Volume (vph)	113	332	1	140	527	299	2	31	752	92
Turn Type	pm+pt	NA	pm+pt	pm+pt	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases	1	6	5	5	2			4	3	8
Permitted Phases	6		2	2		2	4		8	
Detector Phase	1	6	5	5	2	2	4	4	3	8
Switch Phase										
Minimum Initial (s)	4.0	25.0	4.0	4.0	15.0	15.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	30.0	12.0	12.0	30.0	30.0	12.0	12.0	9.0	12.0
Total Split (s)	12.0	27.0	12.0	12.0	27.0	27.0	12.0	12.0	59.0	71.0
Total Split (%)	10.9%	24.5%	10.9%	10.9%	24.5%	24.5%	10.9%	10.9%	53.6%	64.5%
Yellow Time (s)	3.2	3.9	3.2	3.2	3.9	3.9	3.2	3.2	3.2	3.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.2	4.9		4.2	4.9	4.9		4.2	4.2	4.2
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	Min	None	None	Min	Min	None	None	None	None
Act Effect Green (s)	30.6	22.1		30.6	22.1	22.1		7.4	66.4	66.4
Actuated g/C Ratio	0.28	0.20		0.28	0.20	0.20		0.07	0.61	0.61
v/c Ratio	0.73	0.60		0.64	0.85	0.65		0.72	1.01	0.35
Control Delay	51.8	43.7		42.1	54.7	16.5		37.9	55.2	6.1
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	51.8	43.7		42.1	54.7	16.5		37.9	55.2	6.1
LOS	D	D		D	D	B		D	E	A
Approach Delay		45.7			41.1			37.9		41.3
Approach LOS		D			D			D		D

Intersection Summary

Cycle Length: 110  
 Actuated Cycle Length: 109.6  
 Natural Cycle: 110  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.01  
 Intersection Signal Delay: 41.9  
 Intersection LOS: D  
 Intersection Capacity Utilization 92.6%  
 ICU Level of Service F  
 Analysis Period (min) 15

Splits and Phases: 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

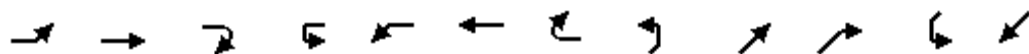
Ø1	Ø2	Ø3	Ø4
12 s	27 s	59 s	12 s
Ø5	Ø6	Ø8	
12 s	27 s	71 s	



# HCM Signalized Intersection Capacity Analysis

## 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

Future PM Imp  
09/06/2023



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT
Lane Configurations												
Traffic Volume (vph)	113	332	7	1	140	527	299	2	31	97	752	92
Future Volume (vph)	113	332	7	1	140	527	299	2	31	97	752	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9			4.2	4.9	4.9		4.2		4.2	4.2
Lane Util. Factor	1.00	0.95			1.00	0.95	1.00		1.00		1.00	1.00
Frt	1.00	1.00			1.00	1.00	0.85		0.90		1.00	0.90
Flt Protected	0.95	1.00			0.95	1.00	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1770	3528			1770	3539	1583		1673		1770	1670
Flt Permitted	0.18	1.00			0.33	1.00	1.00		0.99		0.34	1.00
Satd. Flow (perm)	337	3528			612	3539	1583		1658		642	1670
Peak-hour factor, PHF	0.79	0.79	0.79	0.87	0.87	0.87	0.87	0.85	0.85	0.85	0.78	0.78
Adj. Flow (vph)	143	420	9	1	161	606	344	2	36	114	964	118
RTOR Reduction (vph)	0	2	0	0	0	0	212	0	99	0	0	73
Lane Group Flow (vph)	143	427	0	0	162	606	132	0	53	0	964	308
Turn Type	pm+pt	NA		pm+pt	pm+pt	NA	Perm	Perm	NA		pm+pt	NA
Protected Phases	1	6		5	5	2			4		3	8
Permitted Phases	6			2	2		2	4			8	
Actuated Green, G (s)	29.9	22.1			29.9	22.1	22.1		7.4		66.4	66.4
Effective Green, g (s)	29.9	22.1			29.9	22.1	22.1		7.4		66.4	66.4
Actuated g/C Ratio	0.27	0.20			0.27	0.20	0.20		0.07		0.61	0.61
Clearance Time (s)	4.2	4.9			4.2	4.9	4.9		4.2		4.2	4.2
Vehicle Extension (s)	3.0	6.0			3.0	6.0	6.0		3.5		3.5	3.0
Lane Grp Cap (vph)	193	711			249	713	319		111		952	1011
v/s Ratio Prot	c0.05	0.12			0.05	c0.17					c0.51	0.18
v/s Ratio Perm	0.15				0.13		0.08		0.03		c0.11	
v/c Ratio	0.74	0.60			0.65	0.85	0.42		0.48		1.01	0.30
Uniform Delay, d1	32.6	39.7			32.4	42.2	38.1		49.2		22.2	10.4
Progression Factor	1.00	1.00			1.00	1.00	1.00		1.00		1.00	1.00
Incremental Delay, d2	14.2	2.6			6.0	10.7	2.5		3.8		32.3	0.2
Delay (s)	46.8	42.3			38.4	52.9	40.6		53.1		54.5	10.6
Level of Service	D	D			D	D	D		D		D	B
Approach Delay (s)		43.4				47.0			53.1			42.1
Approach LOS		D				D			D			D

### Intersection Summary

HCM 2000 Control Delay	44.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	109.6	Sum of lost time (s)	17.5
Intersection Capacity Utilization	92.6%	ICU Level of Service	F
Analysis Period (min)	15		


c Critical Lane Group



Movement	SWR
Lane Configurations	
Traffic Volume (vph)	205
Future Volume (vph)	205
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.78
Adj. Flow (vph)	263
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

# Memorandum

**To:** Doug Jeffords

**From:** Darrell Skipper, P.E., Skipper Consulting, Inc. 

**Date:** October 4, 2023

**Subject:** Riverchase PUD Traffic Impact Study, Response to City of Hoover Comments

## Introduction

The purpose of this memorandum is to present analysis in response to City of Hoover Comments on the *Riverchase Planned Unit Development Traffic Impact Study*<sup>1</sup>. City of Hoover Comments include concerns to analyze the capacity of study intersections along the Riverchase Parkway corridor as a coordinated signalized corridor and concerns to examine queuing under existing and future conditions for morning and afternoon commuter peak hours.

## Study Area Roadways

The following intersections below will be evaluated and identified as study intersections for the purposes of this Technical Memorandum.

- Valleydale Road at Riverchase Parkway (existing, signalized)
- Riverchase Parkway at Woods of Riverchase Driver (existing, signalized)
- Riverchase Parkway at Regions Drive (existing, signalized)

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<sup>1</sup> Skipper Consulting. September 2023. *Riverchase Planned Unit Development Traffic Impact Study*.

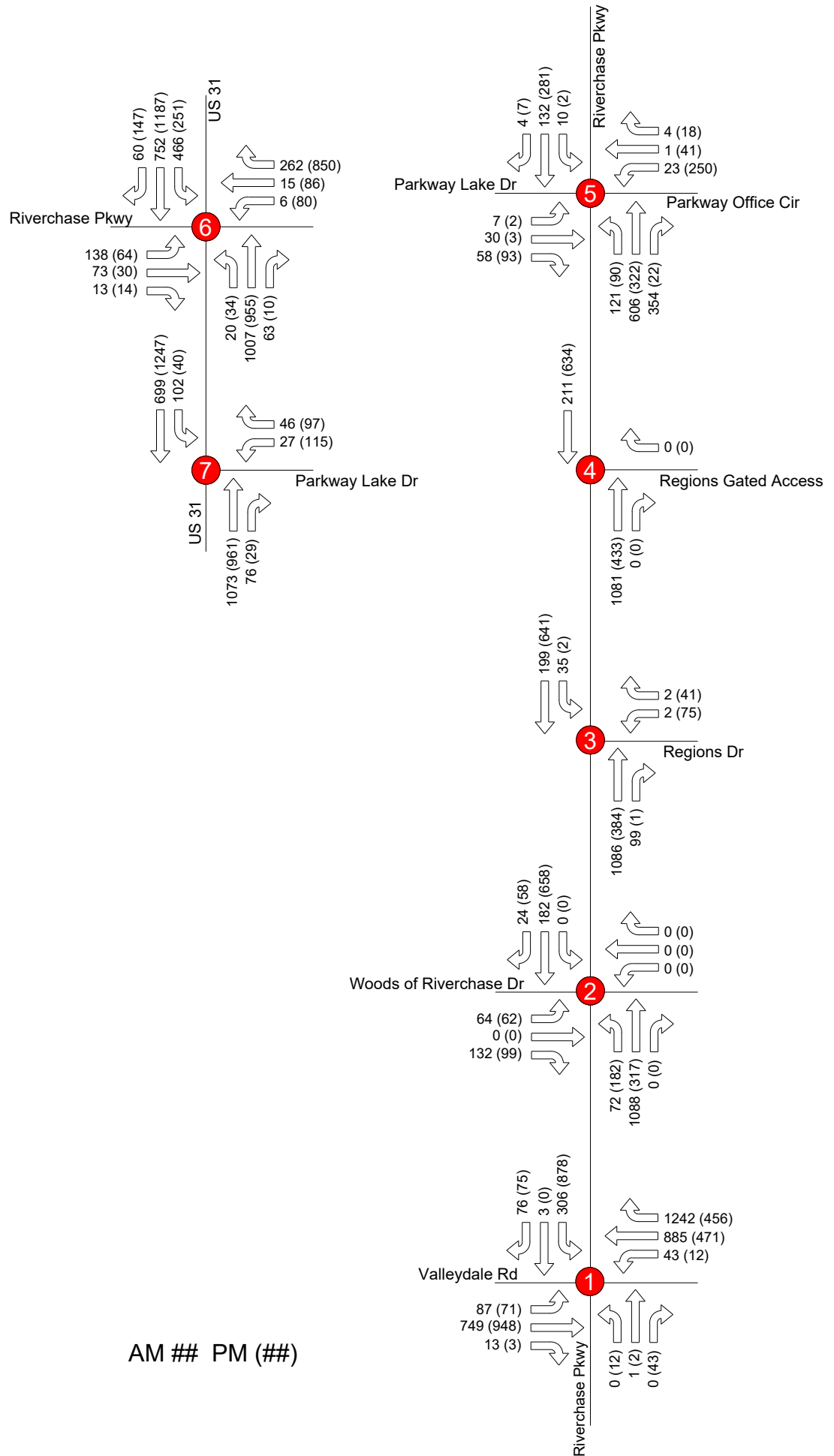
- Riverchase Parkway at Regions Gated Access (existing, unsignalized)
- Riverchase Parkway at Parkway Office Circle/Parkway Lake Drive (existing, signalized)
- US Highway 31 at Riverchase Parkway (existing, signalized)
- US Highway 31 at Parkway Lake Drive (existing, signalized)

The signalized intersection at Valleydale Road and Riverchase Parkway is coordinated with other traffic signals outside of the study area. During the morning peak hour the signal cycle operates at 125 seconds and 130 seconds during the afternoon commuter peak hour. US Highway 31 at Riverchase Parkway also uses coordinated signalization with traffic signals outside of the study area. In the morning peak hour the signal cycle operates at 160 seconds and 200 seconds during the afternoon commuter peak hour. The signal at US Highway 31 at Parkway Lake Drive is not synchronized with other traffic signals. All other intersections along Riverchase Parkway are coordinated with one another and operate under background cycles of 120 seconds during the morning peak hour and 120 seconds during the afternoon commuter peak hour.

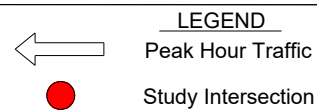
## Existing Intersection Capacity Analysis

Using methods as outlined in the Highway Capacity Manual, the existing capacity and operation of the study intersections are evaluated using existing volumes (shown in **Figure 1**). According to this method of analysis, traffic capacities are expressed as levels of service, ranging from "A" (best) to "F" (worst). In general, a level of service (LOS) "C" is considered desirable, while a level of service "D" is considered acceptable during peak hours of traffic flow.

As indicated in **Table 1**, the overall LOS for all study intersections is desirable. Minor roadways and approach turning movements have poor levels of service at Valleydale Road and Riverchase Parkway and at Riverchase Parkway and Regions Drive. These intersections operate with coordinated signal systems for different coordinated zones. **Table 2** shows the intersection along US Highway 31 and Riverchase Parkway has an overall level of service which is failing during the afternoon commuter peak hour. Capacity analysis printouts that illustrate the results of the analyses for existing conditions are provided in the **Appendix** for reference.



AM ## PM (##)



Scale: Not to Scale  
 Date: OCT 2023  
 North

**Table 1 - Existing Intersection Capacity Analysis**

Intersection	Approach	AM Peak LOS (movement/approach)			PM Peak LOS (movement/approach)		
		Left	Thru	Right	Left	Thru	Right
Valleydale Rd at Riverchase Pkwy (signalized)	NB Riverchase Pkwy	-	E	-	-	D	D
	SB Riverchase Pkwy	C	D	C	C	C	C
	WB Valleydale Rd	E	B	B	D	C	C
	EB Valleydale Rd	D	C	A	E	C	A
	<b>Overall LOS</b>	<b>B</b>			<b>C</b>		
Riverchase Pkwy at Woods of Riverchase Dr (signalized)	NB Riverchase Pkwy	A	A	-	A	A	-
	SB Riverchase Pkwy	-	B	-	-	B	-
	WB Woods. Dr		A	-	-	A	-
	EB Woods. Dr	D	D	-	D	D	-
	<b>Overall LOS</b>	<b>B</b>			<b>B</b>		
Riverchase Pkwy at Regions Dr (signalized)	NB Riverchase Pkwy	-	A	A	-	A	A
	SB Riverchase Pkwy	A	A	-	A	A	-
	WB Regions Dr	E	E	-	D	D	-
	<b>Overall LOS</b>	<b>A</b>			<b>A</b>		
Riverchase Pkwy at Regions Gated Access (unsignalized)	NB Riverchase Pkwy	--	--	--	--	-	--
	SB Riverchase Pkwy	--	--	--	--	--	--
	WB Access	-	A	-	-	A	-
Riverchase Pkwy at Parkway Office Cir / Parkway Lake Dr (signalized)	NB Riverchase Pkwy	A	A	B	A	A	B
	SB Riverchase Pkwy	A	A	-	B	B	-
	WB Parkway Office Cir	D	D	-	D	C	-
	EB Parkway Lake Dr	-	D	-	-	D	-
	<b>Overall LOS</b>	<b>B</b>			<b>C</b>		

Note: '-' indicates that the Level of Service is not defined for unopposed movements in the *Highway Capacity Manual* un-signalized intersection analysis procedures.



**Table 2 - Existing Intersection Capacity Analysis, US Highway 31 Intersections**

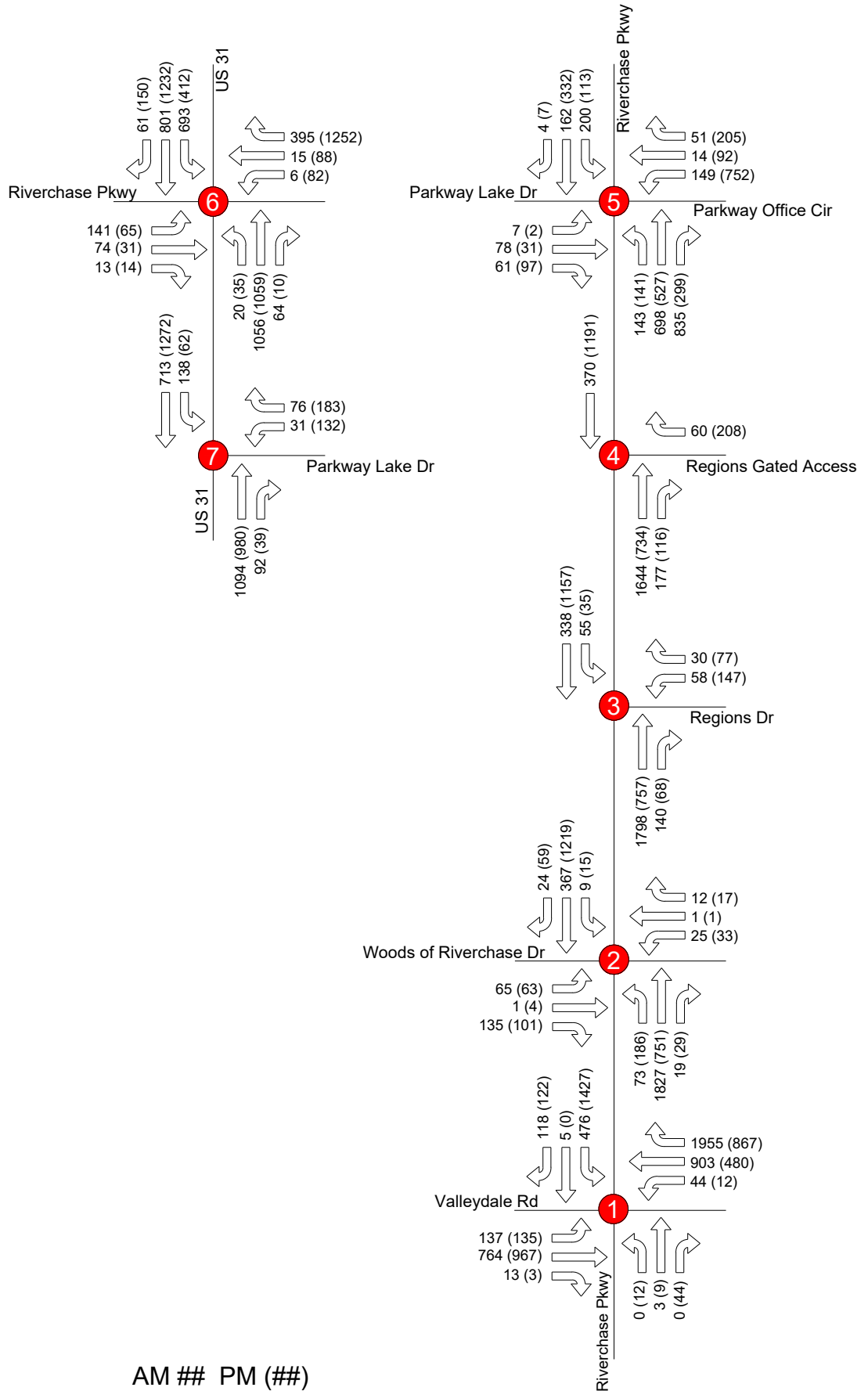
<i>Intersection</i>	<i>Approach</i>	<i>AM Peak LOS (movement/approach)</i>			<i>PM Peak LOS (movement/approach)</i>		
		<i>Left</i>	<i>Thru</i>	<i>Right</i>	<i>Left</i>	<i>Thru</i>	<i>Right</i>
US 31 at Riverchase Pkwy (signalized)	NB US 31	B	C	C	B	C	B
	SB US 31	E	B	A	E	B	A
	WB Riverchase Pkwy	F	D	C	D	D	F
	EB Riverchase Pkwy	E	D	-	E	D	-
	<b>Overall LOS</b>	C			F		
US 31 at Parkway Lake Dr (signalized)	NB US 31	-	A	A	-	A	A
	SB US 31	C	A	-	D	A	-
	WB Parkway Lake Dr	C	-	A	C	-	C
	<b>Overall LOS</b>	A			A		

## Future Intersection Capacity Analysis

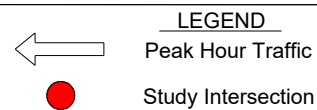
Future traffic volumes (shown in **Figure 2**) were developed from trip generation estimates, trip distributions, and background growth found in the *Traffic Impact Study*. The Future Intersection Capacity Analysis uses methods previously applied to the Existing Intersection Capacity Analysis with Recommended Improvements in place. These improvements include:

- Modify traffic signal timings and offsets for coordinated signals along Riverdale Parkway from Parkway Office Circle to Woods of Riverchase Drive.
- Add a northbound right turn lane at Riverchase Parkway and Regions Gate Access.
- Add a northbound right turn lane at Riverchase Parkway and Woods of Riverchase Drive.
- Add a southbound left turn lane at Riverchase Parkway and Woods of Riverchase Drive.
- Recommended turn lanes are modeled with 100 feet of full lane length.

As indicated in **Table 3**, all intersections have acceptable overall levels of service for the analyzed peak hours. The two intersections with poor or failing approach movement levels of service use coordinated signalized systems. Coordinated traffic signals prioritize through-movements along roadways with the major volumes of traffic. As a result, minor roadways and turning movements carry smaller volumes of traffic and have higher delays. The intersection at Valleydale Road and Riverchase Parkway has poor and failing levels of service for left turning movements in the westbound and eastbound directions. The intersection at Riverchase Parkway and Parkway Office Circle has a westbound left turning movement and an eastbound approach with poor levels of service. **Table 4** shows a poor overall level of service for the intersection at US Highway 31 at Riverchase Parkway under future improved conditions during the afternoon peak hour as it had under existing conditions. US Highway 31 at Riverchase Parkway has poor or failing approach movement levels of service for turning movements. Capacity analysis printouts that illustrate the results of the analyses for future improved conditions are provided in the **Appendix**.



AM ## PM (##)



Scale: Not to Scale  
 Date: OCT 2023  
  
 North

**Table 3 – Future Intersection Capacity Analysis**

<b>Intersection</b>	<b>Approach</b>	<b>AM Peak LOS (movement/approach)</b>			<b>PM Peak LOS (movement/approach)</b>		
		<b>Left</b>	<b>Thru</b>	<b>Right</b>	<b>Left</b>	<b>Thru</b>	<b>Right</b>
Valleydale Rd at Riverchase Pkwy (signalized)	NB Riverchase Pkwy	-	E	-	-	E	D
	SB Riverchase Pkwy	D	D	D	D	E	C
	WB Valleydale Rd	E	C	C	F	C	A
	EB Valleydale Rd	E	B	B	E	C	C
	<b>Overall LOS</b>	<b>C</b>			<b>D</b>		
Riverchase Pkwy at Woods of Riverchase Dr (signalized)	NB Riverchase Pkwy	A	B	A	B	A	A
	SB Riverchase Pkwy	B	A	-	A	A	-
	WB Woods. Dr		D	-	-	D	-
	EB Woods. Dr	D	D	-	D	D	-
	<b>Overall LOS</b>	<b>B</b>			<b>B</b>		
Riverchase Pkwy at Regions Dr (signalized)	NB Riverchase Pkwy	-	A	A	-	A	A
	SB Riverchase Pkwy	D	A	-	A	A	-
	WB Regions Dr	D	D	-	D	D	-
	<b>Overall LOS</b>	<b>B</b>			<b>B</b>		
Riverchase Pkwy at Regions Gated Access (unsignalized)	NB Riverchase Pkwy	--	--	--	--	-	--
	SB Riverchase Pkwy	--	--	--	--	--	--
	WB Access	-	B	-	-	B	-
Riverchase Pkwy at Parkway Office Cir / Parkway Lake Dr (signalized)	NB Riverchase Pkwy	A	A	C	C	D	C
	SB Riverchase Pkwy	B	B	-	D	D	-
	WB Parkway Office Cir	D	C	-	E	B	-
	EB Parkway Lake Dr	-	E	-	-	E	-
	<b>Overall LOS</b>	<b>C</b>			<b>D</b>		

**Table 4 – Future Intersection Capacity Analysis, US Highway 31 Intersections**

<i>Intersection</i>	<i>Approach</i>	<i>AM Peak LOS (movement/approach)</i>			<i>PM Peak LOS (movement/approach)</i>		
		<i>Left</i>	<i>Thru</i>	<i>Right</i>	<i>Left</i>	<i>Thru</i>	<i>Right</i>
US 31 at Riverchase Pkwy (signalized)	NB US 31	C	D	C	B	C	B
	SB US 31	F	B	A	F	B	A
	WB Riverchase Pkwy	E	D	C	E	E	F
	EB Riverchase Pkwy	E	D	-	E	E	-
	<b>Overall LOS</b>	D			F		
US 31 at Parkway Lake Dr (signalized)	NB US 31	-	B	A	-	B	A
	SB US 31	C	A	-	D	A	-
	WB Parkway Lake Dr	C	-	C	C	-	C
	<b>Overall LOS</b>	B			B		

### Existing Conditions Queuing Analysis

Queueing analysis was performed on the study intersections to estimate queue lengths and blockage. **Table 5** shows the full lane lengths for the Existing Conditions Queuing Analysis. Study intersections were modeled using SimTraffic software (version 11.1.2.9) with a 10-minute interval for seeding and a 60-minute interval during the corridor's peak hours. Queue lengths in **Table 6** and **Table 7** were averaged from seven simulations for each peak period with traffic arriving randomly to the study area. The 95th percentile queues are shown in feet for each intersection movement.

**Table 5 – Existing Conditions Queuing Analysis**

Intersection	Approach	Existing Conditions Full Lane Width (ft)	
		Left	Right
Valleydale Rd at Riverchase Pkwy	NB Riverchase Pkwy	-	150
	SB Riverchase Pkwy	350*	170
	WB Valleydale Rd	170	
	EB Valleydale Rd	300	300
Riverchase Pkwy at Woods of Riverchase Dr	NB Riverchase Pkwy	130	-
	SB Riverchase Pkwy	-	-
	WB Woods. Dr	-	-
	EB Woods. Dr	120	-
Riverchase Pkwy at Regions Dr	NB Riverchase Pkwy	-	90
	SB Riverchase Pkwy	100	-
	WB Regions Dr	-	-
Riverchase Pkwy at Regions Gated Access	NB Riverchase Pkwy	-	-
	SB Riverchase Pkwy	-	-
	WB Regions Gated Access	-	0
Riverchase Pkwy at Parkway Office Cir/Parkway Lake Dr	NB Riverchase Pkwy	180	125
	SB Riverchase Pkwy	100	-
	WB Parkway Office Cir	-	-
	EB Parkway Lake Dr	-	-
US 31 at Riverchase Pkwy	NB US 31	185	315
	SB US 31	120*	175
	WB Riverchase Pkwy	230	-
	EB Riverchase Pkwy	-	-
US 31 at Parkway Lake Dr	NB US 31	-	160
	SB US 31	180*	-
	WB Parkway Lake Dr	-	500

\*=dual lanes



**Table 6 – Existing Conditions Queuing Analysis**

Intersection (Traffic Control)	Approach	Existing Conditions 95 <sup>th</sup> Percentile Queue (ft)					
		AM Peak			PM Peak		
		Left	Thru	Right	Left	Thru	Right
Valleydale Rd at Riverchase Pkwy (signalized)	NB Riverchase Pkwy	-	0	0	-	25	25
	SB Riverchase Pkwy	100	125	25	225	225**	125
	WB Valleydale Rd	75	225**	0	25	175	175
	EB Valleydale Rd	75	125	25	75	175	25
Riverchase Pkwy at Woods of Riverchase Dr (signalized)	NB Riverchase Pkwy	50	150	-	100	75	-
	SB Riverchase Pkwy	-	75	-	-	200	-
	WB Woods. Dr	-	0	-	-	0	-
	EB Woods. Dr	125*	75	-	125*	100	-
Riverchase Pkwy at Regions Dr (signalized)	NB Riverchase Pkwy	-	100**	25	-	75	0
	SB Riverchase Pkwy	50	25	-	25	75	-
	WB Regions Dr	25	-	25	125	-	50
Riverchase Pkwy at Regions Gated Access (unsignalized)	NB Riverchase Pkwy	-	--	-	-	--	-
	SB Riverchase Pkwy	-	--	-	-	--	-
	WB Regions Gated Access	-	-	0	-	-	0
Riverchase Pkwy at Parkway Office Cir/Parkway Lake Dr (signalized)	NB Riverchase Pkwy	75	100	50	75	100	0
	SB Riverchase Pkwy	25	75	-	25	125**	-
	WB Parkway Office Cir	75	25	-	275	100	-
	EB Parkway Lake Dr	-	100	-	-	75	-

Note: '- -' indicates unopposed movements. \*\*=Through volumes blocking turning volumes. \*=Turning volumes blocking through volumes.

**Table 7 – Existing Conditions Queuing Analysis, US Highway 31 Intersections**

Intersection (Traffic Control)	Approach	Existing Conditions 95 <sup>th</sup> Percentile Queue (ft)					
		AM Peak			PM Peak		
		Left	Thru	Right	Left	Thru	Right
US 31 at Riverchase Pkwy	NB US 31	50	350**	25	100	350**	0
	SB US 31	250*	500**	0	225*	325**	50
	WB Riverchase Pkwy	50	50	200	125	200	350*
	EB Riverchase Pkwy	200	150	-	125	100	-
US 31 at Parkway Lake Dr	NB US 31	-	175	0	-	200	0
	SB US 31	75	100	-	75	175	-
	WB Parkway Lake Dr	75	-	25	100	-	75

\*\*=Through volumes blocking turning volumes. \*=Turning volumes blocking through volumes.

The Existing Conditions Queuing Analysis shows there are minimal queuing issues for study area intersections along the Riverchase Parkway Corridor. **Table 6** shows blockage in the eastbound left turning lane at Riverchase Parkway and Woods Drive. The blockage occurs when a queue of vehicles measuring 125 feet occupies a lane with 120 feet of storage. This blockage lasts 1% of the morning peak hour and 1% of the afternoon commuter peak hour. Through-lane blockage denotes vehicles intending to move forward and through intersections are obstructing left or right turning vehicles. This occurs westbound and southbound at Valleydale Road and Riverchase Parkway, northbound at Riverchase Parkway and Regions Drive, and southbound at Riverchase Parkway and Parkway Office Circle.

In **Table 7**, the intersection along US Highway 31 at Riverchase Parkway shows through-lane blockage northbound and southbound during the morning and afternoon commuter peak hours. This intersection also shows left turn lane blockage in the southbound direction for 49% of the morning peak hour and 24% of the afternoon commuter peak hour. The left turn lane queues interact with adjacent through-lane queues throughout peak hours.

## Future Conditions Queuing Analysis

The Future Conditions Queuing Analysis uses the same software, model parameters, and turn lane lengths applied to the Existing Conditions Queuing Analysis, with the addition of future volumes and 100-foot turn lanes along Riverchase Parkway at Regions Gate Access and at Woods of Riverchase Drive.

**Table 8 – Future Conditions Queuing Analysis**

Intersection (Traffic Control)	Approach	95 <sup>th</sup> Percentile Queue (ft)					
		AM Peak			PM Peak		
		Left	Thru	Right	Left	Thru	Right
Valleydale Rd at Riverchase Pkwy (signalized)	NB Riverchase Pkwy	-	25	0	-	25	25
	SB Riverchase Pkwy	150	175**	50	400*	400**	275
	WB Valleydale Rd	100	250**	75	25	175	0
	EB Valleydale Rd	125	125	25	150	200	25
Riverchase Pkwy at Woods of Riverchase Dr (signalized)	NB Riverchase Pkwy	75	275**	50	125*	150**	50
	SB Riverchase Pkwy	25	75	-	50	250**	-
	WB Woods. Dr	-	100	-	-	100	-
	EB Woods. Dr	100	75	-	125*	100	-
Riverchase Pkwy at Regions Dr (signalized)	NB Riverchase Pkwy	-	350**	125	-	175**	100
	SB Riverchase Pkwy	100*	75	-	75	175**	-
	WB Regions Dr	100	-	75	200	-	75
Riverchase Pkwy at Regions Gated Access (unsignalized)	NB Riverchase Pkwy	-	--	50	-	--	0
	SB Riverchase Pkwy	-	--	-	-	--	-
	WB Regions Gated Access	-	-	75	-	-	100
Riverchase Pkwy at Parkway Office Cir/Parkway Lake Dr (signalized)	NB Riverchase Pkwy	125	550**	225*	175	325**	225
	SB Riverchase Pkwy	125*	100	-	150*	225**	-
	WB Parkway Office Cir	200	75	-	625	275	-
	EB Parkway Lake Dr	-	175	-	-	175	-

Note: '- -' indicates unopposed movements. \*\*=Through volumes blocking turning volumes. \*=Turning volumes blocking through volumes.

**Table 9 – Future Conditions Queuing Analysis, US Highway 31 Intersections**

Intersection (Traffic Control)	Approach	Existing Conditions 95 <sup>th</sup> Percentile Queue (ft)					
		AM Peak			PM Peak		
		Left	Thru	Right	Left	Thru	Right
US 31 at Riverchase Pkwy	NB US 31	150	500**	240	100	400**	0
	SB US 31	250*	525**	75	250*	575**	100
	WB Riverchase Pkwy	50	50	225	125	450	550*
	EB Riverchase Pkwy	200	125	-	125	100	-
US 31 at Parkway Lake Dr	NB US 31	-	225**	0	-	250**	0
	SB US 31	100	125	-	100	250**	-
	WB Parkway Lake Dr	75	-	75	125	-	100

\*\*=Through volumes blocking turning volumes. \*=Turning volumes blocking through volumes.

**Table 8** shows there are minimal queuing issues for study area intersections which involve storage blockage. Only one of the queuing blockages or spillbacks noted in **Table 8** endures longer than 5 percent of the peak hour. In these instances, signal cycle green times serve waiting vehicles, clearing queues so that blockage is not a persistent problem through the peak hour. At Valleydale Road and Riverchase Parkway the southbound left lane turn blockage lasts 1% of the afternoon commuter peak hour. The northbound left turn lane of Riverchase Parkway at Woods of Riverchase Drive shows blockage for 1% of the afternoon peak hour and the eastbound left turn lane is blocked for 1% of the afternoon commuter peak hour. Riverchase Parkway at Regions Drive has southbound left turn lane blockage for 2% of the morning peak hour. Riverchase Parkway at Parkway Office Circle/Parkway Lake Drive shows southbound left turn lane blockage for 3% of the morning peak hour and 3% of the afternoon commuter peak hour. The northbound right turn lane shows blockage for a significant portion of the morning peak hour, but the adjacent through-lane queue also obstructs right turning vehicles from the existing turn lane bay.

The Future Conditions Queuing Analysis for US Highway 31 Intersections, **Table 9**, shows the two southbound left turn lanes at US Highway 31 and Riverchase Parkway experience extensive queuing during the peak hours as do the adjacent through-lanes. Other queues forming at US Highway 31 and Riverchase Parkway and at US Highway 31 and Parkway Lake Drive do not result in blockage of through or turning vehicles.

## Conclusions

Findings of these analyses include:

- **Existing Intersection Capacity Analysis** finds a desirable overall level of service for all study intersections under Existing Conditions. Approach movement levels of service are poor at Valleydale Road and Riverchase Parkway and at Riverchase Parkway and Regions Drive. **Table 2** shows the intersection along US Highway 31 and Riverchase Parkway has an overall level of service which is failing during the afternoon commuter peak hour.
- **Future Intersection Capacity Analysis** applies future volumes to existing intersections with previously Recommended Improvements. Study intersections have acceptable overall levels of service. The two intersections with poor or failing approach movement levels of service use coordinated signalized systems. The intersection at Valleydale Road and Riverchase Parkway has poor and failing levels of service for left turning movements in the westbound and eastbound directions. The intersection at Riverchase Parkway and Parkway Office Circle has a westbound left turning movement and an eastbound approach with poor levels of service. **Table 4** shows a poor overall level of service for the intersection at US Highway 31 at Riverchase Parkway under future improved conditions during the afternoon commuter peak hour as it had under existing conditions. US Highway 31 at Riverchase Parkway has poor to failing approach movement levels of service for turning movements.
- **Existing Conditions Queueing Analysis** shows minimal queueing issues for study area intersections along the Riverchase Parkway Corridor. US Highway 31 at Riverchase Parkway shows southbound through-lane and left turn lane queueing issues.
- **Future Conditions Queueing Analysis** shows minimal queueing issues for study area intersections along the Riverchase Parkway Corridor. At Riverchase Parkway and Parkway Office Circle/Parkway Lake Drive the northbound right turn lane shows blockage related to the adjacent through-lane queueing. The two southbound left turn lanes at US Highway 31 and

Riverchase Parkway experience extensive queuing during the peak hours as do the adjacent through-lanes.

- **Recommended Improvements**

- Modify traffic signal timings and offsets for coordinated signals along Riverdale Parkway from Parkway Office Circle to Woods of Riverchase Drive.
- Add a northbound right turn lane at Riverchase Parkway and Regions Gate Access.
- Add a northbound right turn lane at Riverchase Parkway and Woods of Riverchase Drive.
- Add a southbound left turn lane at Riverchase Parkway and Woods of Riverchase Drive.



***Appendix***

# TRAFFIC DATA, LLC

PO Box 187

Cullman, AL 35056

**205-824-0125**

Hoover, AL

File Name : hoover15

Site Code : 00000000

Start Date : 09/20/2023

Page No : 1

Groups Printed- Group 1

Start Time	HWY 31 Southbound		PARKWAY LAKE DR Westbound		HWY 31 Northbound		Int. Total
	Left	Thru	Left	Right	Thru	Right	
04:00 PM	11	323	28	29	206	3	600
04:15 PM	11	296	21	21	224	6	579
04:30 PM	15	291	38	28	219	4	595
04:45 PM	7	290	18	20	218	11	564
<b>Total</b>	<b>44</b>	<b>1200</b>	<b>105</b>	<b>98</b>	<b>867</b>	<b>24</b>	<b>2338</b>
05:00 PM	13	354	33	28	233	7	668
05:15 PM	5	312	26	21	291	7	662
05:30 PM	16	279	27	19	216	4	561
05:45 PM	4	246	10	8	216	6	490
<b>Total</b>	<b>38</b>	<b>1191</b>	<b>96</b>	<b>76</b>	<b>956</b>	<b>24</b>	<b>2381</b>
07:00 AM	11	119	1	10	190	12	343
07:15 AM	22	166	5	10	256	18	477
07:30 AM	25	186	2	11	255	17	496
07:45 AM	36	193	11	12	292	21	565
<b>Total</b>	<b>94</b>	<b>664</b>	<b>19</b>	<b>43</b>	<b>993</b>	<b>68</b>	<b>1881</b>
08:00 AM	19	154	9	13	270	20	485
08:15 AM	16	132	2	10	245	18	423
08:30 AM	9	134	6	3	211	9	372
08:45 AM	6	151	2	4	198	10	371
<b>Total</b>	<b>50</b>	<b>571</b>	<b>19</b>	<b>30</b>	<b>924</b>	<b>57</b>	<b>1651</b>
<b>Grand Total</b>	<b>226</b>	<b>3626</b>	<b>239</b>	<b>247</b>	<b>3740</b>	<b>173</b>	<b>8251</b>
<b>Apprch %</b>	<b>5.9</b>	<b>94.1</b>	<b>49.2</b>	<b>50.8</b>	<b>95.6</b>	<b>4.4</b>	
<b>Total %</b>	<b>2.7</b>	<b>43.9</b>	<b>2.9</b>	<b>3.0</b>	<b>45.3</b>	<b>2.1</b>	

Start Time	HWY 31 Southbound			PARKWAY LAKE DR Westbound			HWY 31 Northbound			App. Total	Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total		
<b>Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1</b>											
Intersection	04:30 PM			04:30 PM			05:15 PM			3:45:00 PM	
Volume	40	1247	1287	115	97	212	961	29	990	0	2489
Percent	3.1	96.9		54.2	45.8		97.1	2.9		0	668
05:00 Volume	13	354	367	33	28	61	233	7	240	0	
Peak Factor										0.932	
High Int.	05:00 PM			04:30 PM			05:15 PM			3:45:00 PM	
Volume	13	354	367	38	28	66	291	7	298		
Peak Factor	0.877						0.803			0.831	
<b>Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1</b>											
By Approach	04:30 PM			04:30 PM			04:30 PM			04:00 PM	
Volume	40	1247	1287	115	97	212	961	29	990	0	
Percent	3.1	96.9		54.2	45.8		97.1	2.9			
High Int.	05:00 PM			04:30 PM			05:15 PM			-	
Volume	13	354	367	38	28	66	291	7	298	-	-
Peak Factor	0.877						0.803			0.831	

# TRAFFIC DATA, LLC

PO Box 187  
Cullman, AL 35056  
205-824-0125

File Name : hoover15  
Site Code : 00000000  
Start Date : 09/20/2023  
Page No : 2

Start Time	HWY 31 Southbound			PARKWAY LAKE DR Westbound			HWY 31 Northbound			App. Total	Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total		
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1											
Intersection	07:15 AM										
Volume	102	699	801	27	46	73	1073	76	1149	0	2023
Percent	12.7	87.3		37.0	63.0		93.4	6.6			
07:45 Volume	36	193	229	11	12	23	292	21	313	0	565
Peak Factor										0.895	
High Int.	07:45 AM			07:45 AM			07:45 AM				
Volume	36	193	229	11	12	23	292	21	313		
Peak Factor	0.874						0.793			0.918	
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1											
By Approach	07:15 AM			07:15 AM			07:15 AM			07:00 AM	
Volume	102	699	801	27	46	73	1073	76	1149	0	
Percent	12.7	87.3		37.0	63.0		93.4	6.6			
High Int.	07:45 AM			07:45 AM			07:45 AM				
Volume	36	193	229	11	12	23	292	21	313	-	-
Peak Factor	0.874						0.793			0.918	

# TRAFFIC DATA, LLC

PO Box 187

Cullman, AL 35056

**205-824-0125**

Hoover, AL

File Name : hoover14

Site Code : 00000000

Start Date : 09/20/2023

Page No : 1

Groups Printed- Group 1

Start Time	HWY 31 Southbound			RIVERCHASE PKWY E Westbound			HWY 31 Northbound			RIVERCHASE PKWY W Eastbound			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	37	312	27	15	35	170	7	231	1	17	2	4	858
04:15 PM	47	303	23	12	29	160	7	226	2	23	2	2	836
04:30 PM	38	281	35	23	22	178	5	224	2	8	2	3	821
04:45 PM	57	280	30	26	20	224	4	210	1	14	15	5	886
<b>Total</b>	<b>179</b>	<b>1176</b>	<b>115</b>	<b>76</b>	<b>106</b>	<b>732</b>	<b>23</b>	<b>891</b>	<b>6</b>	<b>62</b>	<b>21</b>	<b>14</b>	<b>3401</b>
05:00 PM	59	321	41	18	23	271	14	237	3	20	5	4	1016
05:15 PM	97	305	41	13	21	177	11	284	4	22	8	2	985
05:30 PM	39	257	32	7	22	138	11	219	4	22	3	3	757
05:45 PM	40	252	41	6	16	76	12	204	0	26	13	3	689
<b>Total</b>	<b>235</b>	<b>1135</b>	<b>155</b>	<b>44</b>	<b>82</b>	<b>662</b>	<b>48</b>	<b>944</b>	<b>11</b>	<b>90</b>	<b>29</b>	<b>12</b>	<b>3447</b>
07:00 AM	67	128	11	2	1	33	0	164	10	41	12	0	469
07:15 AM	79	170	13	1	7	49	6	245	13	48	14	4	649
07:30 AM	123	211	17	0	4	72	4	241	8	27	17	2	726
07:45 AM	155	208	14	1	2	71	4	267	24	38	22	4	810
<b>Total</b>	<b>424</b>	<b>717</b>	<b>55</b>	<b>4</b>	<b>14</b>	<b>225</b>	<b>14</b>	<b>917</b>	<b>55</b>	<b>154</b>	<b>65</b>	<b>10</b>	<b>2654</b>
08:00 AM	109	163	16	4	2	70	6	254	18	25	20	3	690
08:15 AM	117	151	17	3	3	53	1	241	12	17	10	2	627
08:30 AM	73	140	29	1	3	38	3	185	18	28	7	6	531
08:45 AM	76	140	31	1	1	50	2	193	5	27	11	6	543
<b>Total</b>	<b>375</b>	<b>594</b>	<b>93</b>	<b>9</b>	<b>9</b>	<b>211</b>	<b>12</b>	<b>873</b>	<b>53</b>	<b>97</b>	<b>48</b>	<b>17</b>	<b>2391</b>
<b>Grand Total</b>	<b>1213</b>	<b>3622</b>	<b>418</b>	<b>133</b>	<b>211</b>	<b>1830</b>	<b>97</b>	<b>3625</b>	<b>125</b>	<b>403</b>	<b>163</b>	<b>53</b>	<b>11893</b>
Apprch %	23.1	69.0	8.0	6.1	9.7	84.2	2.5	94.2	3.2	65.1	26.3	8.6	
Total %	10.2	30.5	3.5	1.1	1.8	15.4	0.8	30.5	1.1	3.4	1.4	0.4	

Start Time	HWY 31 Southbound				RIVERCHASE PKWY E Westbound				HWY 31 Northbound				RIVERCHASE PKWY W Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
<b>Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1</b>																	
Intersection	04:30 PM				05:00 PM				05:15 PM				04:45 PM				
Volume	251	1187	147	1585	80	86	850	1016	34	955	10	999	64	30	14	108	3708
Percent	15.8	74.9	9.3		7.9	8.5	83.7		3.4	95.6	1.0		59.3	27.8	13.0		
Volume	59	321	41	421	18	23	271	312	14	237	3	254	20	5	4	29	1016
Peak Factor																	0.912
High Int.	05:15 PM				05:00 PM				05:15 PM				04:45 PM				
Volume	97	305	41	443	18	23	271	312	11	284	4	299	14	15	5	34	
Peak Factor	0.894				0.814				0.835				0.794				
<b>Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1</b>																	
By Approach	04:30 PM				04:30 PM				05:00 PM				05:00 PM				
Volume	251	1187	147	1585	80	86	850	1016	48	944	11	1003	90	29	12	131	
Percent	15.8	74.9	9.3		7.9	8.5	83.7		4.8	94.1	1.1		68.7	22.1	9.2		
High Int.	05:15 PM				05:00 PM				05:15 PM				05:45 PM				
Volume	97	305	41	443	18	23	271	312	11	284	4	299	26	13	3	42	
Peak Factor	0.894				0.814				0.839				0.780				

# TRAFFIC DATA, LLC

PO Box 187  
Cullman, AL 35056  
205-824-0125

File Name : hoover14  
Site Code : 00000000  
Start Date : 09/20/2023  
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Start Time	HWY 31 Southbound				RIVERCHASE PKWY E Westbound				HWY 31 Northbound				RIVERCHASE PKWY W Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection	07:15 AM																
Volume	466	752	60	1278	6	15	262	283	20	1007	63	1090	138	73	13	224	2875
Percent	36.5	58.8	4.7		2.1	5.3	92.6		1.8	92.4	5.8		61.6	32.6	5.8		
07:45																	
Volume	155	208	14	377	1	2	71	74	4	267	24	295	38	22	4	64	810
Peak Factor	0.847																0.887
High Int.	07:45 AM				07:30 AM				07:45 AM				07:15 AM				
Volume	155	208	14	377	0	4	72	76	4	267	24	295	48	14	4	66	
Peak Factor	0.847								0.931				0.924				0.848
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
By Approach	07:30 AM				07:30 AM				07:15 AM				07:00 AM				
Volume	504	733	64	1301	8	11	266	285	20	1007	63	1090	154	65	10	229	
Percent	38.7	56.3	4.9		2.8	3.9	93.3		1.8	92.4	5.8		67.2	28.4	4.4		
High Int.	07:45 AM				07:30 AM				07:45 AM				07:15 AM				
Volume	155	208	14	377	0	4	72	76	4	267	24	295	48	14	4	66	
Peak Factor	0.863								0.938				0.924				0.867

Timings  
1: Valleydale Rd & Riverchase Pkwy

Existing AM  
09/29/2023

Lane Group	NBT	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations										
Traffic Volume (vph)	1	306	3	76	87	749	13	37	885	1242
Future Volume (vph)	1	306	3	76	87	749	13	37	885	1242
Turn Type	NA	Split	NA	Perm	Prot	NA	Perm	Prot	NA	pt+ov
Protected Phases	4	3	3		1	6		5	2	2 3
Permitted Phases				3			6			
Detector Phase	4	3	3	3	1	6	6	5	2	2 3
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	10.0	20.0	20.0	20.0	10.0	26.0	26.0	12.0	26.0	
Total Split (s)	12.0	28.0	28.0	28.0	20.0	70.0	70.0	15.0	65.0	
Total Split (%)	9.6%	22.4%	22.4%	22.4%	16.0%	56.0%	56.0%	12.0%	52.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.5	5.5	5.5	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	Min	Min	None	Min	
Act Effect Green (s)	6.8	23.5	23.5	23.5	11.7	51.4	51.4	8.5	48.6	79.7
Actuated g/C Ratio	0.07	0.24	0.24	0.24	0.12	0.51	0.51	0.09	0.49	0.80
v/c Ratio	0.03	0.31	0.31	0.18	0.48	0.33	0.02	0.32	0.56	0.55
Control Delay	54.0	37.9	41.0	3.3	55.0	14.8	0.0	55.8	20.4	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	37.9	41.0	3.3	55.0	14.8	0.0	55.8	20.4	2.0
LOS	D	D	D	A	E	B	A	E	C	A
Approach Delay	54.0		31.9			18.7			10.6	
Approach LOS	D		C			B			B	

Intersection Summary

Cycle Length: 125  
 Actuated Cycle Length: 99.9  
 Natural Cycle: 70  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.56  
 Intersection Signal Delay: 15.2  
 Intersection LOS: B  
 Intersection Capacity Utilization 66.2%  
 ICU Level of Service C  
 Analysis Period (min) 15





























Splits and Phases: 1: Valleydale Rd & Riverchase Pkwy





HCM Signalized Intersection Capacity Analysis  
1: Valleydale Rd & Riverchase Pkwy

Existing AM  
09/29/2023

													
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWU	SWL	SWT	
Lane Configurations				  				  			 	 	
Traffic Volume (vph)	0	1	0	306	3	76	87	749	13	6	37	885	
Future Volume (vph)	0	1	0	306	3	76	87	749	13	6	37	885	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.5		5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00		0.91	0.91	1.00	1.00	0.91	1.00		1.00	0.95	
Frt		1.00		1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)		1863		3221	1616	1583	1770	5085	1583		1770	3539	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (perm)		1863		3221	1616	1583	1770	5085	1583		1770	3539	
Peak-hour factor, PHF	0.25	0.25	0.25	0.88	0.88	0.88	0.87	0.87	0.87	0.92	0.92	0.92	
Adj. Flow (vph)	0	4	0	348	3	86	100	861	15	7	40	962	
RTOR Reduction (vph)	0	0	0	0	0	67	0	0	8	0	0	0	
Lane Group Flow (vph)	0	4	0	233	118	19	100	861	7	0	47	962	
Turn Type		NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	
Protected Phases		4		3	3		1	6		5	5	2	
Permitted Phases	4		4			3			6				
Actuated Green, G (s)		1.0		23.5	23.5	23.5	9.3	51.4	51.4		6.5	48.6	
Effective Green, g (s)		1.0		23.5	23.5	23.5	9.3	51.4	51.4		6.5	48.6	
Actuated g/C Ratio		0.01		0.22	0.22	0.22	0.09	0.49	0.49		0.06	0.46	
Clearance Time (s)		5.5		5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0		4.0	4.0	4.0	4.0	3.0	3.0		4.0	3.0	
Lane Grp Cap (vph)		17		718	360	352	156	2479	771		109	1631	
v/s Ratio Prot		c0.00		0.07	0.07		c0.06	c0.17			0.03	c0.27	
v/s Ratio Perm						0.01			0.00				
v/c Ratio		0.24		0.32	0.33	0.05	0.64	0.35	0.01		0.43	0.59	
Uniform Delay, d1		51.8		34.3	34.3	32.2	46.4	16.7	13.9		47.7	21.0	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		9.5		0.4	0.7	0.1	9.6	0.1	0.0		3.7	0.6	
Delay (s)		61.3		34.7	35.1	32.3	56.1	16.7	13.9		51.4	21.6	
Level of Service		E		C	D	C	E	B	B		D	C	
Approach Delay (s)		61.3			34.3			20.7				13.2	
Approach LOS		E			C			C				B	
<b>Intersection Summary</b>													
HCM 2000 Control Delay			17.7		HCM 2000 Level of Service				B				
HCM 2000 Volume to Capacity ratio			0.59										
Actuated Cycle Length (s)			105.4		Sum of lost time (s)				23.0				
Intersection Capacity Utilization			66.2%		ICU Level of Service				C				
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 1: Valleydale Rd & Riverchase Pkwy

Existing AM  
 09/29/2023



Movement	SWR
Lane Configurations	TT
Traffic Volume (vph)	1242
Future Volume (vph)	1242
Ideal Flow (vphpl)	1900
Total Lost time (s)	6.0
Lane Util. Factor	0.88
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	2787
Flt Permitted	1.00
Satd. Flow (perm)	2787
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	1350
RTOR Reduction (vph)	280
Lane Group Flow (vph)	1070
Turn Type	pt+ov
Protected Phases	2 3
Permitted Phases	
Actuated Green, G (s)	78.1
Effective Green, g (s)	78.1
Actuated g/C Ratio	0.74
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	2065
v/s Ratio Prot	c0.38
v/s Ratio Perm	
v/c Ratio	0.52
Uniform Delay, d1	5.7
Progression Factor	1.00
Incremental Delay, d2	0.2
Delay (s)	6.0
Level of Service	A
Approach Delay (s)	
Approach LOS	
Intersection Summary	

# Timings

## 2: Riverchase Pkwy & Woods of Riverchase Dr

Existing AM  
09/29/2023

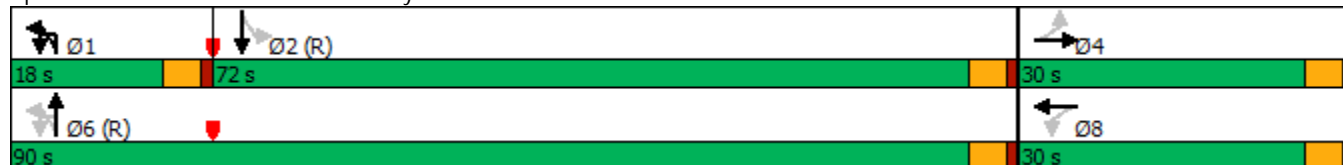


Lane Group	EBL	EBT	NBU	NBL	NBT	SBT	Ø8
Lane Configurations	↶	↷		↶	↷	↷	
Traffic Volume (vph)	64	0	12	60	1088	182	
Future Volume (vph)	64	0	12	60	1088	182	
Turn Type	Perm	NA	pm+pt	pm+pt	NA	NA	
Protected Phases		4	1	1	6	2	8
Permitted Phases	4		6	6			
Detector Phase	4	4	1	1	6	2	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	10.0	10.0	10.0
Minimum Split (s)	9.0	9.0	9.0	9.0	20.0	20.0	15.0
Total Split (s)	30.0	30.0	18.0	18.0	90.0	72.0	30.0
Total Split (%)	25.0%	25.0%	15.0%	15.0%	75.0%	60.0%	25%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	
Lead/Lag			Lead	Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	Max	Max	C-Max	C-Max	None
Act Effect Green (s)	12.9	12.9		98.1	98.1	67.5	
Actuated g/C Ratio	0.11	0.11		0.82	0.82	0.56	
v/c Ratio	0.54	0.22		0.08	0.43	0.14	
Control Delay	63.5	0.6		2.6	3.8	10.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	
Total Delay	63.5	0.6		2.6	3.8	10.7	
LOS	E	A		A	A	B	
Approach Delay		21.2			3.7	10.7	
Approach LOS		C			A	B	

### Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection  
 Natural Cycle: 45  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.54  
 Intersection Signal Delay: 7.2  
 Intersection Capacity Utilization 57.8%  
 Analysis Period (min) 15  
 Intersection LOS: A  
 ICU Level of Service B

### Splits and Phases: 2: Riverchase Pkwy & Woods of Riverchase Dr



# HCM Signalized Intersection Capacity Analysis

## 2: Riverchase Pkwy & Woods of Riverchase Dr

Existing AM  
09/29/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	64	0	132	0	0	0	12	60	1088	0	0	182
Future Volume (vph)	64	0	132	0	0	0	12	60	1088	0	0	182
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5						4.5	4.5			4.5
Lane Util. Factor	1.00	1.00						1.00	0.95			0.95
Frt	1.00	0.85						1.00	1.00			0.98
Flt Protected	0.95	1.00						0.95	1.00			1.00
Satd. Flow (prot)	1770	1583						1770	3539			3477
Flt Permitted	0.76	1.00						0.54	1.00			1.00
Satd. Flow (perm)	1410	1583						1007	3539			3477
Peak-hour factor, PHF	0.78	0.78	0.78	0.92	0.92	0.92	0.88	0.88	0.88	0.88	0.73	0.73
Adj. Flow (vph)	82	0	169	0	0	0	14	68	1236	0	0	249
RTOR Reduction (vph)	0	151	0	0	0	0	0	0	0	0	0	9
Lane Group Flow (vph)	82	18	0	0	0	0	0	82	1236	0	0	273
Turn Type	Perm	NA					pm+pt	pm+pt	NA			NA
Protected Phases		4			8		1	1	6			2
Permitted Phases	4			8			6	6			2	
Actuated Green, G (s)	12.9	12.9						98.1	98.1			67.5
Effective Green, g (s)	12.9	12.9						98.1	98.1			67.5
Actuated g/C Ratio	0.11	0.11						0.82	0.82			0.56
Clearance Time (s)	4.5	4.5						4.5	4.5			4.5
Vehicle Extension (s)	3.0	3.0						3.0	5.0			5.0
Lane Grp Cap (vph)	151	170						989	2893			1955
v/s Ratio Prot		0.01						0.02	c0.35			0.08
v/s Ratio Perm	c0.06							0.05				
v/c Ratio	0.54	0.11						0.08	0.43			0.14
Uniform Delay, d1	50.8	48.3						2.2	3.1			12.5
Progression Factor	1.00	1.00						1.00	1.00			0.91
Incremental Delay, d2	3.9	0.3						0.2	0.5			0.1
Delay (s)	54.7	48.6						2.4	3.5			11.5
Level of Service	D	D						A	A			B
Approach Delay (s)		50.6			0.0				3.5			11.5
Approach LOS		D			A				A			B

### Intersection Summary

HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR
Lane Configurations	
Traffic Volume (vph)	24
Future Volume (vph)	24
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.73
Adj. Flow (vph)	33
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

# Timings

## 3: Riverchase Pkwy & Regions Dr

Existing AM  
09/29/2023



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↑↑	↗	↙	↑↑
Traffic Volume (vph)	2	2	1086	99	35	199
Future Volume (vph)	2	2	1086	99	35	199
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	15.0	15.0	25.0	25.0	4.0	25.0
Minimum Split (s)	20.0	20.0	30.0	30.0	9.0	30.0
Total Split (s)	25.0	25.0	79.0	79.0	16.0	95.0
Total Split (%)	20.8%	20.8%	65.8%	65.8%	13.3%	79.2%
Yellow Time (s)	3.2	3.2	3.9	3.9	4.0	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	4.2	4.9	4.9	5.0	4.9
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	
Recall Mode	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	15.0	15.0	103.6	103.6	111.2	115.2
Actuated g/C Ratio	0.12	0.12	0.86	0.86	0.93	0.96
v/c Ratio	0.02	0.02	0.40	0.08	0.10	0.07
Control Delay	46.5	29.0	3.0	1.5	2.2	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.5	29.0	3.0	1.5	2.2	1.3
LOS	D	C	A	A	A	A
Approach Delay	37.8		2.9			1.4
Approach LOS	D		A			A

### Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 100 (83%), Referenced to phase 2:SBTL and 6:NBT, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.40  
 Intersection Signal Delay: 2.8  
 Intersection Capacity Utilization 50.1%  
 Analysis Period (min) 15  
 Intersection LOS: A  
 ICU Level of Service A

### Splits and Phases: 3: Riverchase Pkwy & Regions Dr



# HCM Signalized Intersection Capacity Analysis

## 3: Riverchase Pkwy & Regions Dr

Existing AM  
09/29/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↷	↕	↷	↶	↕
Traffic Volume (vph)	2	2	1086	99	35	199
Future Volume (vph)	2	2	1086	99	35	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.2	4.9	4.9	5.0	4.9
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.20	1.00
Satd. Flow (perm)	1770	1583	3539	1583	372	3539
Peak-hour factor, PHF	0.50	0.50	0.88	0.88	0.84	0.84
Adj. Flow (vph)	4	4	1234	112	42	237
RTOR Reduction (vph)	0	4	0	11	0	0
Lane Group Flow (vph)	4	0	1234	102	42	237
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6		2
Actuated Green, G (s)	3.0	3.0	98.3	98.3	107.9	107.9
Effective Green, g (s)	3.0	3.0	98.3	98.3	107.9	107.9
Actuated g/C Ratio	0.02	0.02	0.82	0.82	0.90	0.90
Clearance Time (s)	4.2	4.2	4.9	4.9	5.0	4.9
Vehicle Extension (s)	3.0	3.0	6.0	6.0	3.0	6.0
Lane Grp Cap (vph)	44	39	2899	1296	388	3182
v/s Ratio Prot	c0.00		c0.35		c0.00	0.07
v/s Ratio Perm		0.00		0.06	0.09	
v/c Ratio	0.09	0.00	0.43	0.08	0.11	0.07
Uniform Delay, d1	57.2	57.0	3.0	2.1	1.3	0.7
Progression Factor	1.00	1.00	0.86	0.90	1.52	1.56
Incremental Delay, d2	0.9	0.0	0.4	0.1	0.1	0.0
Delay (s)	58.1	57.1	3.0	2.0	2.1	1.1
Level of Service	E	E	A	A	A	A
Approach Delay (s)	57.6		2.9			1.2
Approach LOS	E		A			A

### Intersection Summary

HCM 2000 Control Delay	2.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.1
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



# HCM Unsignalized Intersection Capacity Analysis

## 4: Riverchase Pkwy & Regions Gated Access

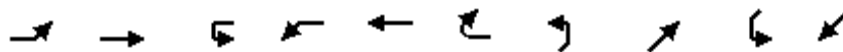
Existing AM  
09/29/2023



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑↑	↑↑			↗
Traffic Volume (veh/h)	0	211	1081	0	0	0
Future Volume (Veh/h)	0	211	1081	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	229	1175	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		586	794			
pX, platoon unblocked	0.91				0.91	0.91
vC, conflicting volume	1175				1290	588
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	990				1116	343
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	630				183	593
Direction, Lane #	SE 1	SE 2	NW 1	NW 2	SW 1	
Volume Total	114	114	783	392	0	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	0	
cSH	1700	1700	1700	1700	1700	
Volume to Capacity	0.07	0.07	0.46	0.23	0.00	
Queue Length 95th (ft)	0	0	0	0	0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS					A	
Approach Delay (s)	0.0		0.0		0.0	
Approach LOS					A	
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			33.2%		ICU Level of Service	A
Analysis Period (min)			15			

Timings  
5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

Existing AM  
09/29/2023

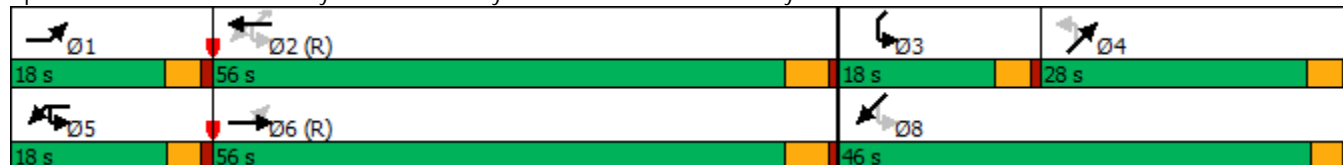


Lane Group	EBL	EBT	WBU	WBL	WBT	WBR	NEL	NET	SWL	SWT
Lane Configurations										
Traffic Volume (vph)	10	132	10	111	606	354	7	30	23	1
Future Volume (vph)	10	132	10	111	606	354	7	30	23	1
Turn Type	pm+pt	NA	pm+pt	pm+pt	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases	1	6	5	5	2			4	3	8
Permitted Phases	6		2	2		2	4		8	
Detector Phase	1	6	5	5	2	2	4	4	3	8
Switch Phase										
Minimum Initial (s)	4.0	25.0	4.0	4.0	15.0	15.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	30.0	9.0	9.0	30.0	30.0	12.0	12.0	9.0	12.0
Total Split (s)	18.0	56.0	18.0	18.0	56.0	56.0	28.0	28.0	18.0	46.0
Total Split (%)	15.0%	46.7%	15.0%	15.0%	46.7%	46.7%	23.3%	23.3%	15.0%	38.3%
Yellow Time (s)	3.2	3.9	3.0	3.0	3.9	3.9	3.2	3.2	3.2	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.2	4.9		4.0	4.9	4.9		4.2	4.2	4.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Min	None	None	C-Min	C-Min	None	None	None	None
Act Effect Green (s)	88.0	81.5		94.2	89.4	89.4		9.5	17.5	17.6
Actuated g/C Ratio	0.73	0.68		0.78	0.74	0.74		0.08	0.15	0.15
v/c Ratio	0.02	0.07		0.14	0.26	0.32		0.59	0.23	0.03
Control Delay	5.3	8.4		4.9	7.5	4.3		39.2	43.1	23.8
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	5.3	8.4		4.9	7.5	4.3		39.2	43.1	23.8
LOS	A	A		A	A	A		D	D	C
Approach Delay		8.1			6.2			39.2		39.6
Approach LOS		A			A			D		D

Intersection Summary

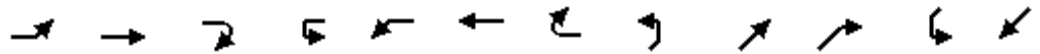
Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 49 (41%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.59  
 Intersection Signal Delay: 9.7  
 Intersection Capacity Utilization 49.9%  
 Analysis Period (min) 15  
 Intersection LOS: A  
 ICU Level of Service A

Splits and Phases: 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

Existing AM  
 09/29/2023



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT
Lane Configurations												
Traffic Volume (vph)	10	132	4	10	111	606	354	7	30	58	23	1
Future Volume (vph)	10	132	4	10	111	606	354	7	30	58	23	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9			4.0	4.9	4.9		4.2		4.2	4.0
Lane Util. Factor	1.00	0.95			1.00	0.95	1.00		1.00		1.00	1.00
Frt	1.00	1.00			1.00	1.00	0.85		0.92		1.00	0.89
Flt Protected	0.95	1.00			0.95	1.00	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1770	3523			1770	3539	1583		1703		1770	1653
Flt Permitted	0.39	1.00			0.62	1.00	1.00		0.98		0.29	1.00
Satd. Flow (perm)	726	3523			1154	3539	1583		1674		536	1653
Peak-hour factor, PHF	0.85	0.85	0.85	0.88	0.88	0.88	0.88	0.85	0.85	0.85	0.64	0.64
Adj. Flow (vph)	12	155	5	11	126	689	402	8	35	68	36	2
RTOR Reduction (vph)	0	1	0	0	0	0	100	0	54	0	0	5
Lane Group Flow (vph)	12	159	0	0	137	689	302	0	57	0	36	3
Turn Type	pm+pt	NA		pm+pt	pm+pt	NA	Perm	Perm	NA		pm+pt	NA
Protected Phases	1	6		5	5	2			4		3	8
Permitted Phases	6			2	2		2	4			8	
Actuated Green, G (s)	82.3	79.9			91.9	85.3	85.3		9.5		19.2	19.2
Effective Green, g (s)	82.3	79.9			91.9	85.3	85.3		9.5		19.2	19.2
Actuated g/C Ratio	0.69	0.67			0.77	0.71	0.71		0.08		0.16	0.16
Clearance Time (s)	4.2	4.9			4.0	4.9	4.9		4.2		4.2	4.0
Vehicle Extension (s)	3.0	6.0			3.0	6.0	6.0		3.0		3.5	3.0
Lane Grp Cap (vph)	518	2345			924	2515	1125		132		140	264
v/s Ratio Prot	0.00	0.05			c0.01	c0.19					c0.01	0.00
v/s Ratio Perm	0.02				0.10		0.19		c0.03		0.03	
v/c Ratio	0.02	0.07			0.15	0.27	0.27		0.43		0.26	0.01
Uniform Delay, d1	6.0	7.0			3.6	6.2	6.2		52.7		43.6	42.4
Progression Factor	1.00	1.00			1.05	1.07	2.10		1.00		1.00	1.00
Incremental Delay, d2	0.0	0.1			0.1	0.3	0.5		2.2		1.2	0.0
Delay (s)	6.0	7.1			3.9	6.9	13.6		54.9		44.8	42.4
Level of Service	A	A			A	A	B		D		D	D
Approach Delay (s)		7.0				8.8			54.9			44.4
Approach LOS		A				A			D			D

Intersection Summary

HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	49.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	SWR
Lane Configurations	
Traffic Volume (vph)	4
Future Volume (vph)	4
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.64
Adj. Flow (vph)	6
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Timings  
6: US-31 & Riverchase Pkwy

Existing AM  
09/29/2023



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	138	73	6	15	262	20	1007	63	466	752	60
Future Volume (vph)	138	73	6	15	262	20	1007	63	466	752	60
Turn Type	Prot	NA	Prot	NA	pt+ov	pm+pt	NA	Perm	Prot	NA	Free
Protected Phases	3	8	7	4	4 5	1	6		5	2	
Permitted Phases						6		6			Free
Detector Phase	3	8	7	4	4 5	1	6	6	5	2	
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	9.0	20.0	9.0	20.0		9.0	25.0	25.0	9.0	25.0	
Total Split (s)	25.0	20.0	25.0	20.0		12.0	85.0	85.0	30.0	103.0	
Total Split (%)	15.6%	12.5%	15.6%	12.5%		7.5%	53.1%	53.1%	18.8%	64.4%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.5	0.5	1.5	0.5		0.5	1.0	1.0	0.5	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	4.0	5.0	4.0		4.0	5.0	5.0	4.0	5.0	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	Min	Min	None	Min	
Act Effct Green (s)	16.5	30.0	6.2	10.3	40.3	66.1	58.9	58.9	25.9	83.3	130.2
Actuated g/C Ratio	0.13	0.23	0.05	0.08	0.31	0.51	0.45	0.45	0.20	0.64	1.00
v/c Ratio	0.72	0.24	0.07	0.11	0.29	0.06	0.68	0.09	0.80	0.39	0.04
Control Delay	76.5	45.3	71.2	63.7	17.9	9.6	30.7	1.7	62.0	13.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.5	45.3	71.2	63.7	17.9	9.6	30.7	1.7	62.0	13.0	0.1
LOS	E	D	E	E	B	A	C	A	E	B	A
Approach Delay		64.5		21.4			28.6			30.2	
Approach LOS		E		C			C			C	

Intersection Summary

Cycle Length: 160  
 Actuated Cycle Length: 130.2  
 Natural Cycle: 90  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.80  
 Intersection Signal Delay: 31.6  
 Intersection Capacity Utilization 66.3%  
 Analysis Period (min) 15  
 Intersection LOS: C  
 ICU Level of Service C

Splits and Phases: 6: US-31 & Riverchase Pkwy



# HCM Signalized Intersection Capacity Analysis

## 6: US-31 & Riverchase Pkwy

Existing AM  
09/29/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	138	73	13	6	15	262	20	1007	63	466	752	60
Future Volume (vph)	138	73	13	6	15	262	20	1007	63	466	752	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.0		5.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	0.88	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1821		1770	1863	2787	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.32	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1821		1770	1863	2787	598	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.85	0.85	0.85	0.93	0.93	0.93	0.92	0.92	0.92	0.85	0.85	0.85
Adj. Flow (vph)	162	86	15	6	16	282	22	1095	68	548	885	71
RTOR Reduction (vph)	0	3	0	0	0	102	0	0	38	0	0	0
Lane Group Flow (vph)	162	98	0	6	16	180	22	1095	30	548	885	71
Turn Type	Prot	NA		Prot	NA	pt+ov	pm+pt	NA	Perm	Prot	NA	Free
Protected Phases	3	8		7	4	4	5	1	6		5	2
Permitted Phases							6		6			Free
Actuated Green, G (s)	16.5	30.0		1.2	14.7	44.6	64.2	60.8	60.8	25.9	83.3	135.9
Effective Green, g (s)	16.5	30.0		1.2	14.7	44.6	64.2	60.8	60.8	25.9	83.3	135.9
Actuated g/C Ratio	0.12	0.22		0.01	0.11	0.33	0.47	0.45	0.45	0.19	0.61	1.00
Clearance Time (s)	5.0	4.0		5.0	4.0		4.0	5.0	5.0	4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	
Lane Grp Cap (vph)	214	401		15	201	914	311	1583	708	654	2169	1583
v/s Ratio Prot	c0.09	c0.05		0.00	0.01	0.06	0.00	c0.31		c0.16	0.25	
v/s Ratio Perm							0.03		0.02			0.04
v/c Ratio	0.76	0.24		0.40	0.08	0.20	0.07	0.69	0.04	0.84	0.41	0.04
Uniform Delay, d1	57.8	43.6		67.0	54.5	32.8	19.2	30.1	21.2	53.0	13.6	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.2	0.3		16.6	0.2	0.1	0.1	2.0	0.1	9.2	0.4	0.1
Delay (s)	71.9	43.9		83.6	54.7	32.9	19.2	32.0	21.2	62.2	13.9	0.1
Level of Service	E	D		F	D	C	B	C	C	E	B	A
Approach Delay (s)		61.2			35.0			31.2			30.9	
Approach LOS		E			D			C			C	

















### Intersection Summary

HCM 2000 Control Delay	33.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	135.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings  
7: US-31 & Parkway Lake Dr

Existing AM  
09/29/2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		 		 	 
Traffic Volume (vph)	27	46	1073	76	102	699
Future Volume (vph)	27	46	1073	76	102	699
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6		
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	20.0	20.0	4.0	20.0
Minimum Split (s)	10.0	10.0	26.0	26.0	9.5	26.0
Total Split (s)	25.0	25.0	55.0	55.0	20.0	75.0
Total Split (%)	25.0%	25.0%	55.0%	55.0%	20.0%	75.0%
Yellow Time (s)	3.5	3.5	4.0	4.0	3.5	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	Min
Act Effect Green (s)	7.8	7.8	47.6	47.6	9.3	58.3
Actuated g/C Ratio	0.11	0.11	0.66	0.66	0.13	0.80
v/c Ratio	0.09	0.26	0.50	0.08	0.27	0.28
Control Delay	34.5	13.6	10.7	3.0	34.3	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.5	13.6	10.7	3.0	34.3	3.0
LOS	C	B	B	A	C	A
Approach Delay	21.3		10.2			7.0
Approach LOS	C		B			A

Intersection Summary

Cycle Length: 100	
Actuated Cycle Length: 72.5	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 9.3	Intersection LOS: A
Intersection Capacity Utilization 50.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 7: US-31 & Parkway Lake Dr





HCM Signalized Intersection Capacity Analysis  
7: US-31 & Parkway Lake Dr

Existing AM  
09/29/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	27	46	1073	76	102	699
Future Volume (vph)	27	46	1073	76	102	699
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	3539	1583	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	3539	1583	3433	3539
Peak-hour factor, PHF	0.79	0.79	0.92	0.92	0.87	0.87
Adj. Flow (vph)	34	58	1166	83	117	803
RTOR Reduction (vph)	0	54	0	28	0	0
Lane Group Flow (vph)	34	4	1166	55	117	803
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6		
Actuated Green, G (s)	5.7	5.7	45.7	45.7	7.0	57.7
Effective Green, g (s)	5.7	5.7	45.7	45.7	7.0	57.7
Actuated g/C Ratio	0.08	0.08	0.61	0.61	0.09	0.77
Clearance Time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Vehicle Extension (s)	4.0	4.0	6.0	6.0	4.0	6.0
Lane Grp Cap (vph)	261	120	2159	965	320	2726
v/s Ratio Prot	c0.01		c0.33		0.03	c0.23
v/s Ratio Perm		0.00		0.03		
v/c Ratio	0.13	0.04	0.54	0.06	0.37	0.29
Uniform Delay, d1	32.3	32.1	8.5	5.9	31.9	2.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.2	0.6	0.1	1.0	0.2
Delay (s)	32.6	32.2	9.1	6.0	32.8	2.7
Level of Service	C	C	A	A	C	A
Approach Delay (s)	32.4		8.9			6.6
Approach LOS	C		A			A

Intersection Summary

HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	74.9	Sum of lost time (s)	16.5
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings  
1: Valleydale Rd & Riverchase Pkwy

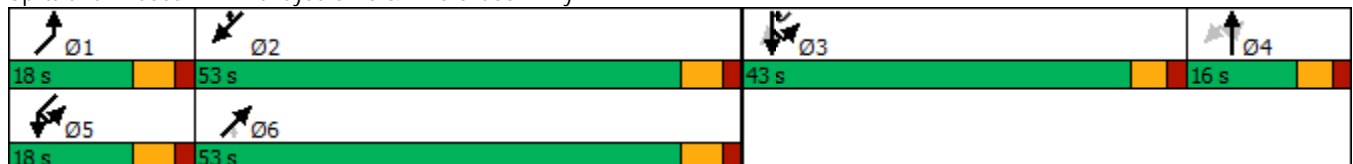
Existing PM  
09/29/2023

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	12	2	43	878	0	75	71	948	3	3	471	456
Future Volume (vph)	12	2	43	878	0	75	71	948	3	3	471	456
Turn Type	Perm	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	pt+ov
Protected Phases		4		3	3		1	6		5	2	2 3
Permitted Phases	4		4			3			6			
Detector Phase	4	4	4	3	3	3	1	6	6	5	2	2 3
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	10.0	10.0	10.0	20.0	20.0	20.0	10.0	26.0	26.0	12.0	26.0	
Total Split (s)	16.0	16.0	16.0	43.0	43.0	43.0	18.0	53.0	53.0	18.0	53.0	
Total Split (%)	12.3%	12.3%	12.3%	33.1%	33.1%	33.1%	13.8%	40.8%	40.8%	13.8%	40.8%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Act Effect Green (s)		9.1	9.1	34.1	34.1	34.1	10.8	36.2	36.2	7.8	26.0	68.3
Actuated g/C Ratio		0.09	0.09	0.36	0.36	0.36	0.11	0.38	0.38	0.08	0.27	0.71
v/c Ratio		0.26	0.29	0.55	0.54	0.13	0.43	0.59	0.01	0.08	0.51	0.22
Control Delay		55.1	4.7	29.8	32.8	2.1	53.9	26.8	0.0	51.1	34.7	0.9
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		55.1	4.7	29.8	32.8	2.1	53.9	26.8	0.0	51.1	34.7	0.9
LOS		E	A	C	C	A	D	C	A	D	C	A
Approach Delay		17.3			28.5			28.6			18.5	
Approach LOS		B			C			C			B	

Intersection Summary




























Cycle Length: 130  
 Actuated Cycle Length: 95.8  
 Natural Cycle: 70  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.59  
 Intersection Signal Delay: 25.3  
 Intersection LOS: C  
 Intersection Capacity Utilization 60.8%  
 ICU Level of Service B  
 Analysis Period (min) 15

Splits and Phases: 1: Valleydale Rd & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
1: Valleydale Rd & Riverchase Pkwy

Existing PM  
09/29/2023

													
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWU	SWL	SWT	
Lane Configurations				  				  				 	
Traffic Volume (vph)	12	2	43	878	0	75	71	948	3	9	3	471	
Future Volume (vph)	12	2	43	878	0	75	71	948	3	9	3	471	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00	0.91	0.91	1.00	1.00	0.91	1.00		1.00	0.95	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	
Flt Protected		0.96	1.00	0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)		1788	1583	3221	1610	1583	1770	5085	1583		1770	3539	
Flt Permitted		0.55	1.00	0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (perm)		1029	1583	3221	1610	1583	1770	5085	1583		1770	3539	
Peak-hour factor, PHF	0.57	0.57	0.57	0.93	0.93	0.93	0.84	0.84	0.84	0.97	0.97	0.97	
Adj. Flow (vph)	21	4	75	944	0	81	85	1129	4	9	3	486	
RTOR Reduction (vph)	0	0	70	0	0	54	0	0	3	0	0	0	
Lane Group Flow (vph)	0	25	5	632	312	27	85	1129	1	0	12	486	
Turn Type	Perm	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	
Protected Phases		4		3	3		1	6		5	5	2	
Permitted Phases	4		4			3			6				
Actuated Green, G (s)		6.7	6.7	34.1	34.1	34.1	8.1	36.1	36.1		1.4	29.4	
Effective Green, g (s)		6.7	6.7	34.1	34.1	34.1	8.1	36.1	36.1		1.4	29.4	
Actuated g/C Ratio		0.07	0.07	0.34	0.34	0.34	0.08	0.36	0.36		0.01	0.29	
Clearance Time (s)		5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0		4.0	3.0	
Lane Grp Cap (vph)		68	104	1084	541	532	141	1812	564		24	1027	
v/s Ratio Prot				c0.20	0.19		c0.05	c0.22			0.01	0.14	
v/s Ratio Perm		c0.02	0.00			0.02			0.00				
v/c Ratio		0.37	0.05	0.58	0.58	0.05	0.60	0.62	0.00		0.50	0.47	
Uniform Delay, d1		45.3	44.3	27.7	27.7	22.7	45.0	27.0	21.0		49.6	29.6	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		4.5	0.3	1.0	1.8	0.1	8.2	0.7	0.0		20.6	0.3	
Delay (s)		49.8	44.6	28.7	29.4	22.7	53.2	27.6	21.0		70.2	29.9	
Level of Service		D	D	C	C	C	D	C	C		E	C	
Approach Delay (s)		45.9			28.4			29.4				18.7	
Approach LOS		D			C			C				B	
<b>Intersection Summary</b>													
HCM 2000 Control Delay			26.5		HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.61										
Actuated Cycle Length (s)			101.3		Sum of lost time (s)				23.0				
Intersection Capacity Utilization			60.8%		ICU Level of Service				B				
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 1: Valleydale Rd & Riverchase Pkwy

Existing PM  
 09/29/2023



Movement	SWR
Lane Configurations	TT
Traffic Volume (vph)	456
Future Volume (vph)	456
Ideal Flow (vphpl)	1900
Total Lost time (s)	6.0
Lane Util. Factor	0.88
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	2787
Flt Permitted	1.00
Satd. Flow (perm)	2787
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	470
RTOR Reduction (vph)	148
Lane Group Flow (vph)	322
Turn Type	pt+ov
Protected Phases	2 3
Permitted Phases	
Actuated Green, G (s)	69.5
Effective Green, g (s)	69.5
Actuated g/C Ratio	0.69
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	1912
v/s Ratio Prot	0.12
v/s Ratio Perm	
v/c Ratio	0.17
Uniform Delay, d1	5.6
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	5.7
Level of Service	A
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Timings  
2: Riverchase Pkwy & Woods of Riverchase Dr

Existing PM  
09/29/2023

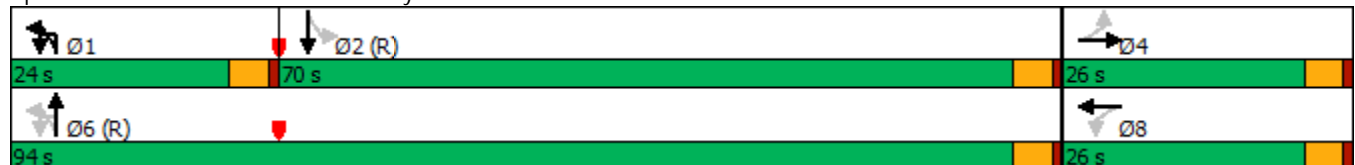


Lane Group	EBL	EBT	NBU	NBL	NBT	SBT	Ø8
Lane Configurations							
Traffic Volume (vph)	62	0	20	162	317	658	
Future Volume (vph)	62	0	20	162	317	658	
Turn Type	Perm	NA	pm+pt	pm+pt	NA	NA	
Protected Phases		4	1	1	6	2	8
Permitted Phases	4		6	6			
Detector Phase	4	4	1	1	6	2	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	10.0	10.0	10.0
Minimum Split (s)	9.0	9.0	9.0	9.0	20.0	20.0	15.0
Total Split (s)	26.0	26.0	24.0	24.0	94.0	70.0	26.0
Total Split (%)	21.7%	21.7%	20.0%	20.0%	78.3%	58.3%	22%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	
Lead/Lag			Lead	Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	Max	Max	C-Max	C-Max	None
Act Effect Green (s)	12.8	12.8		98.2	98.2	65.5	
Actuated g/C Ratio	0.11	0.11		0.82	0.82	0.55	
v/c Ratio	0.54	0.26		0.27	0.12	0.42	
Control Delay	63.5	1.2		3.5	2.5	17.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	
Total Delay	63.5	1.2		3.5	2.5	17.0	
LOS	E	A		A	A	B	
Approach Delay		25.2			2.8	17.0	
Approach LOS		C			A	B	

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection  
 Natural Cycle: 45  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.54  
 Intersection Signal Delay: 13.3  
 Intersection Capacity Utilization 47.5%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service A

Splits and Phases: 2: Riverchase Pkwy & Woods of Riverchase Dr



HCM Signalized Intersection Capacity Analysis  
2: Riverchase Pkwy & Woods of Riverchase Dr

Existing PM  
09/29/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	62	0	99	0	0	0	20	162	317	0	0	658
Future Volume (vph)	62	0	99	0	0	0	20	162	317	0	0	658
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5						4.5	4.5			4.5
Lane Util. Factor	1.00	1.00						1.00	0.95			0.95
Frt	1.00	0.85						1.00	1.00			0.99
Flt Protected	0.95	1.00						0.95	1.00			1.00
Satd. Flow (prot)	1770	1583						1770	3539			3496
Flt Permitted	0.76	1.00						0.27	1.00			1.00
Satd. Flow (perm)	1410	1583						500	3539			3496
Peak-hour factor, PHF	0.77	0.77	0.77	0.92	0.92	0.92	0.95	0.95	0.95	0.95	0.90	0.90
Adj. Flow (vph)	81	0	129	0	0	0	21	171	334	0	0	731
RTOR Reduction (vph)	0	115	0	0	0	0	0	0	0	0	0	5
Lane Group Flow (vph)	81	14	0	0	0	0	0	192	334	0	0	790
Turn Type	Perm	NA					pm+pt	pm+pt	NA			NA
Protected Phases		4			8		1	1	6			2
Permitted Phases	4			8			6	6			2	
Actuated Green, G (s)	12.8	12.8						98.2	98.2			65.5
Effective Green, g (s)	12.8	12.8						98.2	98.2			65.5
Actuated g/C Ratio	0.11	0.11						0.82	0.82			0.55
Clearance Time (s)	4.5	4.5						4.5	4.5			4.5
Vehicle Extension (s)	3.0	3.0						3.0	5.0			5.0
Lane Grp Cap (vph)	150	168						707	2896			1908
v/s Ratio Prot		0.01						c0.06	0.09			c0.23
v/s Ratio Perm	c0.06							0.16				
v/c Ratio	0.54	0.08						0.27	0.12			0.41
Uniform Delay, d1	50.8	48.3						3.8	2.2			16.0
Progression Factor	1.00	1.00						1.00	1.00			1.03
Incremental Delay, d2	3.9	0.2						0.9	0.1			0.7
Delay (s)	54.7	48.5						4.8	2.3			17.1
Level of Service	D	D						A	A			B
Approach Delay (s)		50.9			0.0				3.2			17.1
Approach LOS		D			A				A			B

Intersection Summary		
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.39	B
Actuated Cycle Length (s)	120.0	Sum of lost time (s)
Intersection Capacity Utilization	47.5%	13.5
Analysis Period (min)	15	ICU Level of Service
		A

c Critical Lane Group



Movement	SBR
Lane Configurations	
Traffic Volume (vph)	58
Future Volume (vph)	58
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.90
Adj. Flow (vph)	64
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	



Timings  
3: Riverchase Pkwy & Regions Dr

Existing PM  
09/29/2023

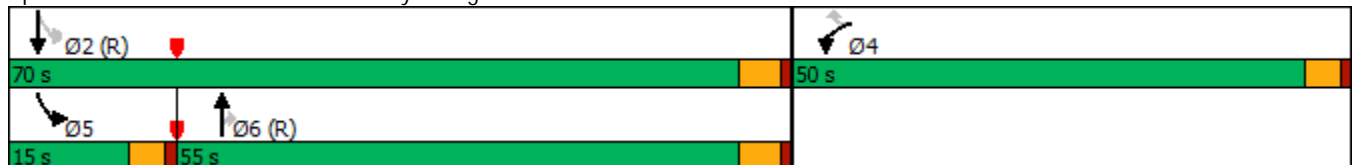
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	75	41	384	1	2	641
Future Volume (vph)	75	41	384	1	2	641
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	2
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	15.0	15.0	25.0	25.0	1.0	25.0
Minimum Split (s)	20.0	20.0	30.0	30.0	5.2	30.0
Total Split (s)	50.0	50.0	55.0	55.0	15.0	70.0
Total Split (%)	41.7%	41.7%	45.8%	45.8%	12.5%	58.3%
Yellow Time (s)	3.2	3.2	3.9	3.9	3.2	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	None	C-Min
Act Effect Green (s)	15.4	15.4	93.5	93.5	96.2	95.5
Actuated g/C Ratio	0.13	0.13	0.78	0.78	0.80	0.80
v/c Ratio	0.45	0.22	0.15	0.00	0.00	0.27
Control Delay	55.1	14.3	3.1	3.0	1.5	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.1	14.3	3.1	3.0	1.5	1.9
LOS	E	B	A	A	A	A
Approach Delay	40.8		3.1			1.9
Approach LOS	D		A			A

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 22 (18%), Referenced to phase 2:SBTL and 6:NBT, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.45  
 Intersection Signal Delay: 6.9  
 Intersection Capacity Utilization 40.9%  
 Analysis Period (min) 15

Intersection LOS: A  
 ICU Level of Service A

Splits and Phases: 3: Riverchase Pkwy & Regions Dr



# HCM Signalized Intersection Capacity Analysis

## 3: Riverchase Pkwy & Regions Dr

Existing PM  
09/29/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	75	41	384	1	2	641
Future Volume (vph)	75	41	384	1	2	641
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.48	1.00
Satd. Flow (perm)	1770	1583	3539	1583	895	3539
Peak-hour factor, PHF	0.73	0.73	0.90	0.90	0.85	0.85
Adj. Flow (vph)	103	56	427	1	2	754
RTOR Reduction (vph)	0	49	0	0	0	0
Lane Group Flow (vph)	103	7	427	1	2	754
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	2
Actuated Green, G (s)	15.4	15.4	90.2	90.2	95.5	95.5
Effective Green, g (s)	15.4	15.4	90.2	90.2	95.5	95.5
Actuated g/C Ratio	0.13	0.13	0.75	0.75	0.80	0.80
Clearance Time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Vehicle Extension (s)	3.0	3.0	6.0	6.0	3.0	6.0
Lane Grp Cap (vph)	227	203	2660	1189	720	2816
v/s Ratio Prot	c0.06		0.12		0.00	c0.21
v/s Ratio Perm		0.00		0.00	0.00	
v/c Ratio	0.45	0.04	0.16	0.00	0.00	0.27
Uniform Delay, d1	48.4	45.8	4.2	3.7	2.6	3.2
Progression Factor	1.00	1.00	0.79	0.84	0.58	0.51
Incremental Delay, d2	1.4	0.1	0.1	0.0	0.0	0.2
Delay (s)	49.8	45.9	3.5	3.1	1.5	1.8
Level of Service	D	D	A	A	A	A
Approach Delay (s)	48.4		3.5			1.8
Approach LOS	D		A			A

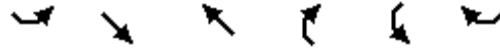
### Intersection Summary

HCM 2000 Control Delay	7.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.3
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
4: Riverchase Pkwy & Regions Gated Access

Existing PM  
09/29/2023



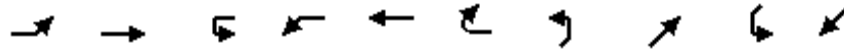
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑↑	↑↑			↑
Traffic Volume (veh/h)	0	634	433	0	0	0
Future Volume (Veh/h)	0	634	433	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.84	0.84	0.85	0.85	0.92	0.92
Hourly flow rate (vph)	0	755	509	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		586	794			
pX, platoon unblocked					0.96	
vC, conflicting volume	509				886	254
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	509				802	254
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1052				309	745
Direction, Lane #	SE 1	SE 2	NW 1	NW 2	SW 1	
Volume Total	378	378	339	170	0	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	0	
cSH	1700	1700	1700	1700	1700	
Volume to Capacity	0.22	0.22	0.20	0.10	0.00	
Queue Length 95th (ft)	0	0	0	0	0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS					A	
Approach Delay (s)	0.0		0.0		0.0	
Approach LOS					A	
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			20.9%		ICU Level of Service	A
Analysis Period (min)			15			

Timings

Existing PM

5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

09/29/2023

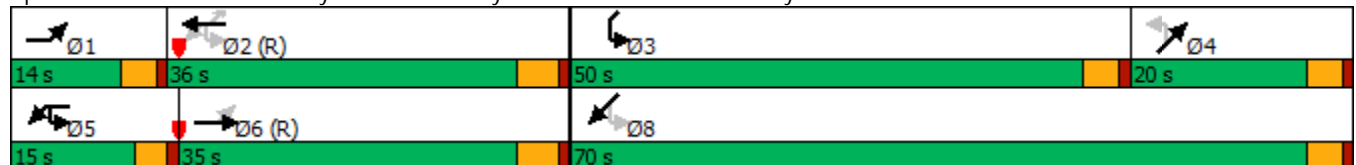


Lane Group	EBL	EBT	WBU	WBL	WBT	WBR	NEL	NET	SWL	SWT
Lane Configurations	↔	↕		↔	↕	↔		↕	↔	↕
Traffic Volume (vph)	2	281	1	89	322	22	2	3	250	41
Future Volume (vph)	2	281	1	89	322	22	2	3	250	41
Turn Type	pm+pt	NA	pm+pt	pm+pt	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases	1	6	5	5	2			4	3	8
Permitted Phases	6		2	2		2	4		8	
Detector Phase	1	6	5	5	2	2	4	4	3	8
Switch Phase										
Minimum Initial (s)	4.0	25.0	4.0	4.0	15.0	15.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	30.0	12.0	12.0	30.0	30.0	12.0	12.0	9.0	12.0
Total Split (s)	14.0	35.0	15.0	15.0	36.0	36.0	20.0	20.0	50.0	70.0
Total Split (%)	11.7%	29.2%	12.5%	12.5%	30.0%	30.0%	16.7%	16.7%	41.7%	58.3%
Yellow Time (s)	3.2	3.9	3.0	3.0	3.9	3.9	3.2	3.2	3.2	3.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.2	4.9		4.0	4.9	4.9		4.2	4.2	4.2
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	C-Min	None	None	C-Min	C-Min	None	None	None	None
Act Effect Green (s)	67.1	60.7		74.2	71.3	71.3		7.4	37.6	37.6
Actuated g/C Ratio	0.56	0.51		0.62	0.59	0.59		0.06	0.31	0.31
v/c Ratio	0.01	0.20		0.17	0.18	0.03		0.57	0.72	0.13
Control Delay	12.5	18.4		8.3	9.3	0.2		22.5	43.2	19.2
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	12.5	18.4		8.3	9.3	0.2		22.5	43.2	19.2
LOS	B	B		A	A	A		C	D	B
Approach Delay		18.4			8.6			22.5		38.6
Approach LOS		B			A			C		D

Intersection Summary

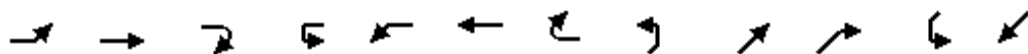
Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 25 (21%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 65  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.72  
 Intersection Signal Delay: 21.0  
 Intersection Capacity Utilization 57.3%  
 Analysis Period (min) 15  
 Intersection LOS: C  
 ICU Level of Service B

Splits and Phases: 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

Existing PM  
 09/29/2023



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT
Lane Configurations												
Traffic Volume (vph)	2	281	7	1	89	322	22	2	3	93	250	41
Future Volume (vph)	2	281	7	1	89	322	22	2	3	93	250	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9			4.0	4.9	4.9		4.2		4.2	4.2
Lane Util. Factor	1.00	0.95			1.00	0.95	1.00		1.00		1.00	1.00
Frt	1.00	1.00			1.00	1.00	0.85		0.87		1.00	0.95
Flt Protected	0.95	1.00			0.95	1.00	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1770	3526			1770	3539	1583		1623		1770	1778
Flt Permitted	0.53	1.00			0.48	1.00	1.00		0.99		0.34	1.00
Satd. Flow (perm)	990	3526			900	3539	1583		1615		642	1778
Peak-hour factor, PHF	0.79	0.79	0.79	0.87	0.87	0.87	0.87	0.85	0.85	0.85	0.78	0.78
Adj. Flow (vph)	3	356	9	1	102	370	25	2	4	109	321	53
RTOR Reduction (vph)	0	1	0	0	0	0	11	0	102	0	0	16
Lane Group Flow (vph)	3	364	0	0	103	370	14	0	13	0	321	60
Turn Type	pm+pt	NA		pm+pt	pm+pt	NA	Perm	Perm	NA		pm+pt	NA
Protected Phases	1	6		5	5	2			4		3	8
Permitted Phases	6			2	2		2	4			8	
Actuated Green, G (s)	62.0	60.8			73.3	67.9	67.9		7.4		37.6	37.6
Effective Green, g (s)	62.0	60.8			73.3	67.9	67.9		7.4		37.6	37.6
Actuated g/C Ratio	0.52	0.51			0.61	0.57	0.57		0.06		0.31	0.31
Clearance Time (s)	4.2	4.9			4.0	4.9	4.9		4.2		4.2	4.2
Vehicle Extension (s)	3.0	6.0			3.0	6.0	6.0		3.0		3.5	3.0
Lane Grp Cap (vph)	519	1786			611	2002	895		99		445	557
v/s Ratio Prot	0.00	c0.10			c0.01	0.10					c0.16	0.03
v/s Ratio Perm	0.00				0.09		0.01		0.01		c0.07	
v/c Ratio	0.01	0.20			0.17	0.18	0.02		0.13		0.72	0.11
Uniform Delay, d1	14.0	16.3			9.8	12.6	11.4		53.3		34.9	29.3
Progression Factor	1.00	1.00			0.69	0.70	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.0	0.3			0.1	0.2	0.0		0.6		5.9	0.1
Delay (s)	14.0	16.5			6.9	9.0	11.4		53.8		40.7	29.4
Level of Service	B	B			A	A	B		D		D	C
Approach Delay (s)		16.5				8.7			53.8			38.6
Approach LOS		B				A			D			D

Intersection Summary

HCM 2000 Control Delay	23.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	SWR
Lane Configurations	
Traffic Volume (vph)	18
Future Volume (vph)	18
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.78
Adj. Flow (vph)	23
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Timings  
6: US-31 & Riverchase Pkwy

Existing PM  
09/29/2023



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	64	30	80	86	850	34	955	10	251	1187	147
Future Volume (vph)	64	30	80	86	850	34	955	10	251	1187	147
Turn Type	Prot	NA	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Free
Protected Phases	3	8	7	4		1	6		5	2	
Permitted Phases					4	6		6			Free
Detector Phase	3	8	7	4	4	1	6	6	5	2	
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	9.0	20.0	9.0	20.0	20.0	9.0	25.0	25.0	9.0	25.0	
Total Split (s)	25.0	22.0	25.0	22.0	22.0	13.0	128.0	128.0	25.0	140.0	
Total Split (%)	12.5%	11.0%	12.5%	11.0%	11.0%	6.5%	64.0%	64.0%	12.5%	70.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.5	0.5	1.5	0.5	0.5	0.5	1.0	1.0	0.5	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	4.0	5.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min	
Act Effect Green (s)	11.4	14.3	18.2	18.5	18.5	67.8	60.1	60.1	16.0	71.9	124.5
Actuated g/C Ratio	0.09	0.11	0.15	0.15	0.15	0.54	0.48	0.48	0.13	0.58	1.00
v/c Ratio	0.50	0.27	0.38	0.38	1.37	0.18	0.67	0.01	0.64	0.65	0.10
Control Delay	69.3	51.9	60.9	58.3	198.1	10.4	26.6	0.0	61.2	19.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.3	51.9	60.9	58.3	198.1	10.4	26.6	0.0	61.2	19.8	0.1
LOS	E	D	E	E	F	B	C	A	E	B	A
Approach Delay		62.2		175.4			25.8			24.6	
Approach LOS		E		F			C			C	

Intersection Summary

Cycle Length: 200  
 Actuated Cycle Length: 124.5  
 Natural Cycle: 90  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.37  
 Intersection Signal Delay: 69.5  
 Intersection LOS: E  
 Intersection Capacity Utilization 70.5%  
 ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 6: US-31 & Riverchase Pkwy





# HCM Signalized Intersection Capacity Analysis

## 6: US-31 & Riverchase Pkwy

Existing PM  
09/29/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↖↗	↖	↕	↖	↖↗	↕	↖
Traffic Volume (vph)	64	30	14	80	86	850	34	955	10	251	1187	147
Future Volume (vph)	64	30	14	80	86	850	34	955	10	251	1187	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.0		5.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	0.88	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1773		1770	1863	2787	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.14	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1773		1770	1863	2787	264	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.79	0.79	0.79	0.81	0.81	0.81	0.84	0.84	0.84	0.89	0.89	0.89
Adj. Flow (vph)	81	38	18	99	106	1049	40	1137	12	282	1334	165
RTOR Reduction (vph)	0	8	0	0	0	350	0	0	6	0	0	0
Lane Group Flow (vph)	81	48	0	99	106	699	40	1137	6	282	1334	165
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Free
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases						4	6		6			Free
Actuated Green, G (s)	11.4	12.8		18.2	19.6	19.6	66.3	61.1	61.1	16.0	71.9	126.1
Effective Green, g (s)	11.4	12.8		18.2	19.6	19.6	66.3	61.1	61.1	16.0	71.9	126.1
Actuated g/C Ratio	0.09	0.10		0.14	0.16	0.16	0.53	0.48	0.48	0.13	0.57	1.00
Clearance Time (s)	5.0	4.0		5.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	6.0	6.0	3.0	6.0	
Lane Grp Cap (vph)	160	179		255	289	433	200	1714	767	435	2017	1583
v/s Ratio Prot	c0.05	0.03		0.06	0.06		0.01	0.32		c0.08	c0.38	
v/s Ratio Perm						c0.25	0.10		0.00			0.10
v/c Ratio	0.51	0.27		0.39	0.37	1.61	0.20	0.66	0.01	0.65	0.66	0.10
Uniform Delay, d1	54.7	52.3		48.9	47.7	53.2	16.1	24.7	16.8	52.4	18.7	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.5	0.8		1.0	0.8	286.5	0.5	1.5	0.0	3.3	1.3	0.1
Delay (s)	57.2	53.1		49.9	48.5	339.7	16.6	26.2	16.8	55.7	20.0	0.1
Level of Service	E	D		D	D	F	B	C	B	E	B	A
Approach Delay (s)		55.5			292.2			25.8			23.8	
Approach LOS		E			F			C			C	

















### Intersection Summary

HCM 2000 Control Delay	102.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	126.1	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings  
7: US-31 & Parkway Lake Dr

Existing PM  
09/29/2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		 		 	 
Traffic Volume (vph)	115	97	961	29	40	1247
Future Volume (vph)	115	97	961	29	40	1247
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6		
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	20.0	20.0	4.0	20.0
Minimum Split (s)	10.0	10.0	26.0	26.0	9.5	26.0
Total Split (s)	25.0	25.0	55.0	55.0	20.0	75.0
Total Split (%)	25.0%	25.0%	55.0%	55.0%	20.0%	75.0%
Yellow Time (s)	3.5	3.5	4.0	4.0	3.5	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	Min
Act Effect Green (s)	9.9	9.9	46.8	46.8	7.7	53.7
Actuated g/C Ratio	0.13	0.13	0.62	0.62	0.10	0.71
v/c Ratio	0.32	0.39	0.53	0.04	0.13	0.56
Control Delay	35.2	11.6	10.3	3.6	36.8	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.2	11.6	10.3	3.6	36.8	6.1
LOS	D	B	B	A	D	A
Approach Delay	24.4		10.1			7.0
Approach LOS	C		B			A

Intersection Summary

Cycle Length: 100  
 Actuated Cycle Length: 75.6  
 Natural Cycle: 50  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.56  
 Intersection Signal Delay: 9.9  
 Intersection Capacity Utilization 47.4%  
 Analysis Period (min) 15  
 Intersection LOS: A  
 ICU Level of Service A

Splits and Phases: 7: US-31 & Parkway Lake Dr



HCM Signalized Intersection Capacity Analysis  
7: US-31 & Parkway Lake Dr

Existing PM  
09/29/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	115	97	961	29	40	1247
Future Volume (vph)	115	97	961	29	40	1247
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	3539	1583	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	3539	1583	3433	3539
Peak-hour factor, PHF	0.80	0.80	0.83	0.83	0.88	0.88
Adj. Flow (vph)	144	121	1158	35	45	1417
RTOR Reduction (vph)	0	106	0	12	0	0
Lane Group Flow (vph)	144	15	1158	23	45	1417
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6		
Actuated Green, G (s)	9.9	9.9	46.8	46.8	4.3	56.1
Effective Green, g (s)	9.9	9.9	46.8	46.8	4.3	56.1
Actuated g/C Ratio	0.13	0.13	0.60	0.60	0.06	0.72
Clearance Time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Vehicle Extension (s)	4.0	4.0	6.0	6.0	4.0	6.0
Lane Grp Cap (vph)	438	202	2137	955	190	2561
v/s Ratio Prot	c0.04		0.33		0.01	c0.40
v/s Ratio Perm		0.01		0.01		
v/c Ratio	0.33	0.08	0.54	0.02	0.24	0.55
Uniform Delay, d1	30.8	29.8	9.0	6.2	35.0	4.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.2	0.6	0.0	0.9	0.6
Delay (s)	31.4	30.0	9.7	6.2	35.9	5.5
Level of Service	C	C	A	A	D	A
Approach Delay (s)	30.7		9.6			6.4
Approach LOS	C		A			A

Intersection Summary

HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	77.5	Sum of lost time (s)	16.5
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings  
1: Valleydale Rd & Riverchase Pkwy

Future AM Imp  
09/29/2023

	↑	↙	↓	↘	↗	↖	↘	↙	↗	↖
Lane Group	NBT	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↖	↖↖	↖	↖	↖	↖↖↖	↖	↘	↖↖	↖↖
Traffic Volume (vph)	3	476	5	118	137	764	13	38	903	1955
Future Volume (vph)	3	476	5	118	137	764	13	38	903	1955
Turn Type	NA	Split	NA	Perm	Prot	NA	Perm	Prot	NA	pt+ov
Protected Phases	4	3	3		1	6		5	2	2 3
Permitted Phases				3			6			
Detector Phase	4	3	3	3	1	6	6	5	2	2 3
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	10.0	20.0	20.0	20.0	10.0	26.0	26.0	12.0	26.0	
Total Split (s)	12.0	28.0	28.0	28.0	20.0	70.0	70.0	15.0	65.0	
Total Split (%)	9.6%	22.4%	22.4%	22.4%	16.0%	56.0%	56.0%	12.0%	52.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.5	5.5	5.5	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	Min	Min	None	Min	
Act Effect Green (s)	6.5	22.6	22.6	22.6	13.5	67.0	67.0	8.3	59.2	87.2
Actuated g/C Ratio	0.06	0.19	0.19	0.19	0.12	0.57	0.57	0.07	0.50	0.74
v/c Ratio	0.12	0.58	0.60	0.33	0.77	0.30	0.02	0.38	0.55	0.94
Control Delay	58.0	48.4	53.4	9.6	75.9	14.7	0.0	62.9	22.2	18.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.0	48.4	53.4	9.6	75.9	14.7	0.0	62.9	22.2	18.3
LOS	E	D	D	A	E	B	A	E	C	B
Approach Delay	58.0		42.1			23.6			20.2	
Approach LOS	E		D			C			C	

Intersection Summary




























Cycle Length: 125  
 Actuated Cycle Length: 117.3  
 Natural Cycle: 90  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.94  
 Intersection Signal Delay: 24.1  
 Intersection LOS: C  
 Intersection Capacity Utilization 93.9%  
 ICU Level of Service F  
 Analysis Period (min) 15

Splits and Phases: 1: Valleydale Rd & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
1: Valleydale Rd & Riverchase Pkwy

Future AM Imp  
09/29/2023

													
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWU	SWL	SWT	
Lane Configurations				  				  				 	
Traffic Volume (vph)	0	3	0	476	5	118	137	764	13	6	38	903	
Future Volume (vph)	0	3	0	476	5	118	137	764	13	6	38	903	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.5		5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00		0.91	0.91	1.00	1.00	0.91	1.00		1.00	0.95	
Frt		1.00		1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)		1863		3221	1617	1583	1770	5085	1583		1770	3539	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (perm)		1863		3221	1617	1583	1770	5085	1583		1770	3539	
Peak-hour factor, PHF	0.25	0.25	0.25	0.88	0.88	0.88	0.87	0.87	0.87	0.92	0.92	0.92	
Adj. Flow (vph)	0	12	0	541	6	134	157	878	15	7	41	982	
RTOR Reduction (vph)	0	0	0	0	0	109	0	0	7	0	0	0	
Lane Group Flow (vph)	0	12	0	362	185	25	157	878	8	0	48	982	
Turn Type		NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	
Protected Phases		4		3	3		1	6		5	5	2	
Permitted Phases	4		4			3			6				
Actuated Green, G (s)		2.4		22.6	22.6	22.6	13.5	67.0	67.0		7.0	60.5	
Effective Green, g (s)		2.4		22.6	22.6	22.6	13.5	67.0	67.0		7.0	60.5	
Actuated g/C Ratio		0.02		0.19	0.19	0.19	0.11	0.55	0.55		0.06	0.50	
Clearance Time (s)		5.5		5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0		4.0	4.0	4.0	4.0	3.0	3.0		4.0	3.0	
Lane Grp Cap (vph)		36		596	299	293	195	2792	869		101	1754	
v/s Ratio Prot		c0.01		0.11	0.11		c0.09	0.17			0.03	0.28	
v/s Ratio Perm						0.02			0.01				
v/c Ratio		0.33		0.61	0.62	0.08	0.81	0.31	0.01		0.48	0.56	
Uniform Delay, d1		59.0		45.6	45.7	41.1	53.0	15.0	12.5		55.7	21.5	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		7.3		2.0	4.3	0.2	22.0	0.1	0.0		4.7	0.4	
Delay (s)		66.3		47.7	50.1	41.3	74.9	15.1	12.5		60.5	21.8	
Level of Service		E		D	D	D	E	B	B		E	C	
Approach Delay (s)		66.3			47.1			24.0				23.7	
Approach LOS		E			D			C				C	
<b>Intersection Summary</b>													
HCM 2000 Control Delay			27.1		HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.96										
Actuated Cycle Length (s)			122.0		Sum of lost time (s)				23.0				
Intersection Capacity Utilization			93.9%		ICU Level of Service				F				
Analysis Period (min)			15										

c Critical Lane Group



Movement	SWR
Lane Configurations	FF
Traffic Volume (vph)	1955
Future Volume (vph)	1955
Ideal Flow (vphpl)	1900
Total Lost time (s)	6.0
Lane Util. Factor	0.88
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	2787
Flt Permitted	1.00
Satd. Flow (perm)	2787
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	2125
RTOR Reduction (vph)	209
Lane Group Flow (vph)	1916
Turn Type	pt+ov
Protected Phases	2 3
Permitted Phases	
Actuated Green, G (s)	89.1
Effective Green, g (s)	89.1
Actuated g/C Ratio	0.73
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	2035
v/s Ratio Prot	c0.69
v/s Ratio Perm	
v/c Ratio	0.94
Uniform Delay, d1	14.2
Progression Factor	1.00
Incremental Delay, d2	9.5
Delay (s)	23.7
Level of Service	C
Approach Delay (s)	
Approach LOS	
Intersection Summary	





# HCM Signalized Intersection Capacity Analysis

## 2: Riverchase Pkwy & Woods of Riverchase Dr

Future AM Imp  
09/29/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	65	1	135	25	1	12	12	61	1827	19	9	367
Future Volume (vph)	65	1	135	25	1	12	12	61	1827	19	9	367
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5			4.5	4.5	4.5	5.0	4.5
Lane Util. Factor	1.00	1.00			1.00			1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85			0.96			1.00	1.00	0.85	1.00	0.99
Flt Protected	0.95	1.00			0.97			0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1585			1726			1770	3539	1583	1770	3507
Flt Permitted	0.80	1.00			0.41			0.42	1.00	1.00	0.06	1.00
Satd. Flow (perm)	1482	1585			738			784	3539	1583	117	3507
Peak-hour factor, PHF	0.78	0.78	0.78	0.92	0.92	0.92	0.88	0.88	0.88	0.88	0.73	0.73
Adj. Flow (vph)	83	1	173	27	1	13	14	69	2076	22	12	503
RTOR Reduction (vph)	0	155	0	0	12	0	0	0	0	5	0	3
Lane Group Flow (vph)	83	19	0	0	29	0	0	83	2076	17	12	533
Turn Type	Perm	NA		Perm	NA		pm+pt	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		4			8		1	1	6			5
Permitted Phases	4			8			6	6		6		2
Actuated Green, G (s)	12.8	12.8			12.8			91.2	91.2	91.2	87.9	87.9
Effective Green, g (s)	12.8	12.8			12.8			91.2	91.2	91.2	87.9	87.9
Actuated g/C Ratio	0.11	0.11			0.11			0.76	0.76	0.76	0.73	0.73
Clearance Time (s)	4.5	4.5			4.5			4.5	4.5	4.5	5.0	4.5
Vehicle Extension (s)	3.0	3.0			3.0			3.0	5.0	5.0	3.0	5.0
Lane Grp Cap (vph)	158	169			78			643	2689	1203	113	2568
v/s Ratio Prot		0.01						0.01	c0.59		0.00	c0.15
v/s Ratio Perm	c0.06				0.04			0.09		0.01	0.08	
v/c Ratio	0.53	0.12			0.38			0.13	0.77	0.01	0.11	0.21
Uniform Delay, d1	50.7	48.5			49.9			3.8	8.4	3.5	17.1	5.1
Progression Factor	1.00	1.00			1.00			1.00	1.00	1.00	0.92	0.84
Incremental Delay, d2	3.1	0.3			3.0			0.1	2.2	0.0	0.4	0.2
Delay (s)	53.9	48.8			52.9			3.9	10.6	3.5	16.1	4.4
Level of Service	D	D			D			A	B	A	B	A
Approach Delay (s)		50.4			52.9				10.3			4.7
Approach LOS		D			D				B			A

### Intersection Summary

HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR
Lane Configurations	
Traffic Volume (vph)	24
Future Volume (vph)	24
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.73
Adj. Flow (vph)	33
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Timings  
3: Riverchase Pkwy & Regions Dr

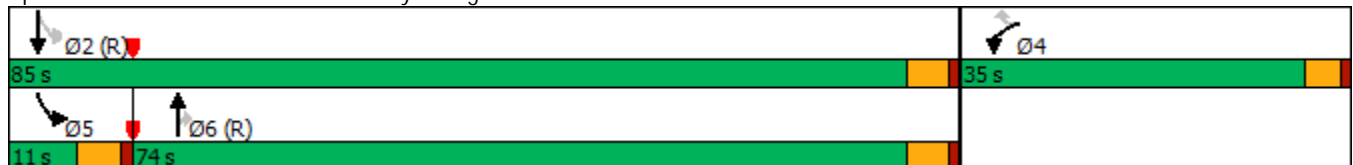


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↕	↗	↙	↕
Traffic Volume (vph)	58	30	1798	140	55	338
Future Volume (vph)	58	30	1798	140	55	338
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	15.0	15.0	25.0	25.0	4.0	25.0
Minimum Split (s)	20.0	20.0	30.0	30.0	9.0	30.0
Total Split (s)	35.0	35.0	74.0	74.0	11.0	85.0
Total Split (%)	29.2%	29.2%	61.7%	61.7%	9.2%	70.8%
Yellow Time (s)	3.2	3.2	3.9	3.9	4.0	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	4.2	4.9	4.9	5.0	4.9
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	
Recall Mode	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	15.7	15.7	85.7	85.7	95.1	95.2
Actuated g/C Ratio	0.13	0.13	0.71	0.71	0.79	0.79
v/c Ratio	0.50	0.23	0.81	0.14	0.41	0.14
Control Delay	56.3	13.5	9.2	2.8	27.0	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.3	13.5	9.2	2.8	27.0	1.5
LOS	E	B	A	A	C	A
Approach Delay	41.8		8.8			5.1
Approach LOS	D		A			A

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 10 (8%), Referenced to phase 2:SBTL and 6:NBT, Start of Green  
 Natural Cycle: 80  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.81  
 Intersection Signal Delay: 10.2  
 Intersection Capacity Utilization 69.8%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service C

Splits and Phases: 3: Riverchase Pkwy & Regions Dr



# HCM Signalized Intersection Capacity Analysis

## 3: Riverchase Pkwy & Regions Dr

Future AM Imp  
09/29/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	58	30	1798	140	55	338
Future Volume (vph)	58	30	1798	140	55	338
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.2	4.9	4.9	5.0	4.9
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.04	1.00
Satd. Flow (perm)	1770	1583	3539	1583	83	3539
Peak-hour factor, PHF	0.50	0.50	0.88	0.88	0.84	0.84
Adj. Flow (vph)	116	60	2043	159	65	402
RTOR Reduction (vph)	0	52	0	14	0	0
Lane Group Flow (vph)	116	8	2043	145	65	402
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6		2
Actuated Green, G (s)	15.7	15.7	84.7	84.7	95.2	95.2
Effective Green, g (s)	15.7	15.7	84.7	84.7	95.2	95.2
Actuated g/C Ratio	0.13	0.13	0.71	0.71	0.79	0.79
Clearance Time (s)	4.2	4.2	4.9	4.9	5.0	4.9
Vehicle Extension (s)	3.0	3.0	6.0	6.0	3.0	6.0
Lane Grp Cap (vph)	231	207	2497	1117	143	2807
v/s Ratio Prot	c0.07		c0.58		c0.02	0.11
v/s Ratio Perm		0.00		0.09	0.34	
v/c Ratio	0.50	0.04	0.82	0.13	0.45	0.14
Uniform Delay, d1	48.5	45.6	12.3	5.7	19.7	2.9
Progression Factor	1.00	1.00	0.54	0.58	2.14	0.48
Incremental Delay, d2	1.7	0.1	2.2	0.2	2.1	0.1
Delay (s)	50.2	45.6	8.8	3.5	44.1	1.5
Level of Service	D	D	A	A	D	A
Approach Delay (s)	48.7		8.4			7.4
Approach LOS	D		A			A

### Intersection Summary

HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.1
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 4: Riverchase Pkwy & Regions Gated Access

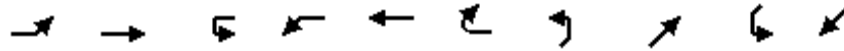
Future AM Imp  
09/29/2023



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑↑	↑↑	↗		↗
Traffic Volume (veh/h)	0	370	1644	177	0	60
Future Volume (Veh/h)	0	370	1644	177	0	60
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	402	1787	192	0	65
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		586	794			
pX, platoon unblocked	0.58				0.58	0.58
vC, conflicting volume	1979				1988	894
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1233				1248	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	90
cM capacity (veh/h)	324				95	626
Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NW 3	SW 1
Volume Total	201	201	894	894	192	65
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	192	65
cSH	1700	1700	1700	1700	1700	626
Volume to Capacity	0.12	0.12	0.53	0.53	0.11	0.10
Queue Length 95th (ft)	0	0	0	0	0	9
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	11.4
Lane LOS						B
Approach Delay (s)	0.0		0.0			11.4
Approach LOS						B
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			55.8%		ICU Level of Service	B
Analysis Period (min)			15			

Timings  
5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

Future AM Imp  
09/29/2023

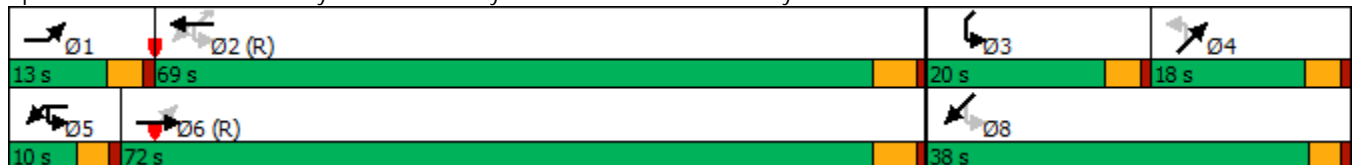


Lane Group	EBL	EBT	WBU	WBL	WBT	WBR	NEL	NET	SWL	SWT
Lane Configurations										
Traffic Volume (vph)	200	162	10	133	698	835	7	78	149	14
Future Volume (vph)	200	162	10	133	698	835	7	78	149	14
Turn Type	pm+pt	NA	pm+pt	pm+pt	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases	1	6	5	5	2			4	3	8
Permitted Phases	6		2	2		2	4		8	
Detector Phase	1	6	5	5	2	2	4	4	3	8
Switch Phase										
Minimum Initial (s)	4.0	25.0	4.0	4.0	15.0	15.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	30.0	9.0	9.0	30.0	30.0	12.0	12.0	9.0	12.0
Total Split (s)	13.0	72.0	10.0	10.0	69.0	69.0	18.0	18.0	20.0	38.0
Total Split (%)	10.8%	60.0%	8.3%	8.3%	57.5%	57.5%	15.0%	15.0%	16.7%	31.7%
Yellow Time (s)	3.2	3.9	3.0	3.0	3.9	3.9	3.2	3.2	3.2	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.2	4.9		4.0	4.9	4.9		4.2	4.2	4.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Min	None	None	C-Min	C-Min	None	None	None	None
Act Effect Green (s)	77.4	68.0		72.4	65.3	65.3		13.1	32.7	32.9
Actuated g/C Ratio	0.64	0.57		0.60	0.54	0.54		0.11	0.27	0.27
v/c Ratio	0.55	0.10		0.22	0.41	0.81		0.82	0.81	0.20
Control Delay	13.7	12.1		3.1	6.9	11.0		74.3	58.5	11.4
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	13.7	12.1		3.1	6.9	11.0		74.3	58.5	11.4
LOS	B	B		A	A	B		E	E	B
Approach Delay		13.0			8.6			74.3		44.2
Approach LOS		B			A			E		D

Intersection Summary

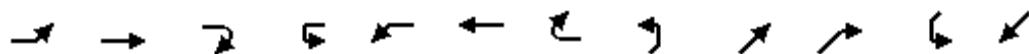
Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 42 (35%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 75  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.82  
 Intersection Signal Delay: 17.4  
 Intersection Capacity Utilization 82.1%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service E

Splits and Phases: 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

Future AM Imp  
 09/29/2023



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT
Lane Configurations												
Traffic Volume (vph)	200	162	4	10	133	698	835	7	78	61	149	14
Future Volume (vph)	200	162	4	10	133	698	835	7	78	61	149	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9			4.0	4.9	4.9		4.2		4.2	4.0
Lane Util. Factor	1.00	0.95			1.00	0.95	1.00		1.00		1.00	1.00
Frt	1.00	1.00			1.00	1.00	0.85		0.94		1.00	0.88
Flt Protected	0.95	1.00			0.95	1.00	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1770	3526			1770	3539	1583		1753		1770	1644
Flt Permitted	0.28	1.00			0.63	1.00	1.00		0.98		0.23	1.00
Satd. Flow (perm)	517	3526			1171	3539	1583		1731		426	1644
Peak-hour factor, PHF	0.85	0.85	0.85	0.88	0.88	0.88	0.88	0.85	0.85	0.85	0.64	0.64
Adj. Flow (vph)	235	191	5	11	151	793	949	8	92	72	233	22
RTOR Reduction (vph)	0	1	0	0	0	0	312	0	21	0	0	58
Lane Group Flow (vph)	235	195	0	0	162	793	637	0	151	0	233	44
Turn Type	pm+pt	NA		pm+pt	pm+pt	NA	Perm	Perm	NA		pm+pt	NA
Protected Phases	1	6		5	5	2			4		3	8
Permitted Phases	6			2	2		2	4			8	
Actuated Green, G (s)	76.7	68.0			71.5	65.3	65.3		13.1		32.9	32.9
Effective Green, g (s)	76.7	68.0			71.5	65.3	65.3		13.1		32.9	32.9
Actuated g/C Ratio	0.64	0.57			0.60	0.54	0.54		0.11		0.27	0.27
Clearance Time (s)	4.2	4.9			4.0	4.9	4.9		4.2		4.2	4.0
Vehicle Extension (s)	3.0	6.0			3.0	6.0	6.0		3.0		3.5	3.0
Lane Grp Cap (vph)	421	1998			728	1925	861		188		289	450
v/s Ratio Prot	c0.04	0.06			0.01	0.22					c0.10	0.03
v/s Ratio Perm	0.32				0.12		c0.40		0.09		c0.12	
v/c Ratio	0.56	0.10			0.22	0.41	0.74		0.80		0.81	0.10
Uniform Delay, d1	10.3	11.9			10.8	16.1	20.9		52.2		37.3	32.5
Progression Factor	1.00	1.00			0.32	0.40	1.12		1.00		1.00	1.00
Incremental Delay, d2	1.6	0.1			0.1	0.4	3.8		21.2		15.4	0.1
Delay (s)	11.9	12.0			3.5	6.8	27.1		73.4		52.7	32.6
Level of Service	B	B			A	A	C		E		D	C
Approach Delay (s)		12.0				16.7			73.4			46.6
Approach LOS		B				B			E			D

Intersection Summary

HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group





Movement	SWR
Lane Configurations	
Traffic Volume (vph)	51
Future Volume (vph)	51
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.64
Adj. Flow (vph)	80
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Timings  
6: US-31 & Riverchase Pkwy

Future AM Imp  
09/29/2023

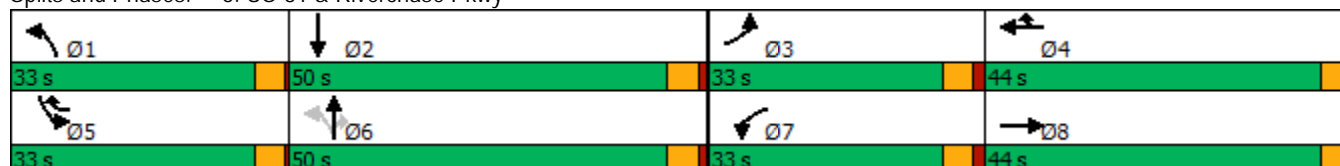


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	141	74	6	15	395	20	1056	64	693	801	61
Future Volume (vph)	141	74	6	15	395	20	1056	64	693	801	61
Turn Type	Prot	NA	Prot	NA	pt+ov	pm+pt	NA	Perm	Prot	NA	Free
Protected Phases	3	8	7	4	4 5	1	6		5	2	
Permitted Phases						6		6			Free
Detector Phase	3	8	7	4	4 5	1	6	6	5	2	
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	9.0	20.0	9.0	20.0		9.0	25.0	25.0	9.0	25.0	
Total Split (s)	33.0	44.0	33.0	44.0		33.0	50.0	50.0	33.0	50.0	
Total Split (%)	20.6%	27.5%	20.6%	27.5%		20.6%	31.3%	31.3%	20.6%	31.3%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.5	0.5	1.5	0.5		0.5	1.0	1.0	0.5	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	4.0	5.0	4.0		4.0	5.0	5.0	4.0	5.0	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	Min	Min	None	Min	
Act Effect Green (s)	16.6	32.0	6.1	12.5	45.7	52.4	45.2	45.2	29.1	72.3	121.6
Actuated g/C Ratio	0.14	0.26	0.05	0.10	0.38	0.43	0.37	0.37	0.24	0.59	1.00
v/c Ratio	0.69	0.21	0.07	0.08	0.36	0.07	0.87	0.11	0.99	0.45	0.05
Control Delay	65.5	34.7	60.5	51.0	13.8	13.1	45.1	7.6	76.0	16.6	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.5	34.7	60.5	51.0	13.8	13.1	45.1	7.6	76.0	16.6	0.0
LOS	E	C	E	D	B	B	D	A	E	B	A
Approach Delay		53.8		15.7			42.4			42.4	
Approach LOS		D		B			D			D	

Intersection Summary

Cycle Length: 160  
 Actuated Cycle Length: 121.6  
 Natural Cycle: 90  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.99  
 Intersection Signal Delay: 40.1  
 Intersection LOS: D  
 Intersection Capacity Utilization 74.3%  
 ICU Level of Service D  
 Analysis Period (min) 15
























Splits and Phases: 6: US-31 & Riverchase Pkwy



# HCM Signalized Intersection Capacity Analysis

## 6: US-31 & Riverchase Pkwy

















Future AM Imp  
09/29/2023

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	141	74	13	6	15	395	20	1056	64	693	801	61	
Future Volume (vph)	141	74	13	6	15	395	20	1056	64	693	801	61	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.0	4.0		5.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	0.88	1.00	0.95	1.00	0.97	0.95	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1822		1770	1863	2787	1770	3539	1583	3433	3539	1583	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.30	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1822		1770	1863	2787	566	3539	1583	3433	3539	1583	
Peak-hour factor, PHF	0.85	0.85	0.85	0.93	0.93	0.93	0.92	0.92	0.92	0.85	0.85	0.85	
Adj. Flow (vph)	166	87	15	6	16	425	22	1148	70	815	942	72	
RTOR Reduction (vph)	0	4	0	0	0	133	0	0	43	0	0	0	
Lane Group Flow (vph)	166	98	0	6	16	292	22	1148	27	815	942	72	
Turn Type	Prot	NA		Prot	NA	pt+ov	pm+pt	NA	Perm	Prot	NA	Free	
Protected Phases	3	8		7	4	4	5	1	6		5	2	
Permitted Phases								6		6		Free	
Actuated Green, G (s)	16.6	32.0		1.3	16.7	49.8	50.6	46.9	46.9	29.1	72.3	127.3	
Effective Green, g (s)	16.6	32.0		1.3	16.7	49.8	50.6	46.9	46.9	29.1	72.3	127.3	
Actuated g/C Ratio	0.13	0.25		0.01	0.13	0.39	0.40	0.37	0.37	0.23	0.57	1.00	
Clearance Time (s)	5.0	4.0		5.0	4.0		4.0	5.0	5.0	4.0	5.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0		
Lane Grp Cap (vph)	230	458		18	244	1090	259	1303	583	784	2009	1583	
v/s Ratio Prot	c0.09	0.05		0.00	0.01	c0.10	0.00	c0.32		c0.24	0.27		
v/s Ratio Perm							0.03		0.02			0.05	
v/c Ratio	0.72	0.21		0.33	0.07	0.27	0.08	0.88	0.05	1.04	0.47	0.05	
Uniform Delay, d1	53.1	37.7		62.6	48.5	26.3	23.4	37.6	25.8	49.1	16.2	0.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.6	0.2		10.6	0.1	0.1	0.1	8.1	0.1	42.9	0.5	0.1	
Delay (s)	63.8	37.9		73.2	48.6	26.5	23.5	45.7	25.9	92.0	16.7	0.1	
Level of Service	E	D		E	D	C	C	D	C	F	B	A	
Approach Delay (s)		53.9			27.9			44.2			49.6		
Approach LOS		D			C			D			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			45.6									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.81										
Actuated Cycle Length (s)			127.3									Sum of lost time (s)	18.0
Intersection Capacity Utilization			74.3%									ICU Level of Service	D
Analysis Period (min)			15										

c Critical Lane Group

Timings  
7: US-31 & Parkway Lake Dr

Future AM Imp  
09/29/2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		 		 	 
Traffic Volume (vph)	31	76	1094	92	138	713
Future Volume (vph)	31	76	1094	92	138	713
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6		
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	20.0	20.0	4.0	20.0
Minimum Split (s)	10.0	10.0	26.0	26.0	9.5	26.0
Total Split (s)	25.0	25.0	55.0	55.0	20.0	75.0
Total Split (%)	25.0%	25.0%	55.0%	55.0%	20.0%	75.0%
Yellow Time (s)	3.5	3.5	4.0	4.0	3.5	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	Min
Act Effct Green (s)	8.1	8.1	44.8	44.8	10.2	62.2
Actuated g/C Ratio	0.11	0.11	0.58	0.58	0.13	0.81
v/c Ratio	0.11	0.38	0.57	0.10	0.35	0.29
Control Delay	35.5	13.2	12.3	3.3	35.6	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.5	13.2	12.3	3.3	35.6	3.0
LOS	D	B	B	A	D	A
Approach Delay	19.6		11.6			8.3
Approach LOS	B		B			A

Intersection Summary

Cycle Length: 100	
Actuated Cycle Length: 76.7	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.57	
Intersection Signal Delay: 10.7	Intersection LOS: B
Intersection Capacity Utilization 51.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 7: US-31 & Parkway Lake Dr



HCM Signalized Intersection Capacity Analysis  
7: US-31 & Parkway Lake Dr

Future AM Imp  
09/29/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↑↑	↔	↔↔	↑↑
Traffic Volume (vph)	31	76	1094	92	138	713
Future Volume (vph)	31	76	1094	92	138	713
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	3539	1583	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	3539	1583	3433	3539
Peak-hour factor, PHF	0.79	0.79	0.92	0.92	0.87	0.87
Adj. Flow (vph)	39	96	1189	100	159	820
RTOR Reduction (vph)	0	88	0	35	0	0
Lane Group Flow (vph)	39	8	1189	65	159	820
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6		
Actuated Green, G (s)	6.1	6.1	45.1	45.1	10.2	60.3
Effective Green, g (s)	6.1	6.1	45.1	45.1	10.2	60.3
Actuated g/C Ratio	0.08	0.08	0.58	0.58	0.13	0.77
Clearance Time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Vehicle Extension (s)	4.0	4.0	6.0	6.0	4.0	6.0
Lane Grp Cap (vph)	268	123	2048	916	449	2739
v/s Ratio Prot	c0.01		c0.34		0.05	c0.23
v/s Ratio Perm		0.00		0.04		
v/c Ratio	0.15	0.06	0.58	0.07	0.35	0.30
Uniform Delay, d1	33.5	33.2	10.4	7.2	30.8	2.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.3	0.8	0.1	0.7	0.2
Delay (s)	33.8	33.5	11.2	7.3	31.5	2.8
Level of Service	C	C	B	A	C	A
Approach Delay (s)	33.6		10.9			7.4
Approach LOS	C		B			A

Intersection Summary

HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	77.9	Sum of lost time (s)	16.5
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings  
1: Valleydale Rd & Riverchase Pkwy

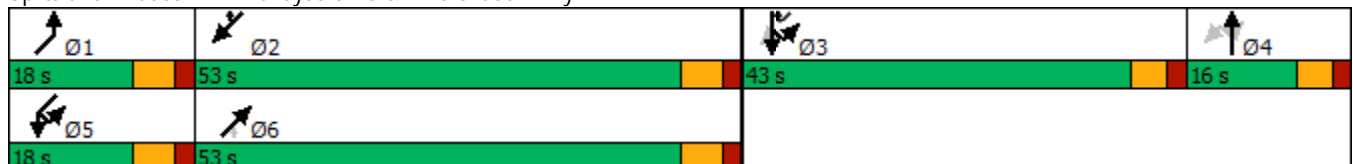
Future PM Imp  
09/29/2023

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	12	9	44	1427	0	122	135	967	3	3	480	867
Future Volume (vph)	12	9	44	1427	0	122	135	967	3	3	480	867
Turn Type	Perm	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	pt+ov
Protected Phases		4		3	3		1	6		5	2	2 3
Permitted Phases	4		4			3			6			
Detector Phase	4	4	4	3	3	3	1	6	6	5	2	2 3
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	10.0	10.0	10.0	20.0	20.0	20.0	10.0	26.0	26.0	12.0	26.0	
Total Split (s)	16.0	16.0	16.0	43.0	43.0	43.0	18.0	53.0	53.0	18.0	53.0	
Total Split (%)	12.3%	12.3%	12.3%	33.1%	33.1%	33.1%	13.8%	40.8%	40.8%	13.8%	40.8%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Act Effect Green (s)		9.2	9.2	38.0	38.0	38.0	12.2	42.7	42.7	7.4	27.0	70.6
Actuated g/C Ratio		0.09	0.09	0.36	0.36	0.36	0.11	0.40	0.40	0.07	0.25	0.66
v/c Ratio		0.42	0.31	0.90	0.88	0.20	0.80	0.57	0.01	0.10	0.55	0.42
Control Delay		64.9	5.5	45.8	53.2	7.1	76.9	27.3	0.0	52.8	37.3	1.6
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		64.9	5.5	45.8	53.2	7.1	76.9	27.3	0.0	52.8	37.3	1.6
LOS		E	A	D	D	A	E	C	A	D	D	A
Approach Delay		24.8			45.0			33.3			14.7	
Approach LOS		C			D			C			B	

Intersection Summary





























Cycle Length: 130  
 Actuated Cycle Length: 106.7  
 Natural Cycle: 80  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.90  
 Intersection Signal Delay: 31.6  
 Intersection Capacity Utilization 72.5%  
 Analysis Period (min) 15  
 Intersection LOS: C  
 ICU Level of Service C

Splits and Phases: 1: Valleydale Rd & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
 1: Valleydale Rd & Riverchase Pkwy

Future PM Imp  
 09/29/2023

													
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWU	SWL	SWT	
Lane Configurations				  				  			 	 	
Traffic Volume (vph)	12	9	44	1427	0	122	135	967	3	9	3	480	
Future Volume (vph)	12	9	44	1427	0	122	135	967	3	9	3	480	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00	0.91	0.91	1.00	1.00	0.91	1.00		1.00	0.95	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	
Flt Protected		0.97	1.00	0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)		1811	1583	3221	1610	1583	1770	5085	1583		1770	3539	
Flt Permitted		0.55	1.00	0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (perm)		1028	1583	3221	1610	1583	1770	5085	1583		1770	3539	
Peak-hour factor, PHF	0.57	0.57	0.57	0.93	0.93	0.93	0.84	0.84	0.84	0.97	0.97	0.97	
Adj. Flow (vph)	21	16	77	1534	0	131	161	1151	4	9	3	495	
RTOR Reduction (vph)	0	0	72	0	0	81	0	0	2	0	0	0	
Lane Group Flow (vph)	0	37	5	1028	506	50	161	1151	2	0	12	495	
Turn Type	Perm	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	
Protected Phases		4		3	3		1	6		5	5	2	
Permitted Phases	4		4			3			6				
Actuated Green, G (s)		7.6	7.6	38.0	38.0	38.0	12.2	42.7	42.7		1.5	32.0	
Effective Green, g (s)		7.6	7.6	38.0	38.0	38.0	12.2	42.7	42.7		1.5	32.0	
Actuated g/C Ratio		0.07	0.07	0.34	0.34	0.34	0.11	0.38	0.38		0.01	0.28	
Clearance Time (s)		5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0		4.0	3.0	
Lane Grp Cap (vph)		69	106	1085	542	533	191	1924	599		23	1003	
v/s Ratio Prot				c0.32	0.31		c0.09	c0.23			0.01	0.14	
v/s Ratio Perm		c0.04	0.00			0.03			0.00				
v/c Ratio		0.54	0.05	0.95	0.93	0.09	0.84	0.60	0.00		0.52	0.49	
Uniform Delay, d1		50.9	49.2	36.4	36.2	25.6	49.4	28.2	21.8		55.3	33.7	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		9.9	0.3	16.2	23.5	0.1	28.1	0.5	0.0		25.1	0.4	
Delay (s)		60.7	49.5	52.7	59.7	25.7	77.4	28.7	21.8		80.4	34.0	
Level of Service		E	D	D	E	C	E	C	C		F	C	
Approach Delay (s)		53.1			52.7			34.6				17.7	
Approach LOS		D			D			C				B	
<b>Intersection Summary</b>													
HCM 2000 Control Delay			36.5		HCM 2000 Level of Service					D			
HCM 2000 Volume to Capacity ratio			0.79										
Actuated Cycle Length (s)			112.8		Sum of lost time (s)					23.0			
Intersection Capacity Utilization			72.5%		ICU Level of Service					C			
Analysis Period (min)			15										

c Critical Lane Group

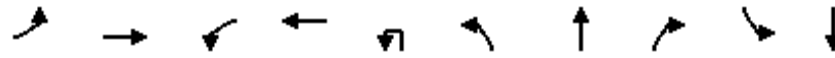




Movement	SWR
Lane Configurations	TT
Traffic Volume (vph)	867
Future Volume (vph)	867
Ideal Flow (vphpl)	1900
Total Lost time (s)	6.0
Lane Util. Factor	0.88
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	2787
Flt Permitted	1.00
Satd. Flow (perm)	2787
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	894
RTOR Reduction (vph)	260
Lane Group Flow (vph)	634
Turn Type	pt+ov
Protected Phases	2 3
Permitted Phases	
Actuated Green, G (s)	76.0
Effective Green, g (s)	76.0
Actuated g/C Ratio	0.67
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	1877
v/s Ratio Prot	0.23
v/s Ratio Perm	
v/c Ratio	0.34
Uniform Delay, d1	7.8
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	7.9
Level of Service	A
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Timings  
2: Riverchase Pkwy & Woods of Riverchase Dr

Future PM Imp  
09/29/2023

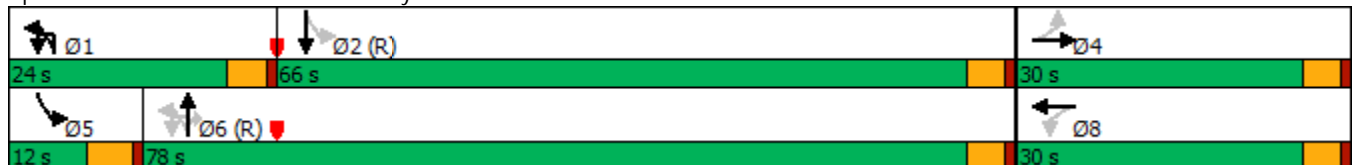


Lane Group	EBL	EBT	WBL	WBT	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	63	4	33	1	20	166	751	29	15	1219
Future Volume (vph)	63	4	33	1	20	166	751	29	15	1219
Turn Type	Perm	NA	Perm	NA	pm+pt	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		4		8	1	1	6		5	2
Permitted Phases	4		8		6	6		6	2	
Detector Phase	4	4	8	8	1	1	6	6	5	2
Switch Phase										
Minimum Initial (s)	4.0	4.0	10.0	10.0	4.0	4.0	10.0	10.0	4.0	10.0
Minimum Split (s)	9.0	9.0	15.0	15.0	9.0	9.0	20.0	20.0	9.0	20.0
Total Split (s)	30.0	30.0	30.0	30.0	24.0	24.0	78.0	78.0	12.0	66.0
Total Split (%)	25.0%	25.0%	25.0%	25.0%	20.0%	20.0%	65.0%	65.0%	10.0%	55.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.0	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5		4.5	4.5	4.5	5.0	4.5
Lead/Lag					Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	13.0	13.0		13.0		98.0	93.6	93.6	85.1	79.9
Actuated g/C Ratio	0.11	0.11		0.11		0.82	0.78	0.78	0.71	0.67
v/c Ratio	0.54	0.47		0.47		0.54	0.29	0.02	0.03	0.61
Control Delay	63.2	14.4		49.0		11.0	4.9	0.4	3.3	8.2
Queue Delay	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	63.2	14.4		49.0		11.0	4.9	0.4	3.3	8.2
LOS	E	B		D		B	A	A	A	A
Approach Delay		32.7		49.0			5.9			8.2
Approach LOS		C		D			A			A

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.61  
 Intersection Signal Delay: 10.1  
 Intersection Capacity Utilization 66.7%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service C

Splits and Phases: 2: Riverchase Pkwy & Woods of Riverchase Dr



# HCM Signalized Intersection Capacity Analysis

## 2: Riverchase Pkwy & Woods of Riverchase Dr

Future PM Imp  
09/29/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	63	4	101	33	1	17	20	166	751	29	15	1219
Future Volume (vph)	63	4	101	33	1	17	20	166	751	29	15	1219
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5			4.5	4.5	4.5	5.0	4.5
Lane Util. Factor	1.00	1.00			1.00			1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.86			0.96			1.00	1.00	0.85	1.00	0.99
Flt Protected	0.95	1.00			0.97			0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1594			1724			1770	3539	1583	1770	3515
Flt Permitted	0.75	1.00			0.52			0.12	1.00	1.00	0.35	1.00
Satd. Flow (perm)	1406	1594			928			232	3539	1583	657	3515
Peak-hour factor, PHF	0.77	0.77	0.77	0.92	0.92	0.92	0.95	0.95	0.95	0.95	0.90	0.90
Adj. Flow (vph)	82	5	131	36	1	18	21	175	791	31	17	1354
RTOR Reduction (vph)	0	117	0	0	16	0	0	0	0	8	0	2
Lane Group Flow (vph)	82	19	0	0	39	0	0	196	791	23	17	1418
Turn Type	Perm	NA		Perm	NA		pm+pt	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		4			8		1	1	6			5
Permitted Phases	4			8			6	6		6		2
Actuated Green, G (s)	13.0	13.0			13.0			98.0	90.6	90.6	82.3	79.9
Effective Green, g (s)	13.0	13.0			13.0			98.0	90.6	90.6	82.3	79.9
Actuated g/C Ratio	0.11	0.11			0.11			0.82	0.75	0.75	0.69	0.67
Clearance Time (s)	4.5	4.5			4.5			4.5	4.5	4.5	5.0	4.5
Vehicle Extension (s)	3.0	3.0			3.0			3.0	5.0	5.0	3.0	5.0
Lane Grp Cap (vph)	152	172			100			363	2671	1195	472	2340
v/s Ratio Prot		0.01						c0.06	0.22		0.00	c0.40
v/s Ratio Perm	c0.06				0.04			0.38		0.01	0.02	
v/c Ratio	0.54	0.11			0.39			0.54	0.30	0.02	0.04	0.61
Uniform Delay, d1	50.7	48.3			49.8			9.9	4.6	3.7	6.0	11.2
Progression Factor	1.00	1.00			1.00			1.00	1.00	1.00	0.86	0.57
Incremental Delay, d2	3.7	0.3			2.5			1.5	0.3	0.0	0.0	1.0
Delay (s)	54.3	48.6			52.3			11.5	4.9	3.7	5.2	7.5
Level of Service	D	D			D			B	A	A	A	A
Approach Delay (s)		50.7			52.3				6.1			7.5
Approach LOS		D			D				A			A

### Intersection Summary

HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR
Lane Configurations	
Traffic Volume (vph)	59
Future Volume (vph)	59
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.90
Adj. Flow (vph)	66
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Timings  
3: Riverchase Pkwy & Regions Dr



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↕	↗	↙	↕
Traffic Volume (vph)	147	77	757	68	35	1157
Future Volume (vph)	147	77	757	68	35	1157
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	2
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	15.0	15.0	25.0	25.0	1.0	25.0
Minimum Split (s)	20.0	20.0	30.0	30.0	5.2	30.0
Total Split (s)	40.0	40.0	71.0	71.0	9.0	80.0
Total Split (%)	33.3%	33.3%	59.2%	59.2%	7.5%	66.7%
Yellow Time (s)	3.2	3.2	3.9	3.9	3.2	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	None	C-Min
Act Effect Green (s)	19.5	19.5	82.9	82.9	92.1	91.4
Actuated g/C Ratio	0.16	0.16	0.69	0.69	0.77	0.76
v/c Ratio	0.70	0.30	0.34	0.07	0.09	0.51
Control Delay	60.1	9.9	7.0	1.5	4.3	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.1	9.9	7.0	1.5	4.3	6.3
LOS	E	A	A	A	A	A
Approach Delay	42.9		6.5			6.3
Approach LOS	D		A			A

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 15 (13%), Referenced to phase 2:SBTL and 6:NBT, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.70  
 Intersection Signal Delay: 10.6  
 Intersection Capacity Utilization 52.1%  
 Analysis Period (min) 15

Intersection LOS: B  
 ICU Level of Service A

Splits and Phases: 3: Riverchase Pkwy & Regions Dr



# HCM Signalized Intersection Capacity Analysis

## 3: Riverchase Pkwy & Regions Dr

Future PM Imp  
09/29/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	147	77	757	68	35	1157
Future Volume (vph)	147	77	757	68	35	1157
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.29	1.00
Satd. Flow (perm)	1770	1583	3539	1583	541	3539
Peak-hour factor, PHF	0.73	0.73	0.90	0.90	0.85	0.85
Adj. Flow (vph)	201	105	841	76	41	1361
RTOR Reduction (vph)	0	88	0	17	0	0
Lane Group Flow (vph)	201	17	841	59	41	1361
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	2
Actuated Green, G (s)	19.5	19.5	82.1	82.1	91.4	91.4
Effective Green, g (s)	19.5	19.5	82.1	82.1	91.4	91.4
Actuated g/C Ratio	0.16	0.16	0.68	0.68	0.76	0.76
Clearance Time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Vehicle Extension (s)	3.0	3.0	6.0	6.0	3.0	6.0
Lane Grp Cap (vph)	287	257	2421	1083	464	2695
v/s Ratio Prot	c0.11		0.24		0.00	c0.38
v/s Ratio Perm		0.01		0.04	0.06	
v/c Ratio	0.70	0.07	0.35	0.05	0.09	0.51
Uniform Delay, d1	47.5	42.5	7.9	6.2	4.1	5.5
Progression Factor	1.00	1.00	0.77	0.40	1.01	0.99
Incremental Delay, d2	7.5	0.1	0.4	0.1	0.0	0.3
Delay (s)	55.0	42.7	6.4	2.6	4.2	5.8
Level of Service	D	D	A	A	A	A
Approach Delay (s)	50.8		6.1			5.7
Approach LOS	D		A			A

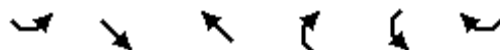
### Intersection Summary

HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.3
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
4: Riverchase Pkwy & Regions Gated Access

Future PM Imp  
09/29/2023

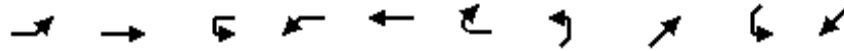


Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑↑	↑↑	↗		↗
Traffic Volume (veh/h)	0	1191	734	116	0	208
Future Volume (Veh/h)	0	1191	734	116	0	208
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.84	0.84	0.85	0.85	0.92	0.92
Hourly flow rate (vph)	0	1418	864	136	0	226
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		586	794			
pX, platoon unblocked	0.93				0.94	0.93
vC, conflicting volume	1000				1573	432
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	843				1137	231
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	68
cM capacity (veh/h)	731				184	716
Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NW 3	SW 1
Volume Total	709	709	432	432	136	226
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	136	226
cSH	1700	1700	1700	1700	1700	716
Volume to Capacity	0.42	0.42	0.25	0.25	0.08	0.32
Queue Length 95th (ft)	0	0	0	0	0	34
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	12.3
Lane LOS						B
Approach Delay (s)	0.0		0.0			12.3
Approach LOS						B
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			39.8%		ICU Level of Service	A
Analysis Period (min)			15			



Timings  
5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

Future PM Imp  
09/29/2023

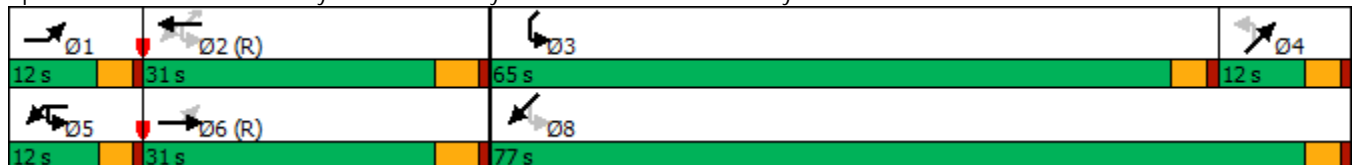


Lane Group	EBL	EBT	WBU	WBL	WBT	WBR	NEL	NET	SWL	SWT
Lane Configurations										
Traffic Volume (vph)	113	332	1	140	527	299	2	31	752	92
Future Volume (vph)	113	332	1	140	527	299	2	31	752	92
Turn Type	pm+pt	NA	pm+pt	pm+pt	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases	1	6	5	5	2			4	3	8
Permitted Phases	6		2	2		2	4		8	
Detector Phase	1	6	5	5	2	2	4	4	3	8
Switch Phase										
Minimum Initial (s)	4.0	25.0	4.0	4.0	15.0	15.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	30.0	12.0	12.0	30.0	30.0	12.0	12.0	9.0	12.0
Total Split (s)	12.0	31.0	12.0	12.0	31.0	31.0	12.0	12.0	65.0	77.0
Total Split (%)	10.0%	25.8%	10.0%	10.0%	25.8%	25.8%	10.0%	10.0%	54.2%	64.2%
Yellow Time (s)	3.2	3.9	3.0	3.0	3.9	3.9	3.2	3.2	3.2	3.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.2	4.9		4.0	4.9	4.9		4.2	4.2	4.2
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	C-Min	None	None	C-Min	C-Min	None	None	None	None
Act Effect Green (s)	34.9	26.2		35.3	26.2	26.2		7.5	72.5	72.5
Actuated g/C Ratio	0.29	0.22		0.29	0.22	0.22		0.06	0.60	0.60
v/c Ratio	0.74	0.56		0.62	0.79	0.64		0.79	1.01	0.35
Control Delay	55.7	44.7		35.5	45.7	13.8		49.8	55.3	7.1
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	55.7	44.7		35.5	45.7	13.8		49.8	55.3	7.1
LOS	E	D		D	D	B		D	E	A
Approach Delay		47.5			34.3			49.8		41.7
Approach LOS		D			C			D		D

Intersection Summary

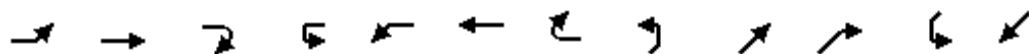
Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 39 (33%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 110  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.01  
 Intersection Signal Delay: 40.5  
 Intersection Capacity Utilization 92.4%  
 Analysis Period (min) 15  
 Intersection LOS: D  
 ICU Level of Service F

Splits and Phases: 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

Future PM Imp  
 09/29/2023



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT
Lane Configurations												
Traffic Volume (vph)	113	332	7	1	140	527	299	2	31	97	752	92
Future Volume (vph)	113	332	7	1	140	527	299	2	31	97	752	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9			4.0	4.9	4.9		4.2		4.2	4.2
Lane Util. Factor	1.00	0.95			1.00	0.95	1.00		1.00		1.00	1.00
Frt	1.00	1.00			1.00	1.00	0.85		0.90		1.00	0.90
Flt Protected	0.95	1.00			0.95	1.00	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1770	3528			1770	3539	1583		1673		1770	1670
Flt Permitted	0.18	1.00			0.34	1.00	1.00		0.99		0.34	1.00
Satd. Flow (perm)	328	3528			630	3539	1583		1658		637	1670
Peak-hour factor, PHF	0.79	0.79	0.79	0.87	0.87	0.87	0.87	0.85	0.85	0.85	0.78	0.78
Adj. Flow (vph)	143	420	9	1	161	606	344	2	36	114	964	118
RTOR Reduction (vph)	0	2	0	0	0	0	194	0	90	0	0	67
Lane Group Flow (vph)	143	427	0	0	162	606	150	0	62	0	964	314
Turn Type	pm+pt	NA		pm+pt	pm+pt	NA	Perm	Perm	NA		pm+pt	NA
Protected Phases	1	6		5	5	2			4		3	8
Permitted Phases	6			2	2		2	4			8	
Actuated Green, G (s)	34.2	26.2			34.4	26.2	26.2		7.5		72.5	72.5
Effective Green, g (s)	34.2	26.2			34.4	26.2	26.2		7.5		72.5	72.5
Actuated g/C Ratio	0.29	0.22			0.29	0.22	0.22		0.06		0.60	0.60
Clearance Time (s)	4.2	4.9			4.0	4.9	4.9		4.2		4.2	4.2
Vehicle Extension (s)	3.0	6.0			3.0	6.0	6.0		3.0		3.5	3.0
Lane Grp Cap (vph)	189	770			258	772	345		103		958	1008
v/s Ratio Prot	c0.05	0.12			0.04	c0.17					c0.51	0.19
v/s Ratio Perm	0.16				0.14		0.09		0.04		c0.10	
v/c Ratio	0.76	0.56			0.63	0.78	0.44		0.60		1.01	0.31
Uniform Delay, d1	34.6	41.7			34.3	44.2	40.5		54.8		24.4	11.6
Progression Factor	1.00	1.00			0.78	0.85	0.65		1.00		1.00	1.00
Incremental Delay, d2	15.8	2.9			4.6	7.7	3.9		9.5		30.6	0.2
Delay (s)	50.3	44.6			31.6	45.3	30.2		64.3		55.0	11.8
Level of Service	D	D			C	D	C		E		E	B
Approach Delay (s)		46.0				38.6			64.3			42.8
Approach LOS		D				D			E			D

Intersection Summary

HCM 2000 Control Delay	42.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	SWR
Lane Configurations	
Traffic Volume (vph)	205
Future Volume (vph)	205
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.78
Adj. Flow (vph)	263
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Timings  
6: US-31 & Riverchase Pkwy

Future PM Imp  
09/29/2023



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	64	30	80	86	850	34	955	10	251	1187	147
Future Volume (vph)	64	30	80	86	850	34	955	10	251	1187	147
Turn Type	Prot	NA	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Free
Protected Phases	3	8	7	4		1	6		5	2	
Permitted Phases					4	6		6			Free
Detector Phase	3	8	7	4	4	1	6	6	5	2	
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	9.0	20.0	9.0	20.0	20.0	9.0	25.0	25.0	9.0	25.0	
Total Split (s)	25.0	22.0	25.0	22.0	22.0	13.0	128.0	128.0	25.0	140.0	
Total Split (%)	12.5%	11.0%	12.5%	11.0%	11.0%	6.5%	64.0%	64.0%	12.5%	70.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.5	0.5	1.5	0.5	0.5	0.5	1.0	1.0	0.5	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	4.0	5.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min	
Act Effect Green (s)	11.9	14.3	18.9	18.7	18.7	77.0	69.3	69.3	16.4	81.7	135.0
Actuated g/C Ratio	0.09	0.11	0.14	0.14	0.14	0.57	0.51	0.51	0.12	0.61	1.00
v/c Ratio	0.52	0.29	0.40	0.41	1.41	0.17	0.63	0.01	0.68	0.62	0.10
Control Delay	76.6	58.3	67.4	65.7	218.2	9.7	24.9	0.0	68.6	18.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.6	58.3	67.4	65.7	218.2	9.7	24.9	0.0	68.6	18.5	0.1
LOS	E	E	E	E	F	A	C	A	E	B	A
Approach Delay		69.1		193.4			24.1			24.7	
Approach LOS		E		F			C			C	

Intersection Summary

Cycle Length: 200  
 Actuated Cycle Length: 135  
 Natural Cycle: 90  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.41  
 Intersection Signal Delay: 74.5  
 Intersection LOS: E  
 Intersection Capacity Utilization 70.5%  
 ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 6: US-31 & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
6: US-31 & Riverchase Pkwy

Future PM Imp  
09/29/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↖↗	↖	↗↗	↖	↖↗	↗↗	↖
Traffic Volume (vph)	64	30	14	80	86	850	34	955	10	251	1187	147
Future Volume (vph)	64	30	14	80	86	850	34	955	10	251	1187	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.0		5.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	0.88	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1773		1770	1863	2787	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.15	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1773		1770	1863	2787	281	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.79	0.79	0.79	0.81	0.81	0.81	0.84	0.84	0.84	0.89	0.89	0.89
Adj. Flow (vph)	81	38	18	99	106	1049	40	1137	12	282	1334	165
RTOR Reduction (vph)	0	8	0	0	0	355	0	0	6	0	0	0
Lane Group Flow (vph)	81	48	0	99	106	694	40	1137	6	282	1334	165
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Free
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases						4	6		6			Free
Actuated Green, G (s)	11.9	12.7		18.9	19.7	19.7	75.5	70.4	70.4	16.4	81.7	136.4
Effective Green, g (s)	11.9	12.7		18.9	19.7	19.7	75.5	70.4	70.4	16.4	81.7	136.4
Actuated g/C Ratio	0.09	0.09		0.14	0.14	0.14	0.55	0.52	0.52	0.12	0.60	1.00
Clearance Time (s)	5.0	4.0		5.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	6.0	6.0	3.0	6.0	
Lane Grp Cap (vph)	154	165		245	269	402	211	1826	817	412	2119	1583
v/s Ratio Prot	c0.05	0.03		0.06	0.06		0.01	0.32		c0.08	c0.38	
v/s Ratio Perm						c0.25	0.10		0.00			0.10
v/c Ratio	0.53	0.29		0.40	0.39	1.73	0.19	0.62	0.01	0.68	0.63	0.10
Uniform Delay, d1	59.6	57.6		53.6	52.9	58.4	15.3	23.5	16.0	57.5	17.6	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.2	1.0		1.1	1.0	337.1	0.4	1.1	0.0	4.7	1.0	0.1
Delay (s)	62.8	58.6		54.7	53.9	395.5	15.8	24.7	16.0	62.2	18.6	0.1
Level of Service	E	E		D	D	F	B	C	B	E	B	A
Approach Delay (s)		61.1			339.7			24.3			23.8	
Approach LOS		E			F			C			C	

Intersection Summary

HCM 2000 Control Delay	115.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	136.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings  
7: US-31 & Parkway Lake Dr

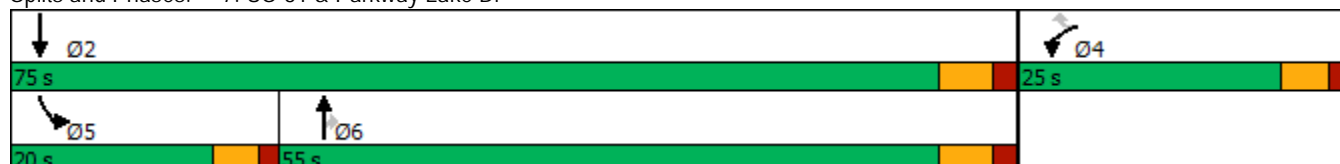
Future PM Imp  
09/29/2023

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	115	97	961	29	40	1247
Future Volume (vph)	115	97	961	29	40	1247
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6		
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	20.0	20.0	4.0	20.0
Minimum Split (s)	10.0	10.0	26.0	26.0	9.5	26.0
Total Split (s)	25.0	25.0	55.0	55.0	20.0	75.0
Total Split (%)	25.0%	25.0%	55.0%	55.0%	20.0%	75.0%
Yellow Time (s)	3.5	3.5	4.0	4.0	3.5	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	Min
Act Effect Green (s)	10.0	10.0	52.0	52.0	7.7	59.1
Actuated g/C Ratio	0.12	0.12	0.64	0.64	0.10	0.73
v/c Ratio	0.34	0.40	0.51	0.03	0.14	0.55
Control Delay	37.5	11.9	9.8	3.4	38.6	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.5	11.9	9.8	3.4	38.6	5.8
LOS	D	B	A	A	D	A
Approach Delay	25.8		9.6			6.8
Approach LOS	C		A			A

Intersection Summary

















Cycle Length: 100	
Actuated Cycle Length: 80.9	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.55	
Intersection Signal Delay: 9.7	Intersection LOS: A
Intersection Capacity Utilization 47.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 7: US-31 & Parkway Lake Dr



HCM Signalized Intersection Capacity Analysis  
7: US-31 & Parkway Lake Dr

Future PM Imp  
09/29/2023

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		 		 	 
Traffic Volume (vph)	115	97	961	29	40	1247
Future Volume (vph)	115	97	961	29	40	1247
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	3539	1583	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	3539	1583	3433	3539
Peak-hour factor, PHF	0.80	0.80	0.83	0.83	0.88	0.88
Adj. Flow (vph)	144	121	1158	35	45	1417
RTOR Reduction (vph)	0	106	0	11	0	0
Lane Group Flow (vph)	144	15	1158	24	45	1417
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6		
Actuated Green, G (s)	10.0	10.0	52.0	52.0	4.4	61.4
Effective Green, g (s)	10.0	10.0	52.0	52.0	4.4	61.4
Actuated g/C Ratio	0.12	0.12	0.63	0.63	0.05	0.74
Clearance Time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Vehicle Extension (s)	4.0	4.0	6.0	6.0	4.0	6.0
Lane Grp Cap (vph)	414	190	2219	992	182	2621
v/s Ratio Prot	c0.04		0.33		0.01	c0.40
v/s Ratio Perm		0.01		0.02		
v/c Ratio	0.35	0.08	0.52	0.02	0.25	0.54
Uniform Delay, d1	33.5	32.4	8.6	5.8	37.7	4.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.2	0.6	0.0	1.0	0.5
Delay (s)	34.2	32.6	9.1	5.9	38.6	5.2
Level of Service	C	C	A	A	D	A
Approach Delay (s)	33.4		9.0			6.2
Approach LOS	C		A			A
<b>Intersection Summary</b>						
HCM 2000 Control Delay			9.8		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.55			
Actuated Cycle Length (s)			82.9		Sum of lost time (s)	16.5
Intersection Capacity Utilization			47.4%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						



Intersection: 1: Valleydale Rd & Riverchase Pkwy

Movement	SB	SB	SB	SB	NE	NE	NE	NE	NE	SW	SW	SW
Directions Served	L	L	LT	R	L	T	T	T	R	UL	T	T
Maximum Queue (ft)	73	106	126	18	107	122	127	112	30	92	236	238
Average Queue (ft)	16	42	57	1	30	57	63	36	4	24	122	130
95th Queue (ft)	51	88	107	9	76	104	115	87	20	62	203	211
Link Distance (ft)		1435	1435			2597	2597	2597			2806	2806
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	350			170	300				300	170		
Storage Blk Time (%)			0									2
Queuing Penalty (veh)			0									1

Intersection: 2: Riverchase Pkwy & Woods of Riverchase Dr

Movement	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	TR	UL	T	TR	LT	TR
Maximum Queue (ft)	112	99	86	137	187	73	83
Average Queue (ft)	57	45	16	49	69	21	25
95th Queue (ft)	100	78	51	116	148	53	64
Link Distance (ft)		663		1435	1435	1117	1117
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	120		130				
Storage Blk Time (%)	1			0			
Queuing Penalty (veh)	1			0			

Intersection: 3: Riverchase Pkwy & Regions Dr

Movement	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	R	L	T	T
Maximum Queue (ft)	21	20	128	151	58	55	21	27
Average Queue (ft)	2	2	13	20	5	17	2	2
95th Queue (ft)	12	12	63	86	33	45	13	16
Link Distance (ft)	812	812	1117	1117			731	731
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)					90	100		
Storage Blk Time (%)				1	0			
Queuing Penalty (veh)				1	0			

Intersection: 4: Riverchase Pkwy & Regions Gated Access

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy

Movement	EB	EB	EB	WB	WB	WB	WB	NE	SW	SW
Directions Served	L	T	TR	UL	T	T	R	LTR	L	TR
Maximum Queue (ft)	18	65	31	86	109	113	75	132	58	40
Average Queue (ft)	3	11	3	24	25	31	3	47	17	5
95th Queue (ft)	15	41	19	60	74	84	35	106	44	26
Link Distance (ft)		334	334		523	523		456	1909	1909
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	100			180			125			
Storage Blk Time (%)		0			0	0	0			
Queuing Penalty (veh)		0			0	0	0			

Intersection: 6: US-31 & Riverchase Pkwy

Movement	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	R	L	T	T	R	L	L
Maximum Queue (ft)	214	151	42	57	202	176	78	349	363	8	170	220
Average Queue (ft)	118	60	7	15	112	52	11	217	227	0	150	203
95th Queue (ft)	195	123	29	46	182	137	50	323	327	7	209	242
Link Distance (ft)	563	563			508	508		2016	2016			
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			230	230			185			315	120	120
Storage Blk Time (%)								13	1		9	49
Queuing Penalty (veh)								3	1		33	186

Intersection: 6: US-31 & Riverchase Pkwy

Movement	SB	SB
Directions Served	T	T
Maximum Queue (ft)	462	401
Average Queue (ft)	258	108
95th Queue (ft)	488	290
Link Distance (ft)	431	431
Upstream Blk Time (%)	4	0
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)	3	0
Queuing Penalty (veh)	12	0

Intersection: 7: US-31 & Parkway Lake Dr

Movement	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	L	L	R	T	T	L	L	T	T
Maximum Queue (ft)	57	19	63	189	171	71	89	108	132
Average Queue (ft)	21	1	25	90	58	17	46	16	27
95th Queue (ft)	51	11	52	160	128	51	74	62	89
Link Distance (ft)	884	884		851	851			2016	2016
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			500			180	180		
Storage Blk Time (%)					0				
Queuing Penalty (veh)					0				

Network Summary

Network wide Queuing Penalty: 237
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Intersection: 1: Valleydale Rd & Riverchase Pkwy

Movement	NB	NB	SB	SB	SB	SB	NE	NE	NE	NE	NE	SW
Directions Served	LT	R	L	L	LT	R	L	T	T	T	R	UL
Maximum Queue (ft)	26	23	207	243	264	194	79	169	185	161	26	36
Average Queue (ft)	2	2	89	120	127	20	20	100	110	77	1	5
95th Queue (ft)	14	12	175	214	229	118	55	154	173	152	11	20
Link Distance (ft)	493			1435	1435			2597	2597	2597		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		150	350			170	300				300	170
Storage Blk Time (%)					5	0						
Queuing Penalty (veh)					4	0						

Intersection: 1: Valleydale Rd & Riverchase Pkwy

Movement	SW	SW
Directions Served	T	T
Maximum Queue (ft)	169	180
Average Queue (ft)	86	90
95th Queue (ft)	141	150
Link Distance (ft)	2806	2806
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 2: Riverchase Pkwy & Woods of Riverchase Dr

Movement	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	TR	UL	T	TR	LT	TR
Maximum Queue (ft)	117	96	101	69	77	175	187
Average Queue (ft)	60	42	41	13	16	82	95
95th Queue (ft)	109	75	81	45	53	146	168
Link Distance (ft)		663		1435	1435	1117	1117
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	120		130				
Storage Blk Time (%)	1	0	0	0			
Queuing Penalty (veh)	1	0	0	0			

**Intersection: 3: Riverchase Pkwy & Regions Dr**

Movement	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	R	L	T	T
Maximum Queue (ft)	144	39	78	68	13	8	70	74
Average Queue (ft)	55	14	26	20	1	0	27	26
95th Queue (ft)	116	33	64	56	7	5	61	67
Link Distance (ft)	812	812	1117	1117			731	731
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)					90	100		
Storage Blk Time (%)				0				
Queuing Penalty (veh)				0				

**Intersection: 4: Riverchase Pkwy & Regions Gated Access**

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

**Intersection: 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy**

Movement	EB	EB	EB	WB	WB	WB	NE	SW	SW
Directions Served	L	T	TR	UL	T	T	LTR	L	TR
Maximum Queue (ft)	5	143	74	71	77	80	138	300	100
Average Queue (ft)	0	51	15	27	25	29	31	187	41
95th Queue (ft)	4	114	51	57	61	69	84	278	86
Link Distance (ft)		334	334		523	523	456	1909	1909
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	100			180					
Storage Blk Time (%)		2							
Queuing Penalty (veh)		0							

Intersection: 6: US-31 & Riverchase Pkwy

Movement	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	R	L	T	T	L	L	T
Maximum Queue (ft)	134	129	136	271	422	353	154	345	361	169	216	386
Average Queue (ft)	54	40	63	82	228	194	23	195	213	87	148	181
95th Queue (ft)	107	92	114	193	350	307	82	319	327	193	223	311
Link Distance (ft)	563	563			508	508		2016	2016			431
Upstream Blk Time (%)					0							0
Queuing Penalty (veh)					0							0
Storage Bay Dist (ft)			230	230			185			120	120	
Storage Blk Time (%)				0	11			10	1	2	24	12
Queuing Penalty (veh)				0	18			3	0	15	141	29

Intersection: 6: US-31 & Riverchase Pkwy

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	287	39
Average Queue (ft)	122	1
95th Queue (ft)	236	33
Link Distance (ft)	431	
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		175
Storage Blk Time (%)	1	
Queuing Penalty (veh)	2	

Intersection: 7: US-31 & Parkway Lake Dr

Movement	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	L	L	R	T	T	L	L	T	T
Maximum Queue (ft)	108	61	81	209	195	27	64	183	190
Average Queue (ft)	53	15	36	106	62	5	30	61	80
95th Queue (ft)	93	45	63	185	143	23	60	142	167
Link Distance (ft)	884	884		851	851			2016	2016
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			500			180	180		
Storage Blk Time (%)					0			0	
Queuing Penalty (veh)					0			0	

Network Summary

Network wide Queuing Penalty: 214

Intersection: 1: Valleydale Rd & Riverchase Pkwy

Movement	NB	SB	SB	SB	SB	NE	NE	NE	NE	NE	SW	SW
Directions Served	LT	L	L	LT	R	L	T	T	T	R	UL	T
Maximum Queue (ft)	3	118	163	180	95	147	118	128	113	23	128	251
Average Queue (ft)	0	46	79	93	5	64	61	66	41	3	28	139
95th Queue (ft)	2	100	140	155	49	124	107	116	92	15	79	225
Link Distance (ft)	493		1434	1434			2597	2597	2597			2806
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		350			170	300				300	170	
Storage Blk Time (%)				1	0							3
Queuing Penalty (veh)				1	0							1

Intersection: 1: Valleydale Rd & Riverchase Pkwy

Movement	SW	SW	SW
Directions Served	T	R	R
Maximum Queue (ft)	262	97	42
Average Queue (ft)	147	4	1
95th Queue (ft)	233	55	35
Link Distance (ft)	2806	2806	2806
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Riverchase Pkwy & Woods of Riverchase Dr

Movement	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	LTR	UL	T	T	R	L	T	TR
Maximum Queue (ft)	114	81	94	110	285	283	79	30	67	86
Average Queue (ft)	57	44	34	23	93	131	4	6	12	22
95th Queue (ft)	100	72	80	68	211	252	33	22	42	64
Link Distance (ft)		663	936		1434	1434			1117	1117
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	120			130			100	100		
Storage Blk Time (%)	0				2	7	0		0	
Queuing Penalty (veh)	1				1	1	0		0	



**Intersection: 3: Riverchase Pkwy & Regions Dr**

Movement	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	R	L	T	T
Maximum Queue (ft)	112	70	350	407	115	95	59	71
Average Queue (ft)	40	19	111	167	31	44	12	15
95th Queue (ft)	86	54	262	339	104	85	42	51
Link Distance (ft)	812	812	1117	1117			730	730
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)					90	100		
Storage Blk Time (%)				12	0	2		
Queuing Penalty (veh)				17	0	3		

**Intersection: 4: Riverchase Pkwy & Regions Gated Access**

Movement	NW	NW	NW	SW
Directions Served	T	T	R	R
Maximum Queue (ft)	12	147	71	93
Average Queue (ft)	0	19	5	32
95th Queue (ft)	10	118	47	72
Link Distance (ft)	730	730		224
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			100	
Storage Blk Time (%)		2	0	
Queuing Penalty (veh)		3	0	

**Intersection: 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy**

Movement	EB	EB	EB	WB	WB	WB	WB	NE	SW	SW
Directions Served	L	T	TR	UL	T	T	R	LTR	L	TR
Maximum Queue (ft)	123	128	59	184	491	520	150	236	228	89
Average Queue (ft)	61	30	15	45	161	293	131	82	102	33
95th Queue (ft)	107	85	47	106	369	536	209	167	177	71
Link Distance (ft)		334	334		523	523		456	1909	1909
Upstream Blk Time (%)					0	1				
Queuing Penalty (veh)					0	5				
Storage Bay Dist (ft)	100			180			125			
Storage Blk Time (%)	3	0			2	3	31			
Queuing Penalty (veh)	2	0			3	26	107			

Intersection: 6: US-31 & Riverchase Pkwy

Movement	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	R	L	T	T	R	L	L
Maximum Queue (ft)	219	129	36	54	222	174	250	511	543	415	170	220
Average Queue (ft)	107	54	6	14	135	75	29	317	336	40	167	219
95th Queue (ft)	182	110	26	43	207	165	140	463	485	240	182	226
Link Distance (ft)	563	563			508	508		2016	2016			
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			230	230			185			315	120	120
Storage Blk Time (%)					0			31	13		27	66
Queuing Penalty (veh)					0			6	8		108	264

Intersection: 6: US-31 & Riverchase Pkwy

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	479	439	118
Average Queue (ft)	440	298	4
95th Queue (ft)	517	503	58
Link Distance (ft)	431	431	
Upstream Blk Time (%)	46	1	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)			175
Storage Blk Time (%)	2	3	
Queuing Penalty (veh)	15	2	

Intersection: 7: US-31 & Parkway Lake Dr

Movement	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	L	L	R	T	T	L	L	T	T
Maximum Queue (ft)	66	28	74	240	239	75	109	130	148
Average Queue (ft)	25	2	32	130	99	26	60	28	42
95th Queue (ft)	55	14	58	215	194	61	92	91	113
Link Distance (ft)	884	884		851	851			2016	2016
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			500			180	180		
Storage Blk Time (%)					1				
Queuing Penalty (veh)					1				

Network Summary

Network wide Queuing Penalty: 575

Intersection: 1: Valleydale Rd & Riverchase Pkwy

Movement	NB	NB	SB	SB	SB	SB	NE	NE	NE	NE	NE	SW
Directions Served	LT	R	L	L	LT	R	L	T	T	T	R	UL
Maximum Queue (ft)	38	33	367	418	426	195	161	205	222	214	19	36
Average Queue (ft)	5	3	207	252	272	104	68	116	125	101	1	6
95th Queue (ft)	23	17	324	374	393	263	136	177	195	187	10	25
Link Distance (ft)	493			1434	1434			2597	2597	2597		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		150	350			170	300				300	170
Storage Blk Time (%)			0	1	27	0						
Queuing Penalty (veh)			0	3	33	1						

Intersection: 1: Valleydale Rd & Riverchase Pkwy

Movement	SW	SW
Directions Served	T	T
Maximum Queue (ft)	192	195
Average Queue (ft)	110	111
95th Queue (ft)	171	176
Link Distance (ft)	2806	2806
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)	1	
Queuing Penalty (veh)	0	

Intersection: 2: Riverchase Pkwy & Woods of Riverchase Dr

Movement	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	LTR	UL	T	T	R	L	T	TR
Maximum Queue (ft)	115	109	118	139	122	161	81	85	255	283
Average Queue (ft)	54	52	39	64	36	55	7	8	101	119
95th Queue (ft)	107	91	91	113	95	130	43	39	220	247
Link Distance (ft)		663	936		1434	1434			1117	1117
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	120			130			100	100		
Storage Blk Time (%)	1	0		1	0	2	0		6	
Queuing Penalty (veh)	1	0		3	0	0	0		1	

**Intersection: 3: Riverchase Pkwy & Regions Dr**

Movement	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	R	L	T	T
Maximum Queue (ft)	222	74	163	215	90	72	169	178
Average Queue (ft)	109	24	51	76	15	19	70	83
95th Queue (ft)	188	52	122	161	60	54	144	164
Link Distance (ft)	812	812	1117	1117			730	730
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)					90	100		
Storage Blk Time (%)				3	0		3	
Queuing Penalty (veh)				2	0		1	

**Intersection: 4: Riverchase Pkwy & Regions Gated Access**

Movement	SW
Directions Served	R
Maximum Queue (ft)	117
Average Queue (ft)	48
95th Queue (ft)	88
Link Distance (ft)	224
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

**Intersection: 5: Parkway Lake Dr/Parkway Office Cir & Riverchase Pkwy**

Movement	EB	EB	EB	WB	WB	WB	WB	NE	SW	SW
Directions Served	L	T	TR	UL	T	T	R	LTR	L	TR
Maximum Queue (ft)	124	254	160	193	305	361	150	196	703	425
Average Queue (ft)	70	121	67	75	140	170	88	69	416	116
95th Queue (ft)	139	210	143	158	254	307	207	155	621	269
Link Distance (ft)		334	334		523	523		456	1909	1909
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	100			180			125			
Storage Blk Time (%)	3	15		0	4	14	0			
Queuing Penalty (veh)	5	17		0	5	42	1			

Intersection: 6: US-31 & Riverchase Pkwy

Movement	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	R	L	T	T	L	L	T
Maximum Queue (ft)	152	130	140	330	559	558	222	377	399	170	220	468
Average Queue (ft)	65	42	60	302	529	527	27	228	249	157	209	362
95th Queue (ft)	123	99	117	439	548	548	99	365	377	194	245	552
Link Distance (ft)	563	563			508	508		2016	2016			431
Upstream Blk Time (%)					84	81						21
Queuing Penalty (veh)					0	0						0
Storage Bay Dist (ft)			230	230			185			120	120	
Storage Blk Time (%)				0	87			16	3	22	66	7
Queuing Penalty (veh)				1	148			5	0	133	406	28

Intersection: 6: US-31 & Riverchase Pkwy

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	448	196
Average Queue (ft)	264	10
95th Queue (ft)	488	96
Link Distance (ft)	431	
Upstream Blk Time (%)	1	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		175
Storage Blk Time (%)	5	
Queuing Penalty (veh)	7	

Intersection: 7: US-31 & Parkway Lake Dr

Movement	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	L	L	R	T	T	L	L	T	T
Maximum Queue (ft)	130	89	103	263	228	47	137	251	299
Average Queue (ft)	64	22	50	143	99	9	41	102	123
95th Queue (ft)	105	60	86	228	191	35	92	209	242
Link Distance (ft)	884	884		851	851			2016	2016
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			500			180	180		
Storage Blk Time (%)					1			1	
Queuing Penalty (veh)					0			1	

Network Summary

Network wide Queuing Penalty: 848

## Riverchase PUD Response to Comments Concerning Technical Memo for Riverchase PUD

- 1) The future PM Peak analysis you performed at the Hwy 31/Riverchase Pkwy intersection only included the background (or existing) traffic volumes. Please re-analyze this intersection and add in the new development trips.

A portion of the Technical Memorandum Appendix contained the incorrect sheets. The correct sheets are attached for inclusion in the Technical Memorandum.

- 2) You are proposing 550 new PM peak trips for the southbound left turn lane on Riverchase Pkwy at the Valleydale Road approach. We are concerned about how this significant increase in the SBLT traffic will impact the Valleydale Road coordinated system. Please re-analyze this intersection with coordinated operation on Valleydale Road. Note that the Valleydale Road coordinated system runs from Riverchase Pkwy to Southlake Pkwy.

We understand there will be signal timing and coordination modifications required as traffic is added to the Valleydale Road corridor. As part of the design process the consultant will work with the City of Hoover to revise the coordinated signal timings along the Riverchase Parkway Corridor, from Parkway Office Circle to Woods of Riverchase Drive, and the Valleydale Road Corridor, from Riverchase Parkway to Southlake Parkway.

- 3) Please propose improvements to deal with the vehicle queue blocking issues indicated on Tables 8 & 9 in your report.

Table 8 and 9 from the Technical Memorandum (see attached) include recommendations for full width turn lane lengths derived from the findings of the Future Conditions Queuing Analysis. These lengths will be our guide for designing such turn lane improvements.

- 4) Please remove all references to 100' full-width storage lanes and propose turn lane lengths (for each turn lane) that will provide adequate storage capacity to the satisfaction of the City Engineer.

Tables 8 and 9 from the Technical Memorandum proposed turn lane lengths that were derived from the Future Conditions Queuing Analysis. These stated lane lengths will be used as our guide as we undertake the design of such improvement.

Response to City Comments  
October 9, 2023

**Table 8 – Future Conditions Queuing Analysis**

Intersection (Traffic Control)	Approach	95 <sup>th</sup> Percentile Queue (ft)					
		AM Peak			PM Peak		
		Left	Thru	Right	Left	Thru	Right
Valleydale Rd at Riverchase Pkwy ( <i>signalized</i> )	NB Riverchase Pkwy	-	25	0	-	25	25
	SB Riverchase Pkwy	150	175**	50	400*	400**	275
	WB Valleydale Rd	100	250**	75	25	175	0
	EB Valleydale Rd	125	125	25	150	200	25
Riverchase Pkwy at Woods of Riverchase Dr ( <i>signalized</i> )	NB Riverchase Pkwy	75	275**	50	125*	150**	50
	SB Riverchase Pkwy	25	75	-	50	250**	-
	WB Woods. Dr	-	100	-	-	100	-
	EB Woods. Dr	100	75	-	125*	100	-
Riverchase Pkwy at Regions Dr ( <i>signalized</i> )	NB Riverchase Pkwy	-	350**	125	-	175**	100
	SB Riverchase Pkwy	100*	75	-	75	175**	-
	WB Regions Dr	100	-	75	200	-	75
Riverchase Pkwy at Regions Gated Access ( <i>unsignalized</i> )	NB Riverchase Pkwy	-	--	50	-	--	0
	SB Riverchase Pkwy	-	--	-	-	--	-
	WB Regions Gated Access	-	-	75	-	-	100
Riverchase Pkwy at Parkway Office Cir/Parkway Lake Dr ( <i>signalized</i> )	NB Riverchase Pkwy	125	550**	225*	175	325**	225
	SB Riverchase Pkwy	125*	100	-	150*	225**	-
	WB Parkway Office Cir	200	75	-	625	275	-
	EB Parkway Lake Dr	-	175	-	-	175	-

Note: '- -' indicates unopposed movements. \*\*=Through volumes blocking turning volumes. \*=Turning volumes blocking through volumes.



**Table 9 – Future Conditions Queuing Analysis, US Highway 31 Intersections**

Intersection (Traffic Control)	Approach	Existing Conditions 95 <sup>th</sup> Percentile Queue (ft)					
		AM Peak			PM Peak		
		Left	Thru	Right	Left	Thru	Right
US 31 at Riverchase Pkwy	NB US 31	150	500**	240	100	400**	0
	SB US 31	250*	525**	75	250*	575**	100
	WB Riverchase Pkwy	50	50	225	125	450	550*
	EB Riverchase Pkwy	200	125	-	125	100	-
US 31 at Parkway Lake Dr	NB US 31	-	225**	0	-	250**	0
	SB US 31	100	125	-	100	250**	-
	WB Parkway Lake Dr	75	-	75	125	-	100

\*\*=Through volumes blocking turning volumes. \*=Turning volumes blocking through volumes.

Timings  
6: US-31 & Riverchase Pkwy

Future PM Imp "10092023"

10/09/2023

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	65	31	82	88	1252	35	1059	10	412	1232	150
Future Volume (vph)	65	31	82	88	1252	35	1059	10	412	1232	150
Turn Type	Prot	NA	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Free
Protected Phases	3	8	7	4		1	6		5	2	
Permitted Phases					4	6		6			Free
Detector Phase	3	8	7	4	4	1	6	6	5	2	
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	9.0	20.0	9.0	20.0	20.0	9.0	25.0	25.0	9.0	25.0	
Total Split (s)	25.0	22.0	25.0	22.0	22.0	13.0	128.0	128.0	25.0	140.0	
Total Split (%)	12.5%	11.0%	12.5%	11.0%	11.0%	6.5%	64.0%	64.0%	12.5%	70.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.5	0.5	1.5	0.5	0.5	0.5	1.0	1.0	0.5	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	4.0	5.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min	
Act Effct Green (s)	12.7	14.5	19.2	18.5	18.5	89.0	81.2	81.2	21.6	98.6	152.6
Actuated g/C Ratio	0.08	0.10	0.13	0.12	0.12	0.58	0.53	0.53	0.14	0.65	1.00
v/c Ratio	0.56	0.32	0.45	0.48	2.29	0.18	0.67	0.01	0.95	0.61	0.11
Control Delay	87.2	65.9	77.4	77.0	606.0	9.5	27.1	0.0	94.7	17.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.2	65.9	77.4	77.0	606.0	9.5	27.1	0.0	94.7	17.2	0.1
LOS	F	E	E	E	F	A	C	A	F	B	A
Approach Delay		78.5		542.8			26.3			33.6	
Approach LOS		E		F			C			C	

Intersection Summary

Cycle Length: 200  
 Actuated Cycle Length: 152.6  
 Natural Cycle: 130  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 2.29  
 Intersection Signal Delay: 204.0  
 Intersection LOS: F  
 Intersection Capacity Utilization 87.5%  
 ICU Level of Service E  
 Analysis Period (min) 15
























Splits and Phases: 6: US-31 & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
6: US-31 & Riverchase Pkwy

Future PM Imp "10092023"

10/09/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	31	14	82	88	1252	35	1059	10	412	1232	150
Future Volume (vph)	65	31	14	82	88	1252	35	1059	10	412	1232	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.0		5.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	0.88	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1775		1770	1863	2787	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.16	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1775		1770	1863	2787	291	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.79	0.79	0.79	0.81	0.81	0.81	0.84	0.84	0.84	0.89	0.89	0.89
Adj. Flow (vph)	82	39	18	101	109	1546	42	1261	12	463	1384	169
RTOR Reduction (vph)	0	8	0	0	0	335	0	0	6	0	0	0
Lane Group Flow (vph)	82	49	0	101	109	1211	42	1261	6	463	1384	169
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Free
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases						4	6		6			Free
Actuated Green, G (s)	12.7	13.0		19.2	19.5	19.5	87.7	82.4	82.4	21.6	98.7	154.2
Effective Green, g (s)	12.7	13.0		19.2	19.5	19.5	87.7	82.4	82.4	21.6	98.7	154.2
Actuated g/C Ratio	0.08	0.08		0.12	0.13	0.13	0.57	0.53	0.53	0.14	0.64	1.00
Clearance Time (s)	5.0	4.0		5.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	6.0	6.0	3.0	6.0	
Lane Grp Cap (vph)	145	149		220	235	352	216	1891	845	480	2265	1583
v/s Ratio Prot	c0.05	0.03		0.06	0.06		0.01	c0.36		c0.13	0.39	
v/s Ratio Perm						c0.43	0.10		0.00			0.11
v/c Ratio	0.57	0.33		0.46	0.46	3.44	0.19	0.67	0.01	0.96	0.61	0.11
Uniform Delay, d1	68.1	66.5		62.7	62.5	67.3	15.7	26.0	16.8	65.9	16.4	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.0	1.3		1.5	1.4	1105.9	0.4	1.4	0.0	31.9	0.9	0.1
Delay (s)	73.1	67.8		64.2	63.9	1173.2	16.1	27.4	16.8	97.8	17.3	0.1
Level of Service	E	E		E	E	F	B	C	B	F	B	A
Approach Delay (s)		70.9			1040.6			26.9			34.3	
Approach LOS		E			F			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			371.5									F
HCM 2000 Volume to Capacity ratio			1.10									
Actuated Cycle Length (s)			154.2								18.0	
Intersection Capacity Utilization			87.5%									E
Analysis Period (min)			15									

c Critical Lane Group

# Memorandum

**To:** John L. Anthony, P.E. PTOE

**From:** Darrell Skipper, P.E., Skipper Consulting, Inc.

**Date:** October 27, 2023

**Subject:** Riverchase PUD Final Traffic Impact Study, Response to City of Hoover Comments

Indicate what additional improvements are being proposed to accommodate the excessive vehicle queuing shown in Tables 8 and 9 for the study intersections as a result of the future development traffic conditions.

There are three locations where turn lanes do not currently exist, but where they will be warranted based on future projected traffic conditions:

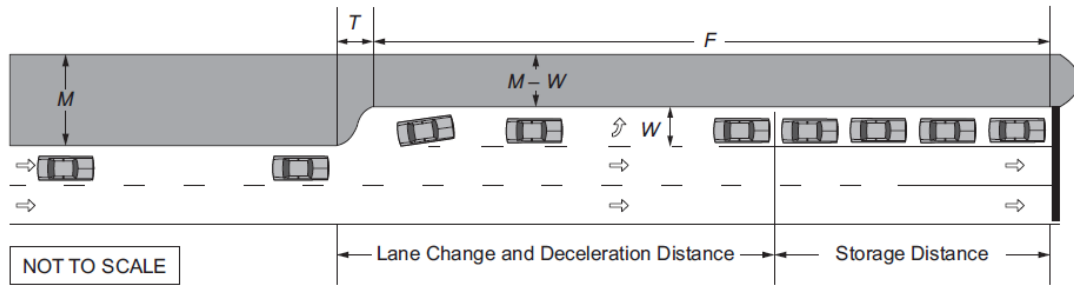
- Northbound right turn lane on Riverchase Pkwy at Woods of Riverchase Dr
- Southbound left turn lane on Riverchase Pkwy at Woods of Riverchase Dr
- Northbound right turn lane at Riverchase Pkwy at Regions Gated Access

In addition, existing turn lane deceleration lengths and storage lengths for the study intersections were examined to determine any improvements needed to accommodate site-generated traffic.

SimTraffic was used to find 95<sup>th</sup> queues for storage. The required storage lengths are shown in Table 4, below. Guidance on the bay taper and full width length of turn lanes was derived from AASHTO (2018) *A Policy on Geometric Design of Highways and Streets*. Lane change and deceleration is calculated to occur through taper length and for a portion of the turn-lane full-width length but before the storage distance, as shown in Figure 1 below. The minimum bay taper length was calculated using an 8:1 taper rate assuming a turn lane width of 12 feet (approximately 100 feet). The total required lane change and deceleration distance based on the 30 mile per hour posted speed limit on Riverchase Parkway is 150 feet. A minimum full width lane length of 100 feet is applied in any instance where the calculated full width lane length falls below 100 feet.

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**Figure 1. Dimensions for Left Turn Auxiliary Lanes (AASHTO Greenbook)**



**Legend:**

- $F$  = full-width left-turn lane length
- $M$  = median width
- $T$  = taper length
- $W$  = left-turn lane width

**Table 1: Recommended Turn Lane Taper and Full Width Dimensions**

Road and Turn Lane	Bay Taper			Full Width Turn Lane			
	Existing Bay Taper Length (ft)	Minimum Required Bay Taper (ft)	Additional Bay Taper Required (ft)	Existing Full-Width Length (ft)	Full Width Required for Deceleration (ft)	Required Full Width Storage (ft)	Additional Full Width Turn Lane Required (ft)
Riverchase Pkwy at Valleydale Rd SB Right	265	100	0	180	0	275	95
Riverchase Pkwy at Valleydale Rd SB Left	315	100	0	350*	0	325	0
Riverchase Pkwy at Woods of Riverchase Dr NB Right	0	100	100	0	30	50	100
Riverchase Pkwy at Woods of Riverchase Dr SB Left	0	100	100	0	30	50	100
Riverchase Pkwy at Regions Dr NB Right	150	100	0	100	0	100	0
Riverchase Pkwy at Regions Dr SB Left	140	100	0	100	0	75	0
Riverchase Pkwy at Regions Gated Access NB Right	0	100	100	0	30	25	100
Riverchase Pkwy at Parkway Office Cir NB Right	125	100	0	125	5	225	105
Riverchase Pkwy at Parkway Office Cir SB Left	140	100	0	100	0	125	25

\* Dual Lane

### Recommended Improvements

- Extend the southbound right turn lane on Riverchase Parkway at Valleydale Road. The design should have a minimum taper length of 100 feet and a minimum full-width turn lane length of 305 feet.
- Construct a northbound right turn lane on Riverchase Parkway at Woods of Riverchase Drive. The design should have a minimum taper length of 100 feet and a minimum full-width turn lane length of 100 feet.
- Construct a southbound left turn lane on Riverchase Parkway at Woods of Riverchase Drive. The design should have a minimum taper length of 100 feet and a minimum full-width turn lane length of 100 feet.
- Construct a northbound right turn lane on Riverchase Parkway at Regions Gate Access. The design should have a minimum taper length of 100 feet and a minimum full-width turn lane length of 100 feet.
- Extend the northbound right turn lane on Riverchase Parkway at Parkway Office Circle. The design should have a minimum taper length of 100 feet and a minimum full-width turn lane length of 255 feet.
- Extend the southbound left turn lane on Riverchase Parkway at Parkway Office Circle. The design should have a minimum taper length of 100 feet and minimum full-width turn lane length of 155 feet.

Re-evaluate the Riverchase Pkwy Valleydale Road intersection with the correct outbound volumes, and with coordinated operation.

See Future Improved Capacity Analysis as shown in Table 4, below.

Provide updated traffic signal timing plans for the six (6) signalized intersections on Riverchase Pkwy East to accommodate the future development traffic conditions.

See Signal Timing Changes as shown in Table 2, below.

Provide any needed signal timing adjustments, while maintaining the current cycle lengths, to the Riverchase Pkwy East/Valleydale Road intersection to accommodate the future development traffic conditions.

See Signal Timing Changes as shown in Table 2, below.

Provide any needed signal timing adjustments, while maintaining the current cycle lengths, to the Riverchase Pkwy East/Highway 31 intersection to accommodate the future development traffic conditions.

See Signal Timing Changes as shown in Table 2, below.

**Table 2: Existing and Proposed Signal Timings**  
**Proposed Changes are Highlighted in Yellow**

Valleydale Rd at Riverchase Pkwy – Existing										
Plan	Cycle	1	2	3	4	5	6	7	8	Off
AM	125	20	65	28	12	15	70	-	-	110
PM	130	18	53	43	16	18	53	-	-	18
Valleydale Rd at Riverchase Pkwy – Proposed										
Plan	Cycle	1	2	3	4	5	6	7	8	Off
AM	125	20	65	28	12	15	70	-	-	110
PM	130	21	50	43	16	18	53	-	-	18
Riverchase Pkwy at Woods of Riverchase Dr – Existing										
Plan	Cycle	1	2	3	4	5	6	7	8	Off
AM	120	18	72	-	30	-	90	-	30	0
PM	120	24	70	-	26	-	94	-	26	0
Riverchase Pkwy at Woods of Riverchase Dr – Proposed										
Plan	Cycle	1	2	3	4	5	6	7	8	Off
AM	120	18	72	-	30	18	72	-	30	0
PM	120	24	70	-	26	24	70	-	26	0
Riverchase Pkwy at Regions Dr – Existing										
Plan	Cycle	1	2	3	4	5	6	7	8	Off
AM	120	-	95	-	25	16	79	-	-	100
PM	120	-	70	-	50	15	55	-	-	22
Riverchase Pkwy at Regions Dr – Proposed										
Plan	Cycle	1	2	3	4	5	6	7	8	Off
AM	120	-	95	-	25	16	79	-	-	15
PM	120	-	70	-	50	15	55	-	-	114
Riverchase Pkwy at Parkway Office Cir S / Parkway Lake Dr – Existing										
Plan	Cycle	1	2	3	4	5	6	7	8	Off
AM	120	18	56	18	28	18	56	-	46	49
PM	120	14	35	51	20	15	34	-	71	25
Riverchase Pkwy at Parkway Office Cir S / Parkway Lake Dr – Proposed										
Plan	Cycle	1	2	3	4	5	6	7	8	Off
AM	120	18	56	18	28	18	56	-	46	73
PM	120	14	35	51	20	15	34	-	71	28



**Table 2: Existing and Proposed Signal Timings (continued)**  
**Proposed Changes are Highlighted in Yellow**

Riverchase Pkwy at Riverchase Office Rd – Existing										
Plan	Cycle	1	2	3	4	5	6	7	8	Off
AM	120	26	62	-	32	24	64	-	32	78
PM	120	26	45	-	49	26	45	-	49	95
Riverchase Pkwy at Riverchase Office Rd – Proposed										
Plan	Cycle	1	2	3	4	5	6	7	8	Off
AM	120	26	62	-	32	24	64	-	32	112
PM	120	26	45	-	49	26	45	-	49	8

Riverchase Pkwy at Parkway Office Cir N – Existing										
Plan	Cycle	1	2	3	4	5	6	7	8	Off
AM	120	12	45	-	63	-	57	-	-	50
PM	120	12	45	41	22	-	57	-	-	111
Riverchase Pkwy at Parkway Office Cir N – Proposed										
Plan	Cycle	1	2	3	4	5	6	7	8	Off
AM	120	12	45	-	63	-	57	-	-	43
PM	120	12	45	41	22	-	57	-	-	110

Riverchase Pkwy at Parkway River Rd – Existing										
Plan	Cycle	1	2	3	4	5	6	7	8	Off
AM	120	47	46	-	27	-	93	-	27	31
PM	120	13	47	-	60	-	60	-	60	96
Riverchase Pkwy at Parkway River Rd – Proposed										
Plan	Cycle	1	2	3	4	5	6	7	8	Off
AM	120	47	46	-	27	-	93	-	27	37
PM	120	13	47	-	60	-	60	-	60	13

US-31 at Riverchase Pkwy – Existing										
Plan	Cycle	1	2	3	4	5	6	7	8	Off
AM	160	12	103	25	20	30	85	25	20	30
PM	200	13	140	25	22	25	128	25	22	25
US-31 at Riverchase Pkwy – Proposed										
Plan	Cycle	1	2	3	4	5	6	7	8	Off
AM	160	12	103	25	20	30	85	25	20	30
PM	200	9	102	14	75	31	80	25	64	25

**Table 2: Existing and Proposed Signal Timings (continued)**  
**Proposed Changes are Highlighted in Yellow**

US-31 at Parkway Lake Dr – Existing										
Plan	Cycle	1	2	3	4	5	6	7	8	Off
OFF	100	-	75	-	25	20	55	-	-	-
US-31 at Parkway Lake Dr – Proposed										
Plan	Cycle	1	2	3	4	5	6	7	8	Off
OFF	100	-	75	-	25	20	55	-	-	-

Provide updated capacity analyses for each of the study intersections based on AM & PM peak traffic conditions with all of the above improvements in place.

See Tables 3 and 4, below.

**Table 3: Existing Conditions Capacity Analysis**

Intersection	Approach/ Movement		AM Peak			PM Peak		
			LOS	Delay (s)	Queues (ft)	LOS	Delay (s)	Queues (ft)
Valleydale Rd at Riverchase Pkwy (signalized)	NB	L	E	69	--	60	--	
		T	E		0		25	
		R	--		0		25	
	SB	L	D	42	125	40	300	
		T	D		125		325	
		R	D		25		200	
	WB	L	E	14	100	19	25	
		T	C		275		200	
		R	A					
	EB	L	E	21	125	31	100	
		T	B		150		200	
		R	B		25		25	
<b>Overall Intersection</b>			<b>B</b>	<b>19</b>	<b>C</b>	<b>31</b>		
Riverchase Pkwy at Woods of Riverchase Dr (signalized)	NB	L	A	4	50	3	100	
		T	A		150		75	
		R			--		--	
	SB	L		6	--	6	--	
		T	A		100		225	
		R	--		--		--	
	WB	L	--	0	--	0	--	
		T	A		0		0	
		R	--		--		--	
	EB	L	D	51	125	51	125	
		T	D		100		100	
		R	--		--		--	
<b>Overall Intersection</b>			<b>B</b>	<b>10</b>	<b>B</b>	<b>11</b>		
Riverchase Pkwy at Regions Dr (signalized)	NB	L		2	--	5	--	
		T	A		75		100	
		R	A		25		25	
	SB	L	A	1	50	2	25	
		T	A		25		100	
		R			--		--	
	WB	L	E	58	25	48	125	
		T			--		--	
		R	E		25		50	
	<b>Overall Intersection</b>			<b>A</b>	<b>2</b>	<b>A</b>	<b>8</b>	
Riverchase Pkwy at Regions Gated Access (unsignalized)	NB	L	--	0	--	0	--	
		T			0		0	
		R			--		--	
	SB	L	--	0	--	0	--	
		T			0		0	
		R			--		--	
	WB	L	A	0	0	0	0	
		T			--		--	
		R			--		--	

**Table 3: Existing Conditions Capacity Analysis (Continued)**

Intersection	Approach/Movement		AM Peak			PM Peak		
			LOS	Delays (s)	Queues (ft)	LOS	Delay (s)	Queues (ft)
Riverchase Pkwy at Parkway Office Cir S / Parkway Lake Dr (signalized)	NB	L	A	10	75	9	75	
		T	A		100		75	
		R	B		25		0	
	SB	L	A	6	25	19	25	
		T	A		50		125	
		R	--		--		--	
	WB	L	D	45	75	40	300	
		T	D		25		100	
		R	--		--		--	
	EB	L	--	55	--	54	--	
		T	D		100		75	
R		--	--		--			
<b>Overall Intersection</b>			<b>B</b>	<b>14</b>		<b>C</b>	<b>24</b>	
Riverchase Pkwy at Riverchase Office Rd (signalized)	NB	L	--	1	75	2	75	
		T	A		100		75	
		R	--		25		0	
	SB	L	--	1	25	1	25	
		T	A		50		125	
		R	--		--		--	
	WB	L	--	59	75	55	300	
		T	D		25		100	
		R	--		--		--	
	EB	L	--	59	--	54	--	
		T	E		100		75	
R		--	--		--			
<b>Overall Intersection</b>			<b>A</b>	<b>2</b>		<b>B</b>	<b>12</b>	
Riverchase Pkwy at Parkway Office Cir N (signalized)	SB	L		55	25	55	25	
		T			50		125	
		R	E		--		--	
	WB	L		4	75	1	300	
		T	A		25		100	
		R			--		--	
	EB	L		1	--	1	--	
T		A	100		75			
R			--		--			
<b>Overall Intersection</b>			<b>A</b>	<b>7</b>		<b>B</b>	<b>12</b>	
Riverchase Pkwy at Parkway River Rd (signalized)	NB	L	--	57	75	52	75	
		T	E		100		75	
		R	--		25		0	
	SB	L	--	57	25	53	25	
		T			50		125	
		R	E		--		--	
	WB	L	--	0	75	2	300	
		T	A		25		100	
		R	--		--		--	
	EB	L		1	--	2	--	
		T	A		100		75	
R		--	--		--			
<b>Overall Intersection</b>			<b>A</b>	<b>4</b>		<b>B</b>	<b>11</b>	

**Table 3: Existing Conditions Capacity Analysis (Continued)**

Intersection	Approach/Movement		AM Peak			PM Peak		
			LOS	Delays (s)	Queues (ft)	LOS	Delay (s)	Queues (ft)
US-31 at Riverchase Pkwy (signalized)	NB	L	B	32	100	C	43	100
		T	C		400	D		400
		R	C		75	C		50
	SB	L	E	34	250	F	44	250
		T	B		525	D		525
		R	A		0	A		175
	WB	L	F	43	50	E	98	175
		T	E		50	E		225
		R	D		175	F		375
	EB	L	F	74	225	F	88	150
		T	D		150	E		125
		R	--		--	--		--
<b>Overall Intersection</b>			<b>D</b>	<b>37</b>		<b>E</b>	<b>60</b>	
US-31 at Parkway Lake Dr (signalized)	NB	L	--	9	--		10	--
		T	A		175	A		175
		R	A		0	A		0
	SB	L	C	7	100	D	7	75
		T	A		100	A		0
		R	--		--	--		--
	WB	L	C	32	50	C	30	100
		T	--		--	--		--
		R	C		50	C		75
	<b>Overall Intersection</b>			<b>A</b>	<b>9</b>		<b>A</b>	<b>10</b>

**Table 4: Future Improved Capacity Analysis**

Intersection	Approach/ Movement		AM Peak			PM Peak		
			LOS	Delay (s)	Queues (ft)	LOS	Delay (s)	Queues (ft)
Valleydale Rd at Riverchase Pkwy (signalized)	NB	L	--	67	--	61	--	
		T	E		0		E	25
		R	E		0		E	25
	SB	L	D	44	150	37	D	325
		T	D		175		D	350
		R	D		75		C	275
	WB	L	E	17	100	23	E	50
		T	C		250		D	200
		R	B		275		A	0
	EB	L	E	25	175	39	E	200
		T	B		125		C	200
R		B	25		C		25	
<b>Overall Intersection</b>			<b>C</b>	<b>23</b>		<b>C</b>	<b>35</b>	
Riverchase Pkwy at Woods of Riverchase Dr (signalized)	NB	L	A	7	75	4	A	100
		T	A		225		A	125
		R	A		50		A	25
	SB	L	A	4	25	3	A	50
		T	A		75		A	175
		R	--		--		--	--
	WB	L	--	53	--	52	--	--
		T	D		75		D	100
		R	--		--		--	--
	EB	L	D	50	125	51	D	100
		T	D		100		D	100
R		--	--		--		--	
<b>Overall Intersection</b>			<b>B</b>	<b>12</b>		<b>A</b>	<b>9</b>	
Riverchase Pkwy at Regions Dr (signalized)	NB	L	--	9	--	7	--	--
		T	A		300		A	150
		R	A		100		A	75
	SB	L	B	5	75	6	A	75
		T	A		75		A	175
		R	--		--		--	--
	WB	L	D	49	100	50	D	200
		T	--		--		--	--
R		D	50		D		75	
<b>Overall Intersection</b>			<b>B</b>	<b>11</b>		<b>B</b>	<b>12</b>	
Riverchase Pkwy at Regions Gated Access (unsignalized)	NB	L	--	0	--	0	--	--
		T			25			0
		R			25			0
	SB	L	--	0	--	0	--	--
		T			0			0
		R			--			--
	WB	L	A	10	50	12	B	100
T			--				--	
R			--				--	

**Table 4: Future Improved Capacity Analysis (Continued)**

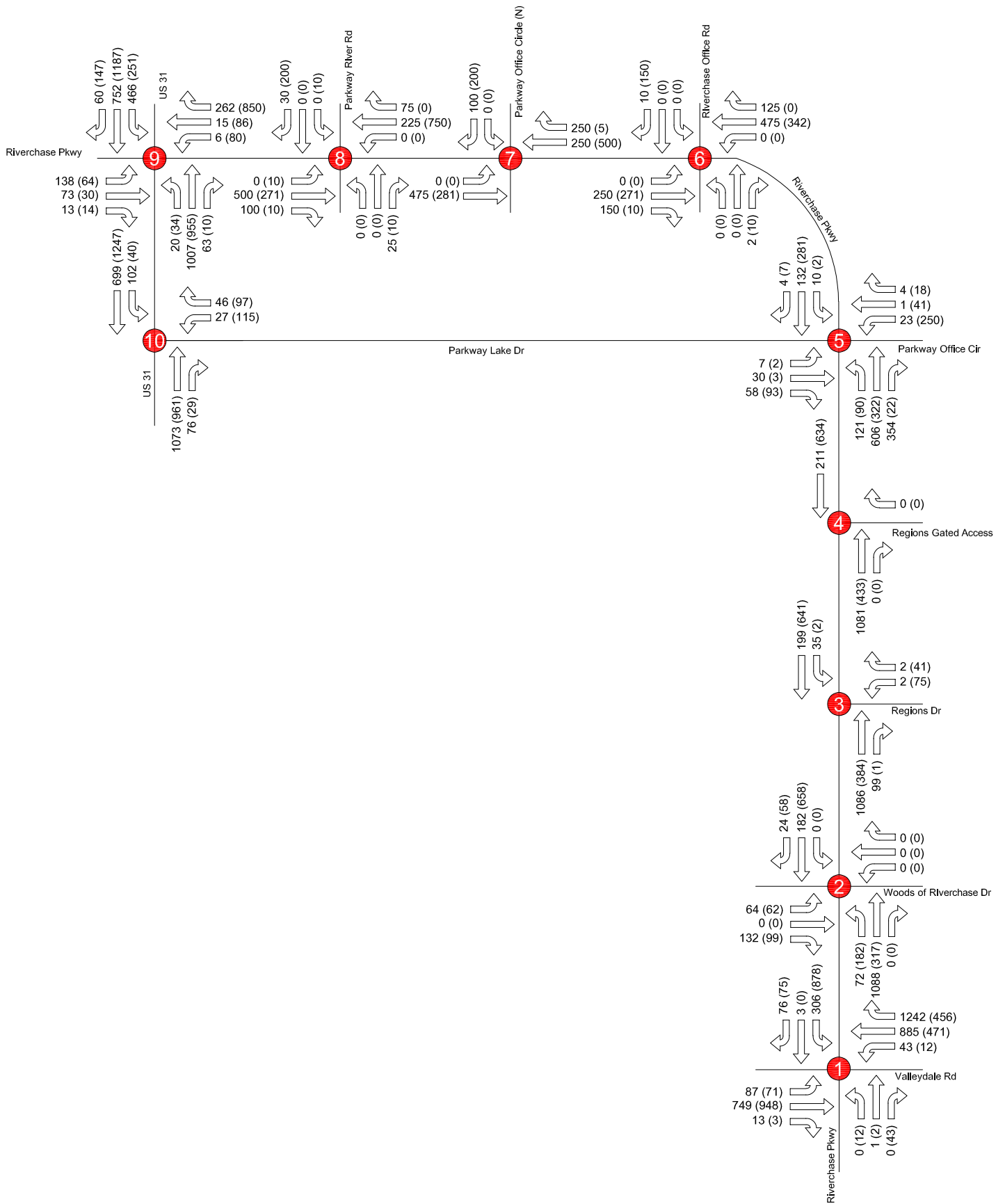
Intersection	Approach/Movement		AM Peak			PM Peak		
			LOS	Delay (s)	Queues (ft)	LOS	Delay (s)	Queues (ft)
Riverchase Pkwy at Parkway Office Cir / Parkway Lake Dr (signalized)	NB	L	A	18	100	B	23	125
		T	B		300	C		250
		R	C		225	B		175
	SB	L	A	10	125	C	30	125
		T	A		100	C		175
		R	--		--	--		--
	WB	L	D	46	175	D	36	475
		T	C		100	B		225
		R	--		--	--		--
	EB	L	--	56	--	--	55	--
		T	E		125	D		125
R		--	--		--	--		
<b>Overall Intersection</b>			<b>C</b>	<b>22</b>		<b>C</b>	<b>31</b>	
Riverchase Pkwy at Riverchase Office Rd (signalized)	NB	L		2	25		1	0
		T	A		25	A		125
		R	--		--	--		--
	SB	L		2	0		1	0
		T	A		50	A		100
		R	--		--	--		--
	WB	L	--	59	--	--	55	--
		T	E		50	E		125
		R	--		--	--		--
	EB	L	--	59	--	--	54	--
		T	E		25	D		50
R		--	--		--	--		
<b>Overall Intersection</b>			<b>A</b>	<b>3</b>		<b>B</b>	<b>11</b>	
Riverchase Pkwy at Parkway Office Cir N (signalized)	SB	L	E	55	75	E	57	0
		T	--		--	--		--
		R			0			125
	WB	L	--	1	--	--	2	--
		T	A		75	A		100
		R	--		0	--		0
	EB	L		1	0		2	0
		T	A		50	A		50
R		--	--		--	--		
<b>Overall Intersection</b>			<b>A</b>	<b>5</b>		<b>B</b>	<b>11</b>	
Riverchase Pkwy at Parkway River Rd (signalized)	NB	L	--	0	--	--	47	--
		T	A		0	D		50
		R	--		--	--		--
	SB	L	--	57	50	--	56	125
		T	E		0	D		0
		R			--	E		--
	WB	L	--	0	--	--	4	--
		T	A		25	A		100
		R	--		--	--		--
	EB	L		1	0	A	3	50
		T	A		50	A		100
R		--	--		--	--		
<b>Overall</b>			<b>A</b>	<b>2</b>		<b>B</b>	<b>12</b>	



**Table 4: Future Improved Capacity Analysis (Continued)**

Intersection	Approach/Movement		AM Peak			PM Peak		
			LOS	Delay (s)	Queues (ft)	LOS	Delay (s)	Queues (ft)
US-31 at Riverchase Pkwy (signalized)	NB	L	C	43	150	D	75	225
		T	D		475	E		625
		R	C		225	D		150
	SB	L	F	52	250	F	61	250
		T	B		1400	D		1425
		R	A		50	A		300
	WB	L	F	37	25	F	88	175
		T	E		50	D		375
		R	D		250	F		625
	EB	L	F	72	225	F	142	200
		T	D		150	D		100
		R			--			--
<b>Overall</b>			<b>D</b>	<b>49</b>		<b>E</b>	<b>76</b>	
US-31 at Parkway Lake Dr (signalized)	NB	L	--	9	--		10	--
		T	A		150	A		175
		R	A		0	A		0
	SB	L	C	7	100	C	7	50
		T	A		100	A		100
		R	--		--	--		--
	WB	L	C	32	50	C	30	75
		T	--		--	--		--
		R	C		75	C		75
	<b>Overall</b>			<b>A</b>	<b>9</b>		<b>A</b>	<b>10</b>

## Appendix



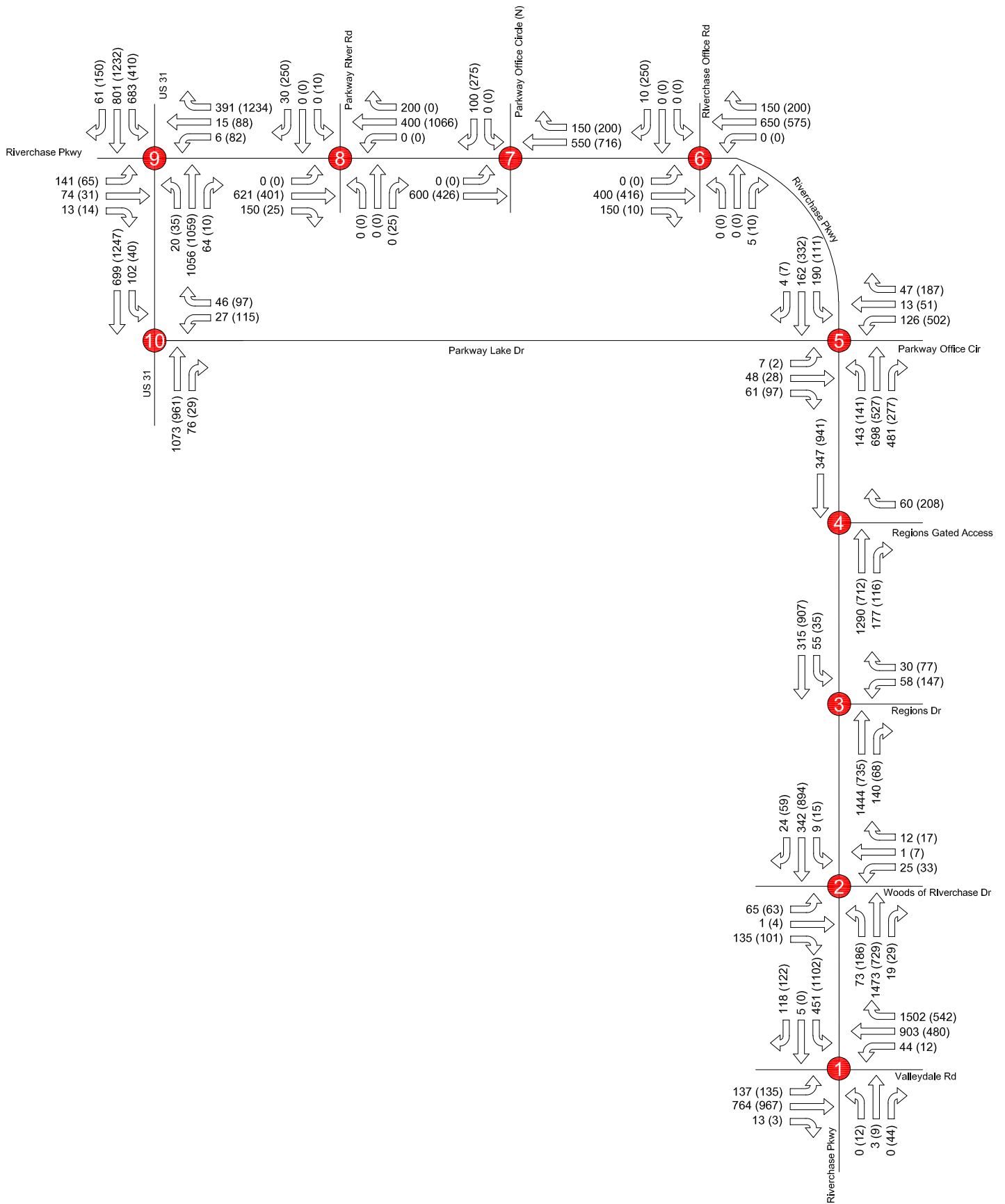
AM ## PM (##)

**LEGEND**

- Peak Hour Traffic
- Study Intersection

Scale: Not to Scale  
Date: OCT 2023

North



AM ## PM (##)

**LEGEND**

- ← Peak Hour Traffic
- Study Intersection

Scale: Not to Scale  
 Date: OCT 2023  
  
 North

Lanes, Volumes, Timings  
1: Valleydale Rd & Riverchase Pkwy

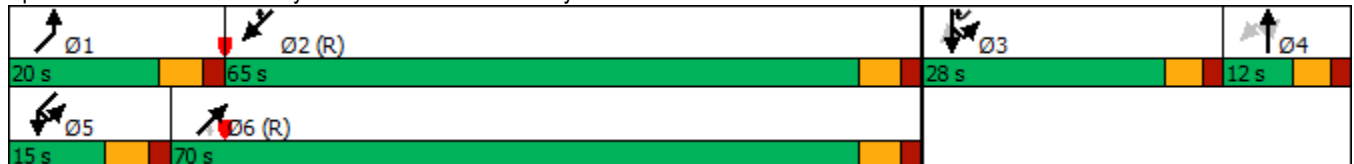
Existing AM  
10/23/2023

	↑	↙	↓	↘	↗	↖	↘	↙	↗	↑
Lane Group	NBT	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↖	↙↘	↖	↗	↘	↖↗↘	↗	↘	↖↗	↙↘
Traffic Volume (vph)	1	306	3	76	87	749	13	37	885	1242
Future Volume (vph)	1	306	3	76	87	749	13	37	885	1242
Turn Type	NA	Split	NA	Perm	Prot	NA	Perm	Prot	NA	pt+ov
Protected Phases	4	3	3		1	6		5	2	2 3
Permitted Phases				3			6			
Detector Phase	4	3	3	3	1	6	6	5	2	2 3
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	10.0	20.0	20.0	20.0	10.0	26.0	26.0	12.0	26.0	
Total Split (s)	12.0	28.0	28.0	28.0	20.0	70.0	70.0	15.0	65.0	
Total Split (%)	9.6%	22.4%	22.4%	22.4%	16.0%	56.0%	56.0%	12.0%	52.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.5	5.5	5.5	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min	

Intersection Summary





























Cycle Length: 125  
 Actuated Cycle Length: 125  
 Offset: 110 (88%), Referenced to phase 2:SWT and 6:NET, Start of Green  
 Natural Cycle: 70  
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Valleydale Rd & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
1: Valleydale Rd & Riverchase Pkwy

Existing AM  
10/23/2023

													
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWU	SWL	SWT	
Lane Configurations				  				  			 	 	
Traffic Volume (vph)	0	1	0	306	3	76	87	749	13	6	37	885	
Future Volume (vph)	0	1	0	306	3	76	87	749	13	6	37	885	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.5		5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00		0.91	0.91	1.00	1.00	0.91	1.00		1.00	0.95	
Frt		1.00		1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)		1863		3221	1616	1583	1770	5085	1583		1770	3539	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (perm)		1863		3221	1616	1583	1770	5085	1583		1770	3539	
Peak-hour factor, PHF	0.25	0.25	0.25	0.88	0.88	0.88	0.87	0.87	0.87	0.92	0.92	0.92	
Adj. Flow (vph)	0	4	0	348	3	86	100	861	15	7	40	962	
RTOR Reduction (vph)	0	0	0	0	0	68	0	0	7	0	0	0	
Lane Group Flow (vph)	0	4	0	233	118	18	100	861	8	0	47	962	
Turn Type		NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	
Protected Phases		4		3	3		1	6		5	5	2	
Permitted Phases	4		4			3			6				
Actuated Green, G (s)		1.3		26.6	26.6	26.6	12.5	66.5	66.5		7.6	61.6	
Effective Green, g (s)		1.3		26.6	26.6	26.6	12.5	66.5	66.5		7.6	61.6	
Actuated g/C Ratio		0.01		0.21	0.21	0.21	0.10	0.53	0.53		0.06	0.49	
Clearance Time (s)		5.5		5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0		4.0	4.0	4.0	4.0	3.0	3.0		4.0	3.0	
Lane Grp Cap (vph)		19		685	343	336	177	2705	842		107	1744	
v/s Ratio Prot		c0.00		0.07	0.07		c0.06	c0.17			0.03	c0.27	
v/s Ratio Perm						0.01			0.01				
v/c Ratio		0.21		0.34	0.34	0.05	0.56	0.32	0.01		0.44	0.55	
Uniform Delay, d1		61.3		41.8	41.8	39.2	53.7	16.5	13.8		56.6	22.1	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		7.4		0.4	0.8	0.1	4.9	0.3	0.0		3.9	1.3	
Delay (s)		68.8		42.2	42.6	39.3	58.6	16.8	13.8		60.5	23.3	
Level of Service		E		D	D	D	E	B	B		E	C	
Approach Delay (s)		68.8			41.7			21.0				14.4	
Approach LOS		E			D			C				B	
<b>Intersection Summary</b>													
HCM 2000 Control Delay			19.4		HCM 2000 Level of Service					B			
HCM 2000 Volume to Capacity ratio			0.55										
Actuated Cycle Length (s)			125.0		Sum of lost time (s)					23.0			
Intersection Capacity Utilization			66.2%		ICU Level of Service					C			
Analysis Period (min)			15										

c Critical Lane Group



Movement	SWR
Lane Configurations	TT
Traffic Volume (vph)	1242
Future Volume (vph)	1242
Ideal Flow (vphpl)	1900
Total Lost time (s)	6.0
Lane Util. Factor	0.88
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	2787
Flt Permitted	1.00
Satd. Flow (perm)	2787
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	1350
RTOR Reduction (vph)	266
Lane Group Flow (vph)	1084
Turn Type	pt+ov
Protected Phases	2 3
Permitted Phases	
Actuated Green, G (s)	94.2
Effective Green, g (s)	94.2
Actuated g/C Ratio	0.75
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	2100
v/s Ratio Prot	c0.39
v/s Ratio Perm	
v/c Ratio	0.52
Uniform Delay, d1	6.2
Progression Factor	1.00
Incremental Delay, d2	0.3
Delay (s)	6.5
Level of Service	A
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Lanes, Volumes, Timings  
2: Riverchase Pkwy & Woods of Riverchase Dr

Existing AM  
10/23/2023

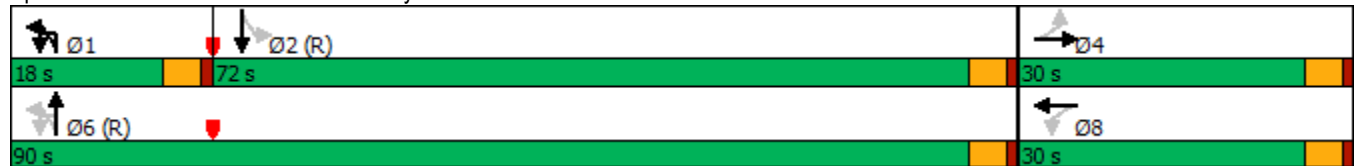


Lane Group	EBL	EBT	NBU	NBL	NBT	SBT	Ø8
Lane Configurations							
Traffic Volume (vph)	64	0	12	60	1088	182	
Future Volume (vph)	64	0	12	60	1088	182	
Turn Type	Perm	NA	pm+pt	pm+pt	NA	NA	
Protected Phases		4	1	1	6	2	8
Permitted Phases	4		6	6			
Detector Phase	4	4	1	1	6	2	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	10.0	10.0	10.0
Minimum Split (s)	9.0	9.0	9.0	9.0	20.0	20.0	15.0
Total Split (s)	30.0	30.0	18.0	18.0	90.0	72.0	30.0
Total Split (%)	25.0%	25.0%	15.0%	15.0%	75.0%	60.0%	25%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	
Lead/Lag			Lead	Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	C-Min	C-Min	None

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection  
 Natural Cycle: 45  
 Control Type: Actuated-Coordinated

Splits and Phases: 2: Riverchase Pkwy & Woods of Riverchase Dr





HCM Signalized Intersection Capacity Analysis  
2: Riverchase Pkwy & Woods of Riverchase Dr

Existing AM  
10/23/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	64	0	132	0	0	0	12	60	1088	0	0	182
Future Volume (vph)	64	0	132	0	0	0	12	60	1088	0	0	182
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5						4.5	4.5			4.5
Lane Util. Factor	1.00	1.00						1.00	0.95			0.95
Frt	1.00	0.85						1.00	1.00			0.98
Flt Protected	0.95	1.00						0.95	1.00			1.00
Satd. Flow (prot)	1770	1583						1770	3539			3477
Flt Permitted	0.76	1.00						0.55	1.00			1.00
Satd. Flow (perm)	1410	1583						1026	3539			3477
Peak-hour factor, PHF	0.78	0.78	0.78	0.92	0.92	0.92	0.88	0.88	0.88	0.88	0.73	0.73
Adj. Flow (vph)	82	0	169	0	0	0	14	68	1236	0	0	249
RTOR Reduction (vph)	0	151	0	0	0	0	0	0	0	0	0	5
Lane Group Flow (vph)	82	18	0	0	0	0	0	82	1236	0	0	277
Turn Type	Perm	NA					pm+pt	pm+pt	NA			NA
Protected Phases		4			8		1	1	6			2
Permitted Phases	4			8			6	6			2	
Actuated Green, G (s)	12.9	12.9						98.1	98.1			88.1
Effective Green, g (s)	12.9	12.9						98.1	98.1			88.1
Actuated g/C Ratio	0.11	0.11						0.82	0.82			0.73
Clearance Time (s)	4.5	4.5						4.5	4.5			4.5
Vehicle Extension (s)	3.0	3.0						3.0	5.0			5.0
Lane Grp Cap (vph)	151	170						872	2893			2552
v/s Ratio Prot		0.01						0.00	c0.35			0.08
v/s Ratio Perm	c0.06							0.07				
v/c Ratio	0.54	0.11						0.09	0.43			0.11
Uniform Delay, d1	50.8	48.3						2.2	3.1			4.6
Progression Factor	1.00	1.00						1.00	1.00			1.17
Incremental Delay, d2	3.9	0.3						0.0	0.5			0.1
Delay (s)	54.7	48.6						2.2	3.5			5.5
Level of Service	D	D						A	A			A
Approach Delay (s)		50.6			0.0				3.5			5.5
Approach LOS		D			A				A			A

Intersection Summary

HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR
Lane Configurations	
Traffic Volume (vph)	24
Future Volume (vph)	24
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.73
Adj. Flow (vph)	33
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Lanes, Volumes, Timings  
3: Riverchase Pkwy & Regions Dr

Existing AM  
10/23/2023

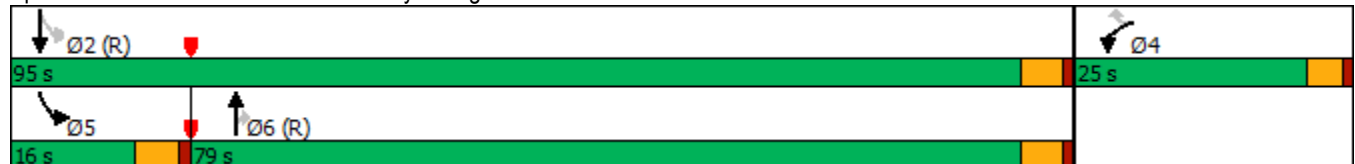


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↑↑	↗	↘	↑↑
Traffic Volume (vph)	2	2	1086	99	35	199
Future Volume (vph)	2	2	1086	99	35	199
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	15.0	15.0	25.0	25.0	4.0	25.0
Minimum Split (s)	20.0	20.0	30.0	30.0	9.0	30.0
Total Split (s)	25.0	25.0	79.0	79.0	16.0	95.0
Total Split (%)	20.8%	20.8%	65.8%	65.8%	13.3%	79.2%
Yellow Time (s)	3.2	3.2	3.9	3.9	4.0	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	4.2	4.9	4.9	5.0	4.9
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	
Recall Mode	None	None	C-Min	C-Min	None	C-Min

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 100 (83%), Referenced to phase 2:SBTL and 6:NBT, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated

Splits and Phases: 3: Riverchase Pkwy & Regions Dr



# HCM Signalized Intersection Capacity Analysis

## 3: Riverchase Pkwy & Regions Dr

Existing AM  
10/23/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	2	2	1086	99	35	199
Future Volume (vph)	2	2	1086	99	35	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.2	4.9	4.9	5.0	4.9
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.20	1.00
Satd. Flow (perm)	1770	1583	3539	1583	372	3539
Peak-hour factor, PHF	0.50	0.50	0.88	0.88	0.84	0.84
Adj. Flow (vph)	4	4	1234	112	42	237
RTOR Reduction (vph)	0	4	0	11	0	0
Lane Group Flow (vph)	4	0	1234	102	42	237
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Actuated Green, G (s)	3.0	3.0	98.3	98.3	107.9	107.9
Effective Green, g (s)	3.0	3.0	98.3	98.3	107.9	107.9
Actuated g/C Ratio	0.02	0.02	0.82	0.82	0.90	0.90
Clearance Time (s)	4.2	4.2	4.9	4.9	5.0	4.9
Vehicle Extension (s)	3.0	3.0	6.0	6.0	3.0	6.0
Lane Grp Cap (vph)	44	39	2899	1296	388	3182
v/s Ratio Prot	c0.00		c0.35		c0.00	0.07
v/s Ratio Perm		0.00		0.06	0.09	
v/c Ratio	0.09	0.00	0.43	0.08	0.11	0.07
Uniform Delay, d1	57.2	57.0	3.0	2.1	1.3	0.7
Progression Factor	1.00	1.00	0.67	0.56	1.65	1.65
Incremental Delay, d2	0.9	0.0	0.4	0.1	0.1	0.0
Delay (s)	58.1	57.1	2.4	1.3	2.3	1.1
Level of Service	E	E	A	A	A	A
Approach Delay (s)	57.6		2.3			1.3
Approach LOS	E		A			A

### Intersection Summary

HCM 2000 Control Delay	2.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.1
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
4: Riverchase Pkwy & Regions Gated Access

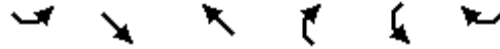
Existing AM  
10/23/2023



Lane Group	SET	NWT
Lane Configurations	↑↑	↑↓
Traffic Volume (vph)	211	1081
Future Volume (vph)	211	1081
Sign Control	Free	Free
<b>Intersection Summary</b>		
Control Type: Unsignalized		

HCM Unsignalized Intersection Capacity Analysis  
4: Riverchase Pkwy & Regions Gated Access

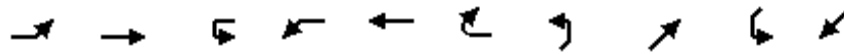
Existing AM  
10/23/2023



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑↑	↑↑			↗
Traffic Volume (veh/h)	0	211	1081	0	0	0
Future Volume (Veh/h)	0	211	1081	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	229	1175	0	0	0
<b>Pedestrians</b>						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		586	794			
pX, platoon unblocked	0.91				0.91	0.91
vC, conflicting volume	1175				1290	588
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	990				1116	343
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	630				183	593
<b>Direction, Lane #</b>	<b>SE 1</b>	<b>SE 2</b>	<b>NW 1</b>	<b>NW 2</b>	<b>SW 1</b>	
Volume Total	114	114	783	392	0	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	0	
cSH	1700	1700	1700	1700	1700	
Volume to Capacity	0.07	0.07	0.46	0.23	0.00	
Queue Length 95th (ft)	0	0	0	0	0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS						A
Approach Delay (s)	0.0		0.0		0.0	
Approach LOS						A
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			33.2%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings  
 5: Parkway Lake Dr/Parkway Office Cir S & Riverchase Pkwy

Existing AM  
 10/23/2023

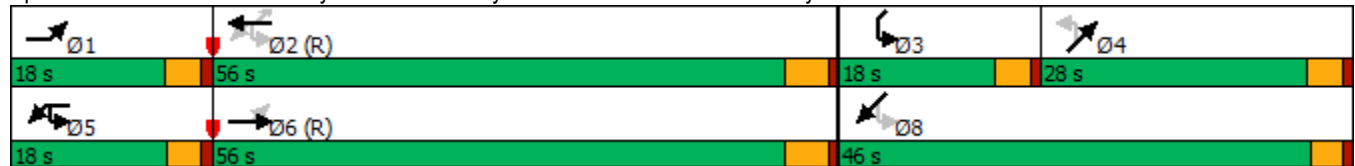


Lane Group	EBL	EBT	WBU	WBL	WBT	WBR	NEL	NET	SWL	SWT
Lane Configurations										
Traffic Volume (vph)	10	132	10	111	606	354	7	30	23	1
Future Volume (vph)	10	132	10	111	606	354	7	30	23	1
Turn Type	pm+pt	NA	pm+pt	pm+pt	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases	1	6	5	5	2			4	3	8
Permitted Phases	6		2	2		2	4		8	
Detector Phase	1	6	5	5	2	2	4	4	3	8
Switch Phase										
Minimum Initial (s)	4.0	15.0	4.0	4.0	15.0	15.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	30.0	9.0	9.0	30.0	30.0	12.0	12.0	9.0	12.0
Total Split (s)	18.0	56.0	18.0	18.0	56.0	56.0	28.0	28.0	18.0	46.0
Total Split (%)	15.0%	46.7%	15.0%	15.0%	46.7%	46.7%	23.3%	23.3%	15.0%	38.3%
Yellow Time (s)	3.2	3.9	3.0	3.0	3.9	3.9	3.2	3.2	3.2	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.2	4.9		4.0	4.9	4.9		4.2	4.2	4.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Min	None	None	C-Min	C-Min	None	None	None	None

Intersection Summary

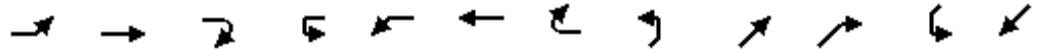
Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 49 (41%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated

Splits and Phases: 5: Parkway Lake Dr/Parkway Office Cir S & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
 5: Parkway Lake Dr/Parkway Office Cir S & Riverchase Pkwy

Existing AM  
 10/23/2023



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT
Lane Configurations												
Traffic Volume (vph)	10	132	4	10	111	606	354	7	30	58	23	1
Future Volume (vph)	10	132	4	10	111	606	354	7	30	58	23	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9			4.0	4.9	4.9		4.2		4.2	4.0
Lane Util. Factor	1.00	0.95			1.00	0.95	1.00		1.00		1.00	1.00
Frt	1.00	1.00			1.00	1.00	0.85		0.92		1.00	0.89
Flt Protected	0.95	1.00			0.95	1.00	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1770	3523			1770	3539	1583		1703		1770	1653
Flt Permitted	0.39	1.00			0.62	1.00	1.00		0.98		0.29	1.00
Satd. Flow (perm)	726	3523			1154	3539	1583		1674		536	1653
Peak-hour factor, PHF	0.85	0.85	0.85	0.88	0.88	0.88	0.88	0.85	0.85	0.85	0.64	0.64
Adj. Flow (vph)	12	155	5	11	126	689	402	8	35	68	36	2
RTOR Reduction (vph)	0	1	0	0	0	0	99	0	54	0	0	5
Lane Group Flow (vph)	12	159	0	0	137	689	303	0	57	0	36	3
Turn Type	pm+pt	NA		pm+pt	pm+pt	NA	Perm	Perm	NA		pm+pt	NA
Protected Phases	1	6		5	5	2			4		3	8
Permitted Phases	6			2	2		2	4			8	
Actuated Green, G (s)	82.7	80.3			92.2	85.6	85.6		9.5		18.9	18.9
Effective Green, g (s)	82.7	80.3			92.2	85.6	85.6		9.5		18.9	18.9
Actuated g/C Ratio	0.69	0.67			0.77	0.71	0.71		0.08		0.16	0.16
Clearance Time (s)	4.2	4.9			4.0	4.9	4.9		4.2		4.2	4.0
Vehicle Extension (s)	3.0	6.0			3.0	6.0	6.0		3.0		3.0	3.0
Lane Grp Cap (vph)	521	2357			927	2524	1129		132		135	260
v/s Ratio Prot	0.00	0.05			c0.01	c0.19					c0.01	0.00
v/s Ratio Perm	0.02				0.10		0.19		c0.03		0.03	
v/c Ratio	0.02	0.07			0.15	0.27	0.27		0.43		0.27	0.01
Uniform Delay, d1	5.8	6.9			3.6	6.1	6.1		52.7		43.9	42.7
Progression Factor	0.96	0.86			0.98	1.21	2.72		1.00		1.00	1.00
Incremental Delay, d2	0.0	0.1			0.1	0.3	0.5		2.2		1.1	0.0
Delay (s)	5.6	6.0			3.6	7.6	17.1		54.9		45.0	42.7
Level of Service	A	A			A	A	B		D		D	D
Approach Delay (s)		5.9				10.3			54.9			44.5
Approach LOS		A				B			D			D

Intersection Summary

HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

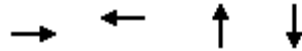




Movement	SWR
Lane Configurations	
Traffic Volume (vph)	4
Future Volume (vph)	4
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.64
Adj. Flow (vph)	6
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Lanes, Volumes, Timings  
6: Riverchase Pkwy & Riverchase Office Rd

Existing AM  
10/23/2023

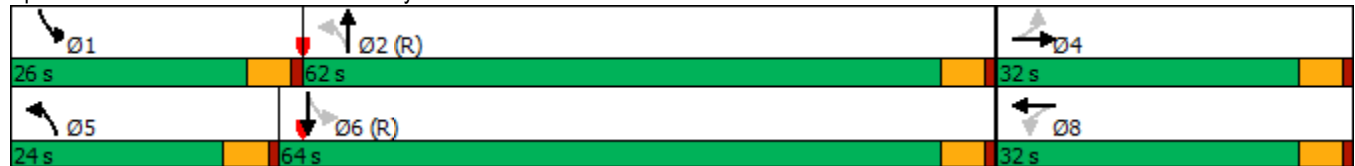


Lane Group	EBT	WBT	NBT	SBT	Ø1	Ø5
Lane Configurations	↔	↔	↑↔	↑↔		
Traffic Volume (vph)	0	0	475	250		
Future Volume (vph)	0	0	475	250		
Turn Type	NA	NA	NA	NA		
Protected Phases	4	8	2	6	1	5
Permitted Phases						
Detector Phase	4	8	2	6		
Switch Phase						
Minimum Initial (s)	4.0	4.0	20.0	20.0	4.0	4.0
Minimum Split (s)	20.0	20.0	25.0	25.0	9.0	9.0
Total Split (s)	32.0	32.0	62.0	64.0	26.0	24.0
Total Split (%)	26.7%	26.7%	51.7%	53.3%	22%	20%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		
Total Lost Time (s)	5.0	5.0	5.0	5.0		
Lead/Lag			Lag	Lag	Lead	Lead
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	None	None

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 78 (65%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated

Splits and Phases: 6: Riverchase Pkwy & Riverchase Office Rd



HCM Signalized Intersection Capacity Analysis  
6: Riverchase Pkwy & Riverchase Office Rd

Existing AM  
10/23/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕↔		↗	↕↔	
Traffic Volume (vph)	0	0	2	0	0	10	0	475	125	0	250	150
Future Volume (vph)	0	0	2	0	0	10	0	475	125	0	250	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.86			0.86			0.97			0.94	
Flt Protected		1.00			1.00			1.00			1.00	
Satd. Flow (prot)		1611			1611			3428			3340	
Flt Permitted		1.00			1.00			1.00			1.00	
Satd. Flow (perm)		1611			1611			3428			3340	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2	0	0	11	0	516	136	0	272	163
RTOR Reduction (vph)	0	2	0	0	11	0	0	4	0	0	14	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	648	0	0	421	0
Turn Type		NA			NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		1.3			1.3			108.7			108.7	
Effective Green, g (s)		1.3			1.3			108.7			108.7	
Actuated g/C Ratio		0.01			0.01			0.91			0.91	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		4.0			4.0			5.0			5.0	
Lane Grp Cap (vph)		17			17			3105			3025	
v/s Ratio Prot		0.00			c0.00			c0.19			0.13	
v/s Ratio Perm												
v/c Ratio		0.00			0.01			0.21			0.14	
Uniform Delay, d1		58.7			58.7			0.7			0.6	
Progression Factor		1.00			1.00			0.92			1.75	
Incremental Delay, d2		0.0			0.2			0.1			0.1	
Delay (s)		58.7			58.9			0.8			1.2	
Level of Service		E			E			A			A	
Approach Delay (s)		58.7			58.9			0.8			1.2	
Approach LOS		E			E			A			A	

Intersection Summary

HCM 2000 Control Delay	1.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
 7: Riverchase Pkwy & Parkway Office Cir N

Existing AM  
 10/23/2023

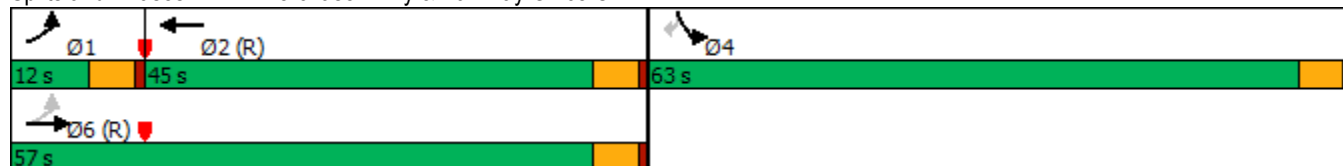


Lane Group	EBT	WBT	SBR	Ø1
Lane Configurations	↑↑	↑↓	↗	
Traffic Volume (vph)	475	250	100	
Future Volume (vph)	475	250	100	
Turn Type	NA	NA	Perm	
Protected Phases	6	2		1
Permitted Phases				4
Detector Phase	6	2	4	
Switch Phase				
Minimum Initial (s)	20.0	20.0	4.0	4.0
Minimum Split (s)	25.0	25.0	20.0	9.0
Total Split (s)	57.0	45.0	63.0	12.0
Total Split (%)	47.5%	37.5%	52.5%	10%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	
Lead/Lag		Lag		Lead
Lead-Lag Optimize?				
Recall Mode	C-Min	C-Min	None	None

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 50 (42%), Referenced to phase 2:WBT and 6:EBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated

Splits and Phases: 7: Riverchase Pkwy & Parkway Office Cir N



HCM Signalized Intersection Capacity Analysis  
7: Riverchase Pkwy & Parkway Office Cir N

Existing AM  
10/23/2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶		↶	↷
Traffic Volume (vph)	0	475	250	250	0	100
Future Volume (vph)	0	475	250	250	0	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0			5.0
Lane Util. Factor		0.95	0.95			1.00
Frt		1.00	0.93			0.85
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		3539	3274			1583
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		3539	3274			1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	516	272	272	0	109
RTOR Reduction (vph)	0	0	29	0	0	104
Lane Group Flow (vph)	0	516	515	0	0	5
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	1	6	2		4	
Permitted Phases	6					4
Actuated Green, G (s)		104.5	104.5			5.5
Effective Green, g (s)		104.5	104.5			5.5
Actuated g/C Ratio		0.87	0.87			0.05
Clearance Time (s)		5.0	5.0			5.0
Vehicle Extension (s)		5.0	5.0			3.0
Lane Grp Cap (vph)		3081	2851			72
v/s Ratio Prot		0.15	c0.16			
v/s Ratio Perm						c0.00
v/c Ratio		0.17	0.18			0.07
Uniform Delay, d1		1.2	1.2			54.8
Progression Factor		0.39	2.95			1.00
Incremental Delay, d2		0.1	0.1			0.4
Delay (s)		0.6	3.6			55.2
Level of Service		A	A			E
Approach Delay (s)		0.6	3.6		55.2	
Approach LOS		A	A		E	

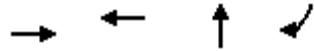
Intersection Summary

HCM 2000 Control Delay	7.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.18		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	31.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
 8: Parkway River Rd & Riverchase Pkwy

Existing AM  
 10/23/2023

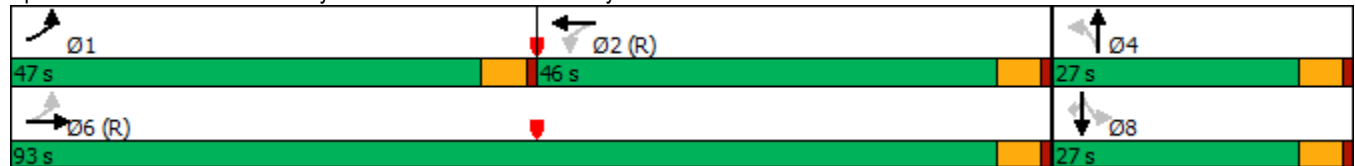


Lane Group	EBT	WBT	NBT	SBR	Ø1
Lane Configurations	↑↑	↑↑	↑	↑	
Traffic Volume (vph)	500	225	0	30	
Future Volume (vph)	500	225	0	30	
Turn Type	NA	NA	NA	Perm	
Protected Phases	6	2	4		1
Permitted Phases					8
Detector Phase	6	2	4	8	
Switch Phase					
Minimum Initial (s)	20.0	20.0	4.0	4.0	4.0
Minimum Split (s)	25.0	25.0	20.0	20.0	9.0
Total Split (s)	93.0	46.0	27.0	27.0	47.0
Total Split (%)	77.5%	38.3%	22.5%	22.5%	39%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	
Lead/Lag		Lag			Lead
Lead-Lag Optimize?					
Recall Mode	C-Min	C-Min	None	None	None

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 31 (26%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated

Splits and Phases: 8: Parkway River Rd & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
8: Parkway River Rd & Riverchase Pkwy

Existing AM  
10/23/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↔			↕			↖	↗
Traffic Volume (vph)	0	500	100	0	225	75	0	0	25	0	0	30
Future Volume (vph)	0	500	100	0	225	75	0	0	25	0	0	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				5.0
Lane Util. Factor		0.95			0.95			1.00				1.00
Frt		0.97			0.96			0.86				0.85
Flt Protected		1.00			1.00			1.00				1.00
Satd. Flow (prot)		3450			3406			1611				1583
Flt Permitted		1.00			1.00			1.00				1.00
Satd. Flow (perm)		3450			3406			1611				1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	543	109	0	245	82	0	0	27	0	0	33
RTOR Reduction (vph)	0	6	0	0	5	0	0	26	0	0	0	32
Lane Group Flow (vph)	0	646	0	0	322	0	0	1	0	0	0	1
Turn Type	pm+pt	NA			NA			NA				Perm
Protected Phases	1	6			2			4				8
Permitted Phases	6			2			4			8		8
Actuated Green, G (s)		106.7			106.7			3.3				3.3
Effective Green, g (s)		106.7			106.7			3.3				3.3
Actuated g/C Ratio		0.89			0.89			0.03				0.03
Clearance Time (s)		5.0			5.0			5.0				5.0
Vehicle Extension (s)		5.0			5.0			3.0				3.0
Lane Grp Cap (vph)		3067			3028			44				43
v/s Ratio Prot		c0.19			0.09			0.00				
v/s Ratio Perm												c0.00
v/c Ratio		0.21			0.11			0.02				0.02
Uniform Delay, d1		0.9			0.8			56.8				56.8
Progression Factor		1.00			0.25			1.00				1.00
Incremental Delay, d2		0.2			0.1			0.2				0.2
Delay (s)		1.1			0.3			56.9				57.0
Level of Service		A			A			E				E
Approach Delay (s)		1.1			0.3			56.9			57.0	
Approach LOS		A			A			E			E	

Intersection Summary

HCM 2000 Control Delay	4.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	35.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
9: US-31 & Riverchase Pkwy

Existing AM  
10/23/2023



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↗↖	↖	↗↗	↗	↗↖	↗↗	↗
Traffic Volume (vph)	138	73	6	15	262	20	1007	63	466	752	60
Future Volume (vph)	138	73	6	15	262	20	1007	63	466	752	60
Turn Type	Prot	NA	Prot	NA	pt+ov	pm+pt	NA	Perm	Prot	NA	Free
Protected Phases	3	8	7	4	4 5	1	6		5	2	
Permitted Phases						6		6			Free
Detector Phase	3	8	7	4	4 5	1	6	6	5	2	
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	9.0	20.0	9.0	20.0		9.0	25.0	25.0	9.0	25.0	
Total Split (s)	25.0	20.0	25.0	20.0		12.0	85.0	85.0	30.0	103.0	
Total Split (%)	15.6%	12.5%	15.6%	12.5%		7.5%	53.1%	53.1%	18.8%	64.4%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.5	0.5	1.5	0.5		0.5	1.0	1.0	0.5	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	4.0	5.0	4.0		4.0	5.0	5.0	4.0	5.0	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	C-Min	C-Min	None	C-Min	

Intersection Summary

Cycle Length: 160  
 Actuated Cycle Length: 160  
 Offset: 30 (19%), Referenced to phase 2:SBT and 6:NBTL, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated

Splits and Phases: 9: US-31 & Riverchase Pkwy





HCM Signalized Intersection Capacity Analysis  
 9: US-31 & Riverchase Pkwy

Existing AM  
 10/23/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	138	73	13	6	15	262	20	1007	63	466	752	60
Future Volume (vph)	138	73	13	6	15	262	20	1007	63	466	752	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.0		5.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	0.88	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1821		1770	1863	2787	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.32	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1821		1770	1863	2787	598	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.85	0.85	0.85	0.93	0.93	0.93	0.92	0.92	0.92	0.85	0.85	0.85
Adj. Flow (vph)	162	86	15	6	16	282	22	1095	68	548	885	71
RTOR Reduction (vph)	0	3	0	0	0	104	0	0	35	0	0	0
Lane Group Flow (vph)	162	98	0	6	16	178	22	1095	33	548	885	71
Turn Type	Prot	NA		Prot	NA	pt+ov	pm+pt	NA	Perm	Prot	NA	Free
Protected Phases	3	8		7	4	4	5	1	6		5	2
Permitted Phases								6		6		Free
Actuated Green, G (s)	18.8	32.7		1.5	15.4	50.2	80.9	77.0	77.0	30.8	103.9	160.0
Effective Green, g (s)	18.8	32.7		1.5	15.4	50.2	80.9	77.0	77.0	30.8	103.9	160.0
Actuated g/C Ratio	0.12	0.20		0.01	0.10	0.31	0.51	0.48	0.48	0.19	0.65	1.00
Clearance Time (s)	5.0	4.0		5.0	4.0		4.0	5.0	5.0	4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	
Lane Grp Cap (vph)	207	372		16	179	874	330	1703	761	660	2298	1583
v/s Ratio Prot	c0.09	c0.05		0.00	0.01	0.06	0.00	c0.31		c0.16	0.25	
v/s Ratio Perm							0.03		0.02			0.04
v/c Ratio	0.78	0.26		0.38	0.09	0.20	0.07	0.64	0.04	0.83	0.39	0.04
Uniform Delay, d1	68.6	53.5		78.8	65.9	40.2	19.8	31.2	22.0	62.1	13.1	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	17.3	0.4		14.1	0.2	0.1	0.1	1.9	0.1	8.7	0.5	0.1
Delay (s)	86.0	53.9		92.9	66.1	40.4	19.9	33.1	22.1	70.8	13.6	0.1
Level of Service	F	D		F	E	D	B	C	C	E	B	A
Approach Delay (s)		73.6			42.8			32.2			33.8	
Approach LOS		E			D			C			C	

Intersection Summary

HCM 2000 Control Delay	37.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
 10: US-31 & Parkway Lake Dr

Existing AM  
 10/23/2023

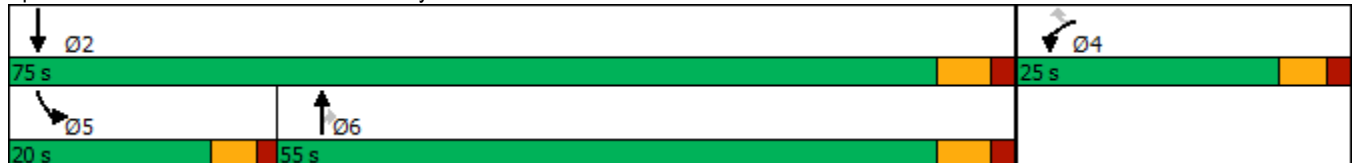


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↙	↙	↕↕	↘	↙↙	↕↕
Traffic Volume (vph)	27	46	1073	76	102	699
Future Volume (vph)	27	46	1073	76	102	699
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6		
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	20.0	20.0	4.0	20.0
Minimum Split (s)	10.0	10.0	26.0	26.0	9.5	26.0
Total Split (s)	25.0	25.0	55.0	55.0	20.0	75.0
Total Split (%)	25.0%	25.0%	55.0%	55.0%	20.0%	75.0%
Yellow Time (s)	3.5	3.5	4.0	4.0	3.5	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	Min

Intersection Summary

Cycle Length: 100  
 Actuated Cycle Length: 71.7  
 Natural Cycle: 50  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 10: US-31 & Parkway Lake Dr



HCM Signalized Intersection Capacity Analysis  
 10: US-31 & Parkway Lake Dr

Existing AM  
 10/23/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	27	46	1073	76	102	699
Future Volume (vph)	27	46	1073	76	102	699
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	3539	1583	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	3539	1583	3433	3539
Peak-hour factor, PHF	0.79	0.79	0.92	0.92	0.87	0.87
Adj. Flow (vph)	34	58	1166	83	117	803
RTOR Reduction (vph)	0	54	0	28	0	0
Lane Group Flow (vph)	34	4	1166	55	117	803
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6		
Actuated Green, G (s)	5.7	5.7	44.9	44.9	7.0	56.9
Effective Green, g (s)	5.7	5.7	44.9	44.9	7.0	56.9
Actuated g/C Ratio	0.08	0.08	0.61	0.61	0.09	0.77
Clearance Time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Vehicle Extension (s)	4.0	4.0	6.0	6.0	4.0	6.0
Lane Grp Cap (vph)	264	121	2144	959	324	2717
v/s Ratio Prot	c0.01		c0.33		0.03	c0.23
v/s Ratio Perm		0.00		0.03		
v/c Ratio	0.13	0.04	0.54	0.06	0.36	0.30
Uniform Delay, d1	31.9	31.7	8.6	6.0	31.5	2.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.2	0.6	0.1	0.9	0.2
Delay (s)	32.2	31.8	9.2	6.0	32.4	2.8
Level of Service	C	C	A	A	C	A
Approach Delay (s)	32.0		9.0			6.5
Approach LOS	C		A			A

Intersection Summary

HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	74.1	Sum of lost time (s)	16.5
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
1: Valleydale Rd & Riverchase Pkwy

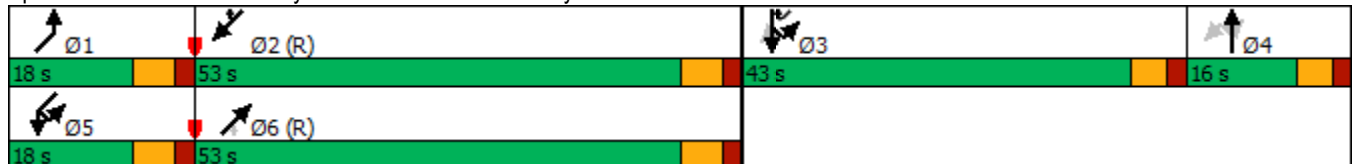
Existing PM  
10/23/2023

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	12	2	43	878	0	75	71	948	3	3	471	456
Future Volume (vph)	12	2	43	878	0	75	71	948	3	3	471	456
Turn Type	Perm	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	pt+ov
Protected Phases		4		3	3		1	6		5	2	2 3
Permitted Phases	4		4			3			6			
Detector Phase	4	4	4	3	3	3	1	6	6	5	2	2 3
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	10.0	10.0	10.0	20.0	20.0	20.0	10.0	26.0	26.0	12.0	26.0	
Total Split (s)	16.0	16.0	16.0	43.0	43.0	43.0	18.0	53.0	53.0	18.0	53.0	
Total Split (%)	12.3%	12.3%	12.3%	33.1%	33.1%	33.1%	13.8%	40.8%	40.8%	13.8%	40.8%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	

Intersection Summary



























Cycle Length: 130  
 Actuated Cycle Length: 130  
 Offset: 18 (14%), Referenced to phase 2:SWT and 6:NET, Start of Green  
 Natural Cycle: 70  
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Valleydale Rd & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
1: Valleydale Rd & Riverchase Pkwy

Existing PM  
10/23/2023

													
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWU	SWL	SWT	
Lane Configurations				  				  					
Traffic Volume (vph)	12	2	43	878	0	75	71	948	3	9	3	471	
Future Volume (vph)	12	2	43	878	0	75	71	948	3	9	3	471	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00	0.91	0.91	1.00	1.00	0.91	1.00		1.00	0.95	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	
Flt Protected		0.96	1.00	0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)		1788	1583	3221	1610	1583	1770	5085	1583		1770	3539	
Flt Permitted		0.55	1.00	0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (perm)		1029	1583	3221	1610	1583	1770	5085	1583		1770	3539	
Peak-hour factor, PHF	0.57	0.57	0.57	0.93	0.93	0.93	0.84	0.84	0.84	0.97	0.97	0.97	
Adj. Flow (vph)	21	4	75	944	0	81	85	1129	4	9	3	486	
RTOR Reduction (vph)	0	0	71	0	0	56	0	0	2	0	0	0	
Lane Group Flow (vph)	0	25	4	632	312	25	85	1129	2	0	12	486	
Turn Type	Perm	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	
Protected Phases		4		3	3		1	6		5	5	2	
Permitted Phases	4		4			3			6				
Actuated Green, G (s)		7.7	7.7	40.5	40.5	40.5	11.1	55.4	55.4		3.4	47.7	
Effective Green, g (s)		7.7	7.7	40.5	40.5	40.5	11.1	55.4	55.4		3.4	47.7	
Actuated g/C Ratio		0.06	0.06	0.31	0.31	0.31	0.09	0.43	0.43		0.03	0.37	
Clearance Time (s)		5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0		4.0	3.0	
Lane Grp Cap (vph)		60	93	1003	501	493	151	2166	674		46	1298	
v/s Ratio Prot				c0.20	0.19		c0.05	c0.22			0.01	0.14	
v/s Ratio Perm		c0.02	0.00			0.02			0.00				
v/c Ratio		0.42	0.05	0.63	0.62	0.05	0.56	0.52	0.00		0.26	0.37	
Uniform Delay, d1		59.0	57.7	38.3	38.2	31.3	57.1	27.5	21.4		62.1	30.2	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		6.3	0.3	1.5	2.7	0.1	5.7	0.9	0.0		4.1	0.8	
Delay (s)		65.3	58.0	39.8	41.0	31.4	62.8	28.4	21.4		66.2	31.0	
Level of Service		E	E	D	D	C	E	C	C		E	C	
Approach Delay (s)		59.8			39.5			30.8				19.2	
Approach LOS		E			D			C				B	
<b>Intersection Summary</b>													
HCM 2000 Control Delay			31.0		HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.57										
Actuated Cycle Length (s)			130.0		Sum of lost time (s)				23.0				
Intersection Capacity Utilization			60.8%		ICU Level of Service				B				
Analysis Period (min)			15										

c Critical Lane Group



Movement	SWR
Lane Configurations	TT
Traffic Volume (vph)	456
Future Volume (vph)	456
Ideal Flow (vphpl)	1900
Total Lost time (s)	6.0
Lane Util. Factor	0.88
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	2787
Flt Permitted	1.00
Satd. Flow (perm)	2787
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	470
RTOR Reduction (vph)	129
Lane Group Flow (vph)	341
Turn Type	pt+ov
Protected Phases	2 3
Permitted Phases	
Actuated Green, G (s)	94.2
Effective Green, g (s)	94.2
Actuated g/C Ratio	0.72
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	2019
v/s Ratio Prot	0.12
v/s Ratio Perm	
v/c Ratio	0.17
Uniform Delay, d1	5.6
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	5.7
Level of Service	A
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Lanes, Volumes, Timings  
2: Riverchase Pkwy & Woods of Riverchase Dr

Existing PM  
10/23/2023

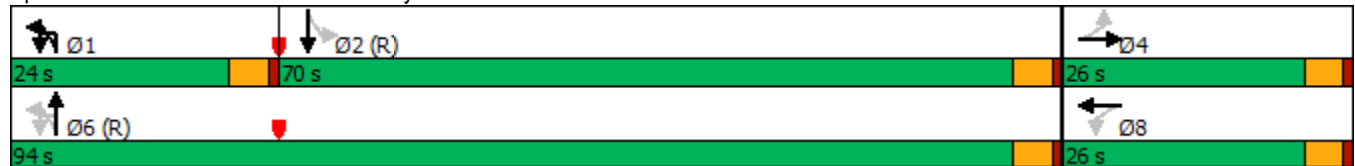


Lane Group	EBL	EBT	NBU	NBL	NBT	SBT	Ø8
Lane Configurations							
Traffic Volume (vph)	62	0	20	162	317	658	
Future Volume (vph)	62	0	20	162	317	658	
Turn Type	Perm	NA	pm+pt	pm+pt	NA	NA	
Protected Phases		4	1	1	6	2	8
Permitted Phases	4		6	6			
Detector Phase	4	4	1	1	6	2	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	10.0	10.0	10.0
Minimum Split (s)	9.0	9.0	9.0	9.0	20.0	20.0	15.0
Total Split (s)	26.0	26.0	24.0	24.0	94.0	70.0	26.0
Total Split (%)	21.7%	21.7%	20.0%	20.0%	78.3%	58.3%	22%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	
Lead/Lag			Lead	Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	C-Min	C-Min	None

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection  
 Natural Cycle: 45  
 Control Type: Actuated-Coordinated

Splits and Phases: 2: Riverchase Pkwy & Woods of Riverchase Dr



HCM Signalized Intersection Capacity Analysis  
2: Riverchase Pkwy & Woods of Riverchase Dr

Existing PM  
10/23/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	62	0	99	0	0	0	20	162	317	0	0	658
Future Volume (vph)	62	0	99	0	0	0	20	162	317	0	0	658
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5						4.5	4.5			4.5
Lane Util. Factor	1.00	1.00						1.00	0.95			0.95
Frt	1.00	0.85						1.00	1.00			0.99
Flt Protected	0.95	1.00						0.95	1.00			1.00
Satd. Flow (prot)	1770	1583						1770	3539			3496
Flt Permitted	0.76	1.00						0.31	1.00			1.00
Satd. Flow (perm)	1410	1583						578	3539			3496
Peak-hour factor, PHF	0.77	0.77	0.77	0.92	0.92	0.92	0.95	0.95	0.95	0.95	0.90	0.90
Adj. Flow (vph)	81	0	129	0	0	0	21	171	334	0	0	731
RTOR Reduction (vph)	0	115	0	0	0	0	0	0	0	0	0	3
Lane Group Flow (vph)	81	14	0	0	0	0	0	192	334	0	0	792
Turn Type	Perm	NA					pm+pt	pm+pt	NA			NA
Protected Phases		4			8		1	1	6			2
Permitted Phases	4			8			6	6			2	
Actuated Green, G (s)	12.8	12.8						98.2	98.2			85.4
Effective Green, g (s)	12.8	12.8						98.2	98.2			85.4
Actuated g/C Ratio	0.11	0.11						0.82	0.82			0.71
Clearance Time (s)	4.5	4.5						4.5	4.5			4.5
Vehicle Extension (s)	3.0	3.0						3.0	5.0			5.0
Lane Grp Cap (vph)	150	168						555	2896			2487
v/s Ratio Prot		0.01						c0.02	0.09			0.23
v/s Ratio Perm	c0.06							c0.26				
v/c Ratio	0.54	0.08						0.35	0.12			0.32
Uniform Delay, d1	50.8	48.3						2.9	2.2			6.4
Progression Factor	1.00	1.00						1.00	1.00			0.91
Incremental Delay, d2	3.9	0.2						0.4	0.1			0.3
Delay (s)	54.7	48.5						3.2	2.3			6.2
Level of Service	D	D						A	A			A
Approach Delay (s)		50.9			0.0				2.6			6.2
Approach LOS		D			A				A			A

Intersection Summary		
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.38	B
Actuated Cycle Length (s)	120.0	Sum of lost time (s)
Intersection Capacity Utilization	47.5%	13.5
Analysis Period (min)	15	ICU Level of Service
		A

c Critical Lane Group





Movement	SBR
Lane Configurations	
Traffic Volume (vph)	58
Future Volume (vph)	58
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.90
Adj. Flow (vph)	64
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Lanes, Volumes, Timings  
3: Riverchase Pkwy & Regions Dr

Existing PM  
10/23/2023

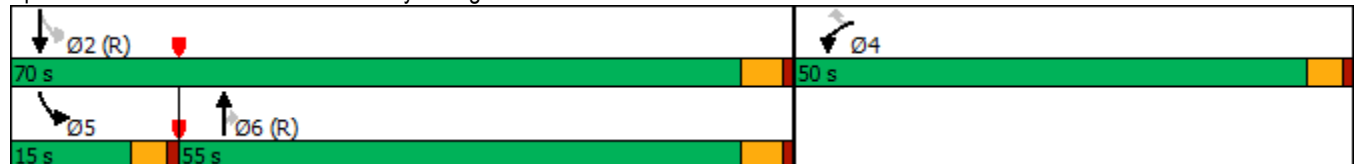


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↑↑	↗	↘	↑↑
Traffic Volume (vph)	75	41	384	1	2	641
Future Volume (vph)	75	41	384	1	2	641
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	2
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	15.0	15.0	25.0	25.0	1.0	25.0
Minimum Split (s)	20.0	20.0	30.0	30.0	5.2	30.0
Total Split (s)	50.0	50.0	55.0	55.0	15.0	70.0
Total Split (%)	41.7%	41.7%	45.8%	45.8%	12.5%	58.3%
Yellow Time (s)	3.2	3.2	3.9	3.9	3.2	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	None	C-Min

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 22 (18%), Referenced to phase 2:SBTL and 6:NBT, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated

Splits and Phases: 3: Riverchase Pkwy & Regions Dr



# HCM Signalized Intersection Capacity Analysis

## 3: Riverchase Pkwy & Regions Dr

Existing PM  
10/23/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↵	↵	↕↕	↵	↵	↕↕
Traffic Volume (vph)	75	41	384	1	2	641
Future Volume (vph)	75	41	384	1	2	641
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.48	1.00
Satd. Flow (perm)	1770	1583	3539	1583	895	3539
Peak-hour factor, PHF	0.73	0.73	0.90	0.90	0.85	0.85
Adj. Flow (vph)	103	56	427	1	2	754
RTOR Reduction (vph)	0	49	0	0	0	0
Lane Group Flow (vph)	103	7	427	1	2	754
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	2
Actuated Green, G (s)	15.4	15.4	90.2	90.2	95.5	95.5
Effective Green, g (s)	15.4	15.4	90.2	90.2	95.5	95.5
Actuated g/C Ratio	0.13	0.13	0.75	0.75	0.80	0.80
Clearance Time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Vehicle Extension (s)	3.0	3.0	6.0	6.0	3.0	6.0
Lane Grp Cap (vph)	227	203	2660	1189	720	2816
v/s Ratio Prot	c0.06		0.12		0.00	c0.21
v/s Ratio Perm		0.00		0.00	0.00	
v/c Ratio	0.45	0.04	0.16	0.00	0.00	0.27
Uniform Delay, d1	48.4	45.8	4.2	3.7	2.6	3.2
Progression Factor	1.00	1.00	1.27	1.08	0.53	0.44
Incremental Delay, d2	1.4	0.1	0.1	0.0	0.0	0.2
Delay (s)	49.8	45.9	5.5	4.0	1.4	1.6
Level of Service	D	D	A	A	A	A
Approach Delay (s)	48.4		5.4			1.6
Approach LOS	D		A			A

### Intersection Summary

HCM 2000 Control Delay	8.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.3
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
4: Riverchase Pkwy & Regions Gated Access

Existing PM  
10/23/2023



Lane Group	SET	NWT
Lane Configurations	↑↑	↑↓
Traffic Volume (vph)	634	433
Future Volume (vph)	634	433
Sign Control	Free	Free
<b>Intersection Summary</b>		
Control Type: Unsignalized		

HCM Unsignalized Intersection Capacity Analysis  
4: Riverchase Pkwy & Regions Gated Access

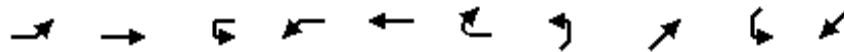
Existing PM  
10/23/2023



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑↑	↑↑			↗
Traffic Volume (veh/h)	0	634	433	0	0	0
Future Volume (Veh/h)	0	634	433	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.84	0.84	0.85	0.85	0.92	0.92
Hourly flow rate (vph)	0	755	509	0	0	0
<b>Pedestrians</b>						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		586	794			
pX, platoon unblocked					0.96	
vC, conflicting volume	509				886	254
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	509				805	254
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1052				308	745
<b>Direction, Lane #</b>	<b>SE 1</b>	<b>SE 2</b>	<b>NW 1</b>	<b>NW 2</b>	<b>SW 1</b>	
Volume Total	378	378	339	170	0	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	0	
cSH	1700	1700	1700	1700	1700	
Volume to Capacity	0.22	0.22	0.20	0.10	0.00	
Queue Length 95th (ft)	0	0	0	0	0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS						A
Approach Delay (s)	0.0		0.0		0.0	
Approach LOS						A
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			20.9%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings  
 5: Parkway Lake Dr/Parkway Office Cir S & Riverchase Pkwy

Existing PM  
 10/23/2023

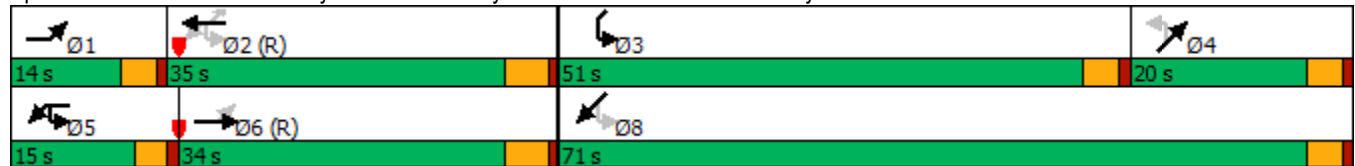


Lane Group	EBL	EBT	WBU	WBL	WBT	WBR	NEL	NET	SWL	SWT
Lane Configurations										
Traffic Volume (vph)	2	281	1	89	322	22	2	3	250	41
Future Volume (vph)	2	281	1	89	322	22	2	3	250	41
Turn Type	pm+pt	NA	pm+pt	pm+pt	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases	1	6	5	5	2			4	3	8
Permitted Phases	6		2	2		2	4		8	
Detector Phase	1	6	5	5	2	2	4	4	3	8
Switch Phase										
Minimum Initial (s)	4.0	15.0	4.0	4.0	15.0	15.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	30.0	12.0	12.0	30.0	30.0	12.0	12.0	9.0	12.0
Total Split (s)	14.0	34.0	15.0	15.0	35.0	35.0	20.0	20.0	51.0	71.0
Total Split (%)	11.7%	28.3%	12.5%	12.5%	29.2%	29.2%	16.7%	16.7%	42.5%	59.2%
Yellow Time (s)	3.2	3.9	3.0	3.0	3.9	3.9	3.2	3.2	3.2	3.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.2	4.9		4.0	4.9	4.9		4.2	4.2	4.2
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	C-Min	None	None	C-Min	C-Min	None	None	None	None

Intersection Summary

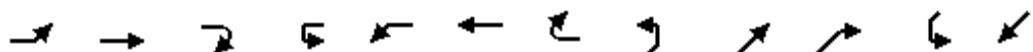
Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 25 (21%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 65  
 Control Type: Actuated-Coordinated

Splits and Phases: 5: Parkway Lake Dr/Parkway Office Cir S & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
 5: Parkway Lake Dr/Parkway Office Cir S & Riverchase Pkwy

Existing PM  
 10/23/2023



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT
Lane Configurations												
Traffic Volume (vph)	2	281	7	1	89	322	22	2	3	93	250	41
Future Volume (vph)	2	281	7	1	89	322	22	2	3	93	250	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9			4.0	4.9	4.9		4.2		4.2	4.2
Lane Util. Factor	1.00	0.95			1.00	0.95	1.00		1.00		1.00	1.00
Frt	1.00	1.00			1.00	1.00	0.85		0.87		1.00	0.95
Flt Protected	0.95	1.00			0.95	1.00	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1770	3526			1770	3539	1583		1623		1770	1778
Flt Permitted	0.53	1.00			0.49	1.00	1.00		0.99		0.34	1.00
Satd. Flow (perm)	990	3526			903	3539	1583		1615		642	1778
Peak-hour factor, PHF	0.79	0.79	0.79	0.87	0.87	0.87	0.87	0.85	0.85	0.85	0.78	0.78
Adj. Flow (vph)	3	356	9	1	102	370	25	2	4	109	321	53
RTOR Reduction (vph)	0	1	0	0	0	0	11	0	102	0	0	16
Lane Group Flow (vph)	3	364	0	0	103	370	14	0	13	0	321	60
Turn Type	pm+pt	NA		pm+pt	pm+pt	NA	Perm	Perm	NA		pm+pt	NA
Protected Phases	1	6		5	5	2			4		3	8
Permitted Phases	6			2	2		2	4			8	
Actuated Green, G (s)	63.0	61.8			74.3	68.9	68.9		7.4		36.6	36.6
Effective Green, g (s)	63.0	61.8			74.3	68.9	68.9		7.4		36.6	36.6
Actuated g/C Ratio	0.52	0.51			0.62	0.57	0.57		0.06		0.31	0.31
Clearance Time (s)	4.2	4.9			4.0	4.9	4.9		4.2		4.2	4.2
Vehicle Extension (s)	3.0	6.0			3.0	6.0	6.0		3.0		3.0	3.0
Lane Grp Cap (vph)	527	1815			620	2031	908		99		430	542
v/s Ratio Prot	0.00	c0.10			c0.01	0.10					c0.16	0.03
v/s Ratio Perm	0.00				0.09		0.01		0.01		c0.07	
v/c Ratio	0.01	0.20			0.17	0.18	0.02		0.13		0.75	0.11
Uniform Delay, d1	13.6	15.7			9.4	12.2	11.0		53.3		35.7	30.0
Progression Factor	1.28	1.16			0.75	0.73	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.0	0.2			0.1	0.2	0.0		0.6		6.9	0.1
Delay (s)	17.4	18.6			7.2	9.1	11.0		53.8		42.6	30.1
Level of Service	B	B			A	A	B		D		D	C
Approach Delay (s)		18.5				8.8			53.8			40.2
Approach LOS		B				A			D			D

Intersection Summary

HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

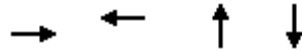


Movement	SWR
Lane Configurations	
Traffic Volume (vph)	18
Future Volume (vph)	18
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.78
Adj. Flow (vph)	23
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	



Lanes, Volumes, Timings  
6: Riverchase Pkwy & Riverchase Office Rd

Existing PM  
10/23/2023

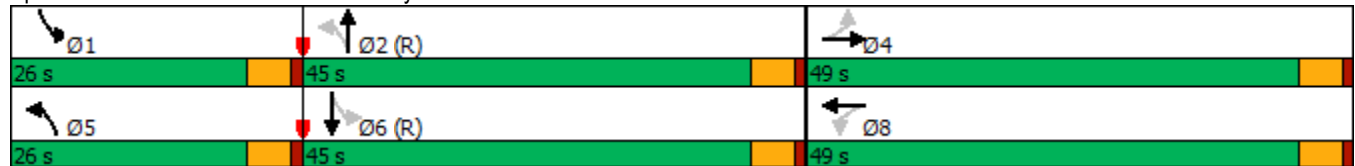


Lane Group	EBT	WBT	NBT	SBT	Ø1	Ø5
Lane Configurations	↔	↔	↑↓	↑↓		
Traffic Volume (vph)	0	0	342	271		
Future Volume (vph)	0	0	342	271		
Turn Type	NA	NA	NA	NA		
Protected Phases	4	8	2	6	1	5
Permitted Phases						
Detector Phase	4	8	2	6		
Switch Phase						
Minimum Initial (s)	4.0	4.0	20.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	25.0	20.0	9.0	9.0
Total Split (s)	49.0	49.0	45.0	45.0	26.0	26.0
Total Split (%)	40.8%	40.8%	37.5%	37.5%	22%	22%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		
Total Lost Time (s)	5.0	5.0	5.0	5.0		
Lead/Lag			Lag	Lag	Lead	Lead
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	None	None

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 95 (79%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated

Splits and Phases: 6: Riverchase Pkwy & Riverchase Office Rd



HCM Signalized Intersection Capacity Analysis  
6: Riverchase Pkwy & Riverchase Office Rd

Existing PM  
10/23/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕↔		↕	↕↔	
Traffic Volume (vph)	0	0	10	0	0	150	0	342	0	0	271	10
Future Volume (vph)	0	0	10	0	0	150	0	342	0	0	271	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.86			0.86			1.00			0.99	
Flt Protected		1.00			1.00			1.00			1.00	
Satd. Flow (prot)		1611			1611			3539			3520	
Flt Permitted		1.00			1.00			1.00			1.00	
Satd. Flow (perm)		1611			1611			3539			3520	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	11	0	0	163	0	372	0	0	295	11
RTOR Reduction (vph)	0	10	0	0	154	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1	0	0	9	0	0	372	0	0	306	0
Turn Type		NA			NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.5			6.5			103.5			103.5	
Effective Green, g (s)		6.5			6.5			103.5			103.5	
Actuated g/C Ratio		0.05			0.05			0.86			0.86	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		4.0			4.0			5.0			5.0	
Lane Grp Cap (vph)		87			87			3052			3036	
v/s Ratio Prot		0.00			c0.01			c0.11			0.09	
v/s Ratio Perm												
v/c Ratio		0.01			0.10			0.12			0.10	
Uniform Delay, d1		53.7			54.0			1.3			1.2	
Progression Factor		1.00			1.00			1.16			0.98	
Incremental Delay, d2		0.0			0.7			0.1			0.1	
Delay (s)		53.7			54.7			1.6			1.3	
Level of Service		D			D			A			A	
Approach Delay (s)		53.7			54.7			1.6			1.3	
Approach LOS		D			D			A			A	

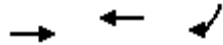
Intersection Summary

HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.13		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
7: Riverchase Pkwy & Parkway Office Cir N

Existing PM  
10/23/2023

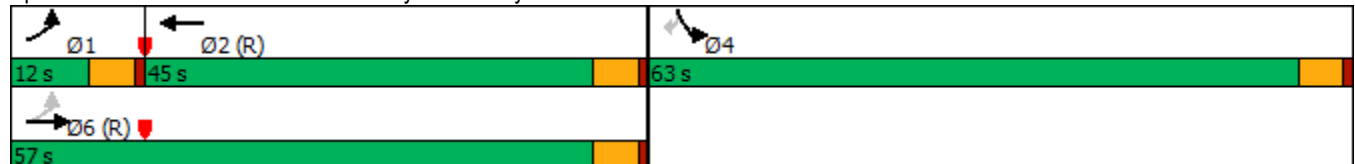


Lane Group	EBT	WBT	SBR	Ø1
Lane Configurations	↑↑	↑↓	↗	
Traffic Volume (vph)	281	500	200	
Future Volume (vph)	281	500	200	
Turn Type	NA	NA	Perm	
Protected Phases	6	2		1
Permitted Phases				4
Detector Phase	6	2	4	
Switch Phase				
Minimum Initial (s)	20.0	20.0	4.0	4.0
Minimum Split (s)	25.0	25.0	20.0	9.0
Total Split (s)	57.0	45.0	63.0	12.0
Total Split (%)	47.5%	37.5%	52.5%	10%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	
Lead/Lag		Lag		Lead
Lead-Lag Optimize?				
Recall Mode	C-Min	C-Min	None	None

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 111 (93%), Referenced to phase 2:WBT and 6:EBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated

Splits and Phases: 7: Riverchase Pkwy & Parkway Office Cir N



HCM Signalized Intersection Capacity Analysis  
7: Riverchase Pkwy & Parkway Office Cir N

Existing PM  
10/23/2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑↑	↑↑		↘	↘
Traffic Volume (vph)	0	281	500	5	0	200
Future Volume (vph)	0	281	500	5	0	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0			5.0
Lane Util. Factor		0.95	0.95			1.00
Frt		1.00	1.00			0.85
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		3539	3534			1583
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		3539	3534			1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	305	543	5	0	217
RTOR Reduction (vph)	0	0	0	0	0	205
Lane Group Flow (vph)	0	305	548	0	0	12
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	1	6	2		4	
Permitted Phases	6					4
Actuated Green, G (s)		103.6	103.6			6.4
Effective Green, g (s)		103.6	103.6			6.4
Actuated g/C Ratio		0.86	0.86			0.05
Clearance Time (s)		5.0	5.0			5.0
Vehicle Extension (s)		5.0	5.0			3.0
Lane Grp Cap (vph)		3055	3051			84
v/s Ratio Prot		0.09	c0.16			
v/s Ratio Perm						c0.01
v/c Ratio		0.10	0.18			0.14
Uniform Delay, d1		1.2	1.3			54.2
Progression Factor		0.74	0.55			1.00
Incremental Delay, d2		0.1	0.1			0.8
Delay (s)		1.0	0.9			54.9
Level of Service		A	A			D
Approach Delay (s)		1.0	0.9		54.9	
Approach LOS		A	A		D	

Intersection Summary

HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.19		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	37.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
8: Parkway River Rd & Riverchase Pkwy

Existing PM  
10/23/2023

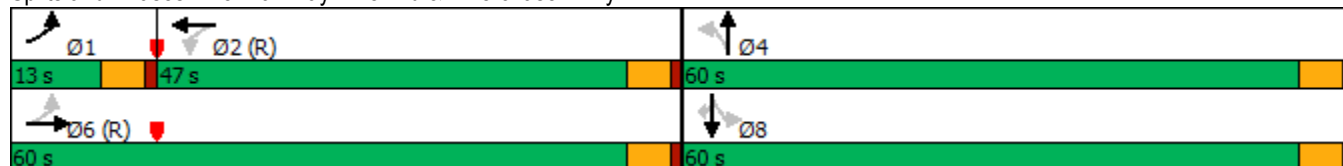


Lane Group	EBL	EBT	WBT	NBT	SBL	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	10	271	750	0	10	0	200
Future Volume (vph)	10	271	750	0	10	0	200
Turn Type	pm+pt	NA	NA	NA	Perm	NA	Perm
Protected Phases	1	6	2	4		8	
Permitted Phases	6				8		8
Detector Phase	1	6	2	4	8	8	8
Switch Phase							
Minimum Initial (s)	4.0	20.0	20.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	25.0	25.0	20.0	20.0	20.0	20.0
Total Split (s)	13.0	60.0	47.0	60.0	60.0	60.0	60.0
Total Split (%)	10.8%	50.0%	39.2%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0
Lead/Lag	Lead		Lag				
Lead-Lag Optimize?							
Recall Mode	None	C-Min	C-Min	None	None	None	None

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 96 (80%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated

Splits and Phases: 8: Parkway River Rd & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
8: Parkway River Rd & Riverchase Pkwy

Existing PM  
10/23/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	271	10	0	750	0	0	0	10	10	0	200
Future Volume (vph)	10	271	10	0	750	0	0	0	10	10	0	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0			5.0	5.0
Lane Util. Factor	1.00	0.95			0.95			1.00			1.00	1.00
Frt	1.00	0.99			1.00			0.86			1.00	0.85
Flt Protected	0.95	1.00			1.00			1.00			0.95	1.00
Satd. Flow (prot)	1770	3520			3539			1611			1770	1583
Flt Permitted	0.32	1.00			1.00			1.00			0.75	1.00
Satd. Flow (perm)	592	3520			3539			1611			1398	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	295	11	0	815	0	0	0	11	11	0	217
RTOR Reduction (vph)	0	1	0	0	0	0	0	10	0	0	0	200
Lane Group Flow (vph)	11	305	0	0	815	0	0	1	0	0	11	17
Turn Type	pm+pt	NA			NA			NA		Perm	NA	Perm
Protected Phases	1	6			2			4			8	
Permitted Phases	6			2			4			8		8
Actuated Green, G (s)	101.7	101.7			95.3			8.3			8.3	8.3
Effective Green, g (s)	101.7	101.7			95.3			8.3			8.3	8.3
Actuated g/C Ratio	0.85	0.85			0.79			0.07			0.07	0.07
Clearance Time (s)	5.0	5.0			5.0			5.0			5.0	5.0
Vehicle Extension (s)	4.0	5.0			5.0			3.0			3.0	3.0
Lane Grp Cap (vph)	515	2983			2810			111			96	109
v/s Ratio Prot	0.00	c0.09			c0.23			0.00				
v/s Ratio Perm	0.02										0.01	c0.01
v/c Ratio	0.02	0.10			0.29			0.01			0.11	0.15
Uniform Delay, d1	1.7	1.5			3.3			52.0			52.4	52.5
Progression Factor	1.00	1.00			0.56			1.00			1.00	1.00
Incremental Delay, d2	0.0	0.1			0.3			0.0			0.5	0.7
Delay (s)	1.7	1.6			2.1			52.0			52.9	53.2
Level of Service	A	A			A			D			D	D
Approach Delay (s)		1.6			2.1			52.0			53.2	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
9: US-31 & Riverchase Pkwy

Existing PM  
10/23/2023



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	→	↰	↑	↰↰	↰	↑↑	↰	↰↰	↑↑	↰
Traffic Volume (vph)	64	30	80	86	850	34	955	10	251	1187	147
Future Volume (vph)	64	30	80	86	850	34	955	10	251	1187	147
Turn Type	Prot	NA	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Free
Protected Phases	3	8	7	4		1	6		5	2	
Permitted Phases					4	6		6			Free
Detector Phase	3	8	7	4	4	1	6	6	5	2	
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	9.0	20.0	9.0	20.0	20.0	9.0	25.0	25.0	9.0	25.0	
Total Split (s)	25.0	22.0	25.0	22.0	22.0	13.0	128.0	128.0	25.0	140.0	
Total Split (%)	12.5%	11.0%	12.5%	11.0%	11.0%	6.5%	64.0%	64.0%	12.5%	70.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.5	0.5	1.5	0.5	0.5	0.5	1.0	1.0	0.5	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	4.0	5.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	

Intersection Summary

Cycle Length: 200  
 Actuated Cycle Length: 200  
 Offset: 25 (13%), Referenced to phase 2:SBT and 6:NBTL, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated

Splits and Phases: 9: US-31 & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
 9: US-31 & Riverchase Pkwy

Existing PM  
 10/23/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↖↗	↖	↗↗	↖	↖↗	↗↗	↖
Traffic Volume (vph)	64	30	14	80	86	850	34	955	10	251	1187	147
Future Volume (vph)	64	30	14	80	86	850	34	955	10	251	1187	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.0		5.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	0.88	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1773		1770	1863	2787	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.12	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1773		1770	1863	2787	219	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.79	0.79	0.79	0.81	0.81	0.81	0.84	0.84	0.84	0.89	0.89	0.89
Adj. Flow (vph)	81	38	18	99	106	1049	40	1137	12	282	1334	165
RTOR Reduction (vph)	0	7	0	0	0	303	0	0	6	0	0	0
Lane Group Flow (vph)	81	49	0	99	106	746	40	1137	6	282	1334	165
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Free
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases						4	6		6			Free
Actuated Green, G (s)	14.5	34.3		34.1	53.9	53.9	99.6	93.7	93.7	19.9	107.7	200.0
Effective Green, g (s)	14.5	34.3		34.1	53.9	53.9	99.6	93.7	93.7	19.9	107.7	200.0
Actuated g/C Ratio	0.07	0.17		0.17	0.27	0.27	0.50	0.47	0.47	0.10	0.54	1.00
Clearance Time (s)	5.0	4.0		5.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	6.0	6.0	3.0	6.0	
Lane Grp Cap (vph)	128	304		301	502	751	154	1658	741	341	1905	1583
v/s Ratio Prot	c0.05	0.03		0.06	0.06		0.01	0.32		c0.08	c0.38	
v/s Ratio Perm						c0.27	0.12		0.00			0.10
v/c Ratio	0.63	0.16		0.33	0.21	0.99	0.26	0.69	0.01	0.83	0.70	0.10
Uniform Delay, d1	90.2	70.6		72.9	56.6	72.9	30.3	41.6	28.3	88.4	34.2	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.8	0.2		0.6	0.2	31.0	0.9	2.3	0.0	15.1	2.2	0.1
Delay (s)	100.0	70.8		73.5	56.8	103.8	31.2	44.0	28.4	103.4	36.4	0.1
Level of Service	F	E		E	E	F	C	D	C	F	D	A
Approach Delay (s)		88.0			97.5			43.4			43.6	
Approach LOS		F			F			D			D	

Intersection Summary

HCM 2000 Control Delay	60.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	200.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lanes, Volumes, Timings  
 10: US-31 & Parkway Lake Dr

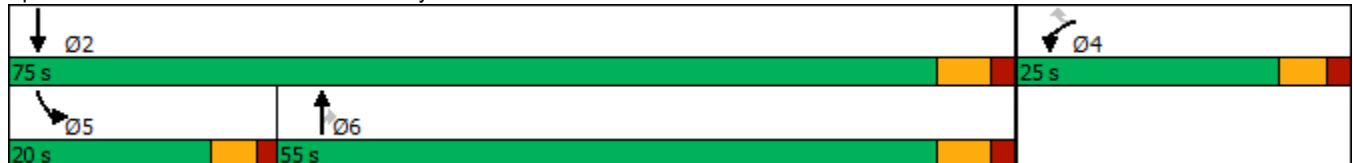
Existing PM  
 10/23/2023

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↘	↖	↕↕	↗	↙↘	↕↕
Traffic Volume (vph)	115	97	961	29	40	1247
Future Volume (vph)	115	97	961	29	40	1247
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6		
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	20.0	20.0	4.0	20.0
Minimum Split (s)	10.0	10.0	26.0	26.0	9.5	26.0
Total Split (s)	25.0	25.0	55.0	55.0	20.0	75.0
Total Split (%)	25.0%	25.0%	55.0%	55.0%	20.0%	75.0%
Yellow Time (s)	3.5	3.5	4.0	4.0	3.5	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	Min

Intersection Summary

Cycle Length: 100  
 Actuated Cycle Length: 73.6  
 Natural Cycle: 50  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 10: US-31 & Parkway Lake Dr



HCM Signalized Intersection Capacity Analysis  
 10: US-31 & Parkway Lake Dr

Existing PM  
 10/23/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↰	↱	↕↕	↱	↰↰	↕↕
Traffic Volume (vph)	115	97	961	29	40	1247
Future Volume (vph)	115	97	961	29	40	1247
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	3539	1583	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	3539	1583	3433	3539
Peak-hour factor, PHF	0.80	0.80	0.83	0.83	0.88	0.88
Adj. Flow (vph)	144	121	1158	35	45	1417
RTOR Reduction (vph)	0	105	0	12	0	0
Lane Group Flow (vph)	144	16	1158	23	45	1417
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6		
Actuated Green, G (s)	9.9	9.9	44.8	44.8	4.3	54.1
Effective Green, g (s)	9.9	9.9	44.8	44.8	4.3	54.1
Actuated g/C Ratio	0.13	0.13	0.59	0.59	0.06	0.72
Clearance Time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Vehicle Extension (s)	4.0	4.0	6.0	6.0	4.0	6.0
Lane Grp Cap (vph)	450	207	2099	939	195	2535
v/s Ratio Prot	c0.04		0.33		0.01	c0.40
v/s Ratio Perm		0.01		0.01		
v/c Ratio	0.32	0.08	0.55	0.02	0.23	0.56
Uniform Delay, d1	29.7	28.8	9.3	6.3	34.0	5.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.2	0.7	0.0	0.8	0.6
Delay (s)	30.3	29.0	10.0	6.4	34.8	5.6
Level of Service	C	C	A	A	C	A
Approach Delay (s)	29.7		9.9			6.5
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	75.5	Sum of lost time (s)	16.5
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
1: Valleydale Rd & Riverchase Pkwy

Future Imp. AM  
10/23/2023

	↑	↙	↓	↘	↗	↖	↘	↙	↗	↖
Lane Group	NBT	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↕	↙↘	↕	↘	↙	↖↖↖	↘	↘	↖↖	↘↘
Traffic Volume (vph)	3	451	5	118	137	764	13	38	903	1502
Future Volume (vph)	3	451	5	118	137	764	13	38	903	1502
Turn Type	NA	Split	NA	Perm	Prot	NA	Perm	Prot	NA	pt+ov
Protected Phases	4	3	3		1	6		5	2	2 3
Permitted Phases				3			6			
Detector Phase	4	3	3	3	1	6	6	5	2	2 3
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	10.0	20.0	20.0	20.0	10.0	26.0	26.0	12.0	26.0	
Total Split (s)	12.0	28.0	28.0	28.0	20.0	70.0	70.0	15.0	65.0	
Total Split (%)	9.6%	22.4%	22.4%	22.4%	16.0%	56.0%	56.0%	12.0%	52.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.5	5.5	5.5	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Min	C-Min	None	C-Min	

Intersection Summary





























Cycle Length: 125  
 Actuated Cycle Length: 125  
 Offset: 110 (88%), Referenced to phase 2:SWT and 6:NET, Start of Green  
 Natural Cycle: 70  
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Valleydale Rd & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
 1: Valleydale Rd & Riverchase Pkwy

Future Imp. AM  
 10/23/2023

													
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWU	SWL	SWT	
Lane Configurations				  				  			 	 	
Traffic Volume (vph)	0	3	0	451	5	118	137	764	13	6	38	903	
Future Volume (vph)	0	3	0	451	5	118	137	764	13	6	38	903	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.5		5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00		0.91	0.91	1.00	1.00	0.91	1.00		1.00	0.95	
Frt		1.00		1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)		1863		3221	1617	1583	1770	5085	1583		1770	3539	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (perm)		1863		3221	1617	1583	1770	5085	1583		1770	3539	
Peak-hour factor, PHF	0.25	0.25	0.25	0.88	0.88	0.88	0.87	0.87	0.87	0.92	0.92	0.92	
Adj. Flow (vph)	0	12	0	512	6	134	157	878	15	7	41	982	
RTOR Reduction (vph)	0	0	0	0	0	106	0	0	7	0	0	0	
Lane Group Flow (vph)	0	12	0	344	175	28	157	878	8	0	48	982	
Turn Type		NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	
Protected Phases		4		3	3		1	6		5	5	2	
Permitted Phases	4		4			3			6				
Actuated Green, G (s)		2.6		26.0	26.0	26.0	14.8	66.2	66.2		7.2	58.6	
Effective Green, g (s)		2.6		26.0	26.0	26.0	14.8	66.2	66.2		7.2	58.6	
Actuated g/C Ratio		0.02		0.21	0.21	0.21	0.12	0.53	0.53		0.06	0.47	
Clearance Time (s)		5.5		5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0		4.0	4.0	4.0	4.0	3.0	3.0		4.0	3.0	
Lane Grp Cap (vph)		38		669	336	329	209	2693	838		101	1659	
v/s Ratio Prot		c0.01		0.11	0.11		c0.09	0.17			0.03	0.28	
v/s Ratio Perm						0.02			0.01				
v/c Ratio		0.32		0.51	0.52	0.08	0.75	0.33	0.01		0.48	0.59	
Uniform Delay, d1		60.3		43.9	44.0	39.9	53.3	16.7	13.9		57.1	24.4	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		6.4		0.9	1.9	0.2	14.9	0.3	0.0		4.7	1.6	
Delay (s)		66.7		44.8	45.9	40.1	68.2	17.0	13.9		61.8	26.0	
Level of Service		E		D	D	D	E	B	B		E	C	
Approach Delay (s)		66.7			44.1			24.6				17.4	
Approach LOS		E			D			C				B	
<b>Intersection Summary</b>													
HCM 2000 Control Delay			23.2		HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.74										
Actuated Cycle Length (s)			125.0		Sum of lost time (s)				23.0				
Intersection Capacity Utilization			78.1%		ICU Level of Service				D				
Analysis Period (min)			15										

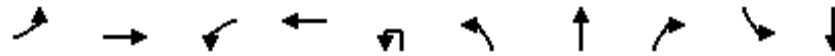
c Critical Lane Group



Movement	SWR
Lane Configurations	TT
Traffic Volume (vph)	1502
Future Volume (vph)	1502
Ideal Flow (vphpl)	1900
Total Lost time (s)	6.0
Lane Util. Factor	0.88
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	2787
Flt Permitted	1.00
Satd. Flow (perm)	2787
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	1633
RTOR Reduction (vph)	213
Lane Group Flow (vph)	1420
Turn Type	pt+ov
Protected Phases	2 3
Permitted Phases	
Actuated Green, G (s)	90.6
Effective Green, g (s)	90.6
Actuated g/C Ratio	0.72
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	2020
v/s Ratio Prot	c0.51
v/s Ratio Perm	
v/c Ratio	0.70
Uniform Delay, d1	9.6
Progression Factor	1.00
Incremental Delay, d2	1.2
Delay (s)	10.9
Level of Service	B
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Lanes, Volumes, Timings  
2: Riverchase Pkwy & Woods of Riverchase Dr

Future Imp. AM  
10/23/2023



Lane Group	EBL	EBT	WBL	WBT	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	65	1	25	1	12	61	1473	19	9	342
Future Volume (vph)	65	1	25	1	12	61	1473	19	9	342
Turn Type	Perm	NA	Perm	NA	pm+pt	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		4		8	1	1	6		5	2
Permitted Phases	4		8		6	6		6	2	
Detector Phase	4	4	8	8	1	1	6	6	5	2
Switch Phase										
Minimum Initial (s)	4.0	4.0	10.0	10.0	4.0	4.0	10.0	10.0	4.0	10.0
Minimum Split (s)	9.0	9.0	15.0	15.0	9.0	9.0	20.0	20.0	9.0	20.0
Total Split (s)	30.0	30.0	30.0	30.0	18.0	18.0	72.0	72.0	18.0	72.0
Total Split (%)	25.0%	25.0%	25.0%	25.0%	15.0%	15.0%	60.0%	60.0%	15.0%	60.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.0	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5		4.5	4.5	4.5	5.0	4.5
Lead/Lag					Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Min	C-Min	None	C-Min

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated

Splits and Phases: 2: Riverchase Pkwy & Woods of Riverchase Dr



HCM Signalized Intersection Capacity Analysis  
2: Riverchase Pkwy & Woods of Riverchase Dr

Future Imp. AM  
10/23/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	65	1	135	25	1	12	12	61	1473	19	9	342
Future Volume (vph)	65	1	135	25	1	12	12	61	1473	19	9	342
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5			4.5	4.5	4.5	5.0	4.5
Lane Util. Factor	1.00	1.00			1.00			1.00	0.95	1.00	0.91	0.91
Frt	1.00	0.85			0.96			1.00	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00			0.97			0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1585			1726			1770	3539	1583	1610	3377
Flt Permitted	0.80	1.00			0.41			0.47	1.00	1.00	0.11	0.95
Satd. Flow (perm)	1482	1585			738			871	3539	1583	194	3220
Peak-hour factor, PHF	0.78	0.78	0.78	0.92	0.92	0.92	0.88	0.88	0.88	0.88	0.73	0.73
Adj. Flow (vph)	83	1	173	27	1	13	14	69	1674	22	12	468
RTOR Reduction (vph)	0	155	0	0	12	0	0	0	0	5	0	1
Lane Group Flow (vph)	83	19	0	0	29	0	0	83	1674	17	11	480
Turn Type	Perm	NA		Perm	NA		pm+pt	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		4			8		1	1	6		5	2
Permitted Phases	4			8			6	6		6	2	
Actuated Green, G (s)	12.8	12.8			12.8			97.5	92.0	92.0	89.4	89.4
Effective Green, g (s)	12.8	12.8			12.8			97.5	92.0	92.0	89.4	89.4
Actuated g/C Ratio	0.11	0.11			0.11			0.81	0.77	0.77	0.75	0.75
Clearance Time (s)	4.5	4.5			4.5			4.5	4.5	4.5	5.0	4.5
Vehicle Extension (s)	3.0	3.0			3.0			3.0	5.0	5.0	3.0	5.0
Lane Grp Cap (vph)	158	169			78			748	2713	1213	158	2400
v/s Ratio Prot		0.01						c0.01	c0.47		0.00	0.00
v/s Ratio Perm	c0.06				0.04			0.08		0.01	0.05	0.15
v/c Ratio	0.53	0.12			0.38			0.11	0.62	0.01	0.07	0.20
Uniform Delay, d1	50.7	48.5			49.9			2.2	6.2	3.3	5.4	4.6
Progression Factor	1.00	1.00			1.00			1.00	1.00	1.00	0.79	0.86
Incremental Delay, d2	3.1	0.3			3.0			0.1	1.1	0.0	0.2	0.0
Delay (s)	53.9	48.8			52.9			2.3	7.3	3.3	4.5	4.0
Level of Service	D	D			D			A	A	A	A	A
Approach Delay (s)		50.4			52.9				7.0			4.0
Approach LOS		D			D				A			A

Intersection Summary

HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	82.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR
Lane Configurations	
Traffic Volume (vph)	9
Future Volume (vph)	9
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.73
Adj. Flow (vph)	12
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	



Lanes, Volumes, Timings  
3: Riverchase Pkwy & Regions Dr

Future Imp. AM  
10/23/2023

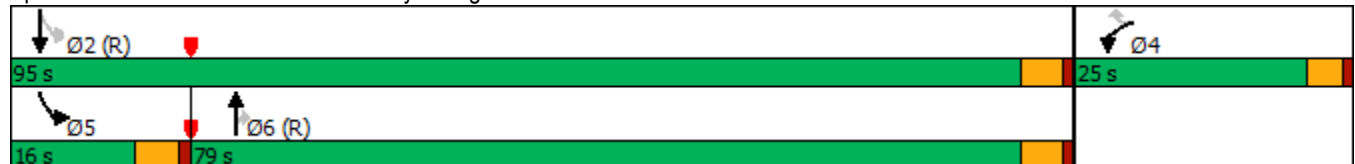


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↑↑	↗	↘	↑↑
Traffic Volume (vph)	58	30	1444	140	55	315
Future Volume (vph)	58	30	1444	140	55	315
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	15.0	15.0	25.0	25.0	4.0	25.0
Minimum Split (s)	20.0	20.0	30.0	30.0	9.0	30.0
Total Split (s)	25.0	25.0	79.0	79.0	16.0	95.0
Total Split (%)	20.8%	20.8%	65.8%	65.8%	13.3%	79.2%
Yellow Time (s)	3.2	3.2	3.9	3.9	4.0	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	4.2	4.9	4.9	5.0	4.9
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	
Recall Mode	None	None	C-Min	C-Min	None	C-Min

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 100 (83%), Referenced to phase 2:SBTL and 6:NBT, Start of Green  
 Natural Cycle: 65  
 Control Type: Actuated-Coordinated

Splits and Phases: 3: Riverchase Pkwy & Regions Dr



# HCM Signalized Intersection Capacity Analysis

## 3: Riverchase Pkwy & Regions Dr

Future Imp. AM  
10/23/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	58	30	1444	140	55	315
Future Volume (vph)	58	30	1444	140	55	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.2	4.9	4.9	5.0	4.9
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.10	1.00
Satd. Flow (perm)	1770	1583	3539	1583	179	3539
Peak-hour factor, PHF	0.50	0.50	0.88	0.88	0.84	0.84
Adj. Flow (vph)	116	60	1641	159	65	375
RTOR Reduction (vph)	0	52	0	19	0	0
Lane Group Flow (vph)	116	8	1641	140	65	375
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Actuated Green, G (s)	15.7	15.7	84.9	84.9	95.2	95.2
Effective Green, g (s)	15.7	15.7	84.9	84.9	95.2	95.2
Actuated g/C Ratio	0.13	0.13	0.71	0.71	0.79	0.79
Clearance Time (s)	4.2	4.2	4.9	4.9	5.0	4.9
Vehicle Extension (s)	3.0	3.0	6.0	6.0	3.0	6.0
Lane Grp Cap (vph)	231	207	2503	1119	212	2807
v/s Ratio Prot	c0.07		c0.46		c0.01	0.11
v/s Ratio Perm		0.00		0.09	0.23	
v/c Ratio	0.50	0.04	0.66	0.12	0.31	0.13
Uniform Delay, d1	48.5	45.6	9.6	5.6	8.4	2.9
Progression Factor	1.00	1.00	0.83	1.02	1.68	0.99
Incremental Delay, d2	1.7	0.1	1.1	0.2	0.8	0.1
Delay (s)	50.2	45.6	9.0	6.0	14.9	2.9
Level of Service	D	D	A	A	B	A
Approach Delay (s)	48.7		8.8			4.7
Approach LOS	D		A			A

### Intersection Summary

HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.1
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
 4: Riverchase Pkwy & Regions Gated Access

Future Imp. AM  
 10/23/2023



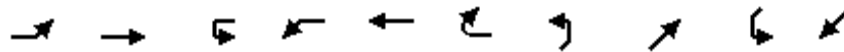
Lane Group	SET	NWT	NWR	SWR
Lane Configurations	↑↑	↑↑	↑	↑
Traffic Volume (vph)	347	1290	177	60
Future Volume (vph)	347	1290	177	60
Sign Control	Free	Free		
<b>Intersection Summary</b>				
Control Type: Unsignalized				

HCM Unsignalized Intersection Capacity Analysis  
 4: Riverchase Pkwy & Regions Gated Access

Future Imp. AM  
 10/23/2023



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑↑	↑↑	↗		↗
Traffic Volume (veh/h)	0	347	1290	177	0	60
Future Volume (Veh/h)	0	347	1290	177	0	60
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	377	1402	192	0	65
<b>Pedestrians</b>						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		586	794			
pX, platoon unblocked	0.76				0.76	0.76
vC, conflicting volume	1594				1590	701
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1148				1143	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	92
cM capacity (veh/h)	459				147	823
<b>Direction, Lane #</b>	<b>SE 1</b>	<b>SE 2</b>	<b>NW 1</b>	<b>NW 2</b>	<b>NW 3</b>	<b>SW 1</b>
Volume Total	188	188	701	701	192	65
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	192	65
cSH	1700	1700	1700	1700	1700	823
Volume to Capacity	0.11	0.11	0.41	0.41	0.11	0.08
Queue Length 95th (ft)	0	0	0	0	0	6
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	9.7
Lane LOS						A
Approach Delay (s)	0.0		0.0			9.7
Approach LOS						A
<b>Intersection Summary</b>						
Average Delay			0.3			
Intersection Capacity Utilization			46.0%	ICU Level of Service	A	
Analysis Period (min)			15			

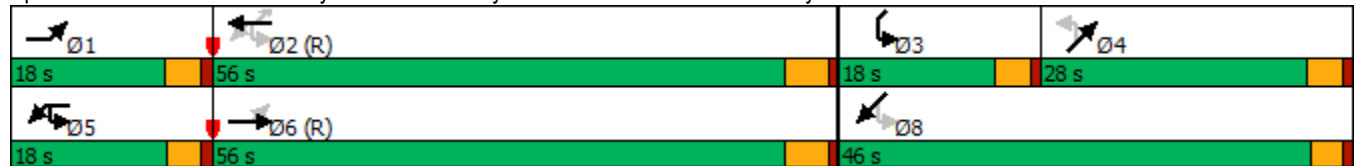


Lane Group	EBL	EBT	WBU	WBL	WBT	WBR	NEL	NET	SWL	SWT
Lane Configurations										
Traffic Volume (vph)	190	162	10	133	698	481	7	48	126	13
Future Volume (vph)	190	162	10	133	698	481	7	48	126	13
Turn Type	pm+pt	NA	pm+pt	pm+pt	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases	1	6	5	5	2			4	3	8
Permitted Phases	6		2	2		2	4		8	
Detector Phase	1	6	5	5	2	2	4	4	3	8
Switch Phase										
Minimum Initial (s)	4.0	15.0	4.0	4.0	15.0	15.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	30.0	9.0	9.0	30.0	30.0	12.0	12.0	9.0	12.0
Total Split (s)	18.0	56.0	18.0	18.0	56.0	56.0	28.0	28.0	18.0	46.0
Total Split (%)	15.0%	46.7%	15.0%	15.0%	46.7%	46.7%	23.3%	23.3%	15.0%	38.3%
Yellow Time (s)	3.2	3.9	3.0	3.0	3.9	3.9	3.2	3.2	3.2	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.2	4.9		4.0	4.9	4.9		4.2	4.2	4.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Min	None	None	C-Min	C-Min	None	None	None	None

Intersection Summary

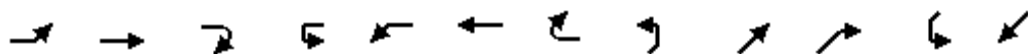
Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 49 (41%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated

Splits and Phases: 5: Parkway Lake Dr/Parkway Office Cir S & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
 5: Parkway Lake Dr/Parkway Office Cir S & Riverchase Pkwy

Future Imp. AM  
 10/23/2023



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT
Lane Configurations												
Traffic Volume (vph)	190	162	4	10	133	698	481	7	48	61	126	13
Future Volume (vph)	190	162	4	10	133	698	481	7	48	61	126	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9			4.0	4.9	4.9		4.2		4.2	4.0
Lane Util. Factor	1.00	0.95			1.00	0.95	1.00		1.00		1.00	1.00
Frt	1.00	1.00			1.00	1.00	0.85		0.93		1.00	0.88
Flt Protected	0.95	1.00			0.95	1.00	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1770	3526			1770	3539	1583		1725		1770	1643
Flt Permitted	0.28	1.00			0.63	1.00	1.00		0.98		0.25	1.00
Satd. Flow (perm)	525	3526			1171	3539	1583		1696		460	1643
Peak-hour factor, PHF	0.85	0.85	0.85	0.88	0.88	0.88	0.88	0.85	0.85	0.85	0.64	0.64
Adj. Flow (vph)	224	191	5	11	151	793	547	8	56	72	197	20
RTOR Reduction (vph)	0	1	0	0	0	0	186	0	38	0	0	55
Lane Group Flow (vph)	224	195	0	0	162	793	361	0	98	0	197	38
Turn Type	pm+pt	NA		pm+pt	pm+pt	NA	Perm	Perm	NA		pm+pt	NA
Protected Phases	1	6		5	5	2			4		3	8
Permitted Phases	6			2	2		2	4			8	
Actuated Green, G (s)	79.1	67.8			75.3	65.8	65.8		12.1		29.8	29.8
Effective Green, g (s)	79.1	67.8			75.3	65.8	65.8		12.1		29.8	29.8
Actuated g/C Ratio	0.66	0.56			0.63	0.55	0.55		0.10		0.25	0.25
Clearance Time (s)	4.2	4.9			4.0	4.9	4.9		4.2		4.2	4.0
Vehicle Extension (s)	3.0	6.0			3.0	6.0	6.0		3.0		3.0	3.0
Lane Grp Cap (vph)	463	1992			782	1940	868		171		259	408
v/s Ratio Prot	c0.05	0.06			0.02	0.22					c0.08	0.02
v/s Ratio Perm	c0.27				0.11		0.23		0.06		c0.10	
v/c Ratio	0.48	0.10			0.21	0.41	0.42		0.57		0.76	0.09
Uniform Delay, d1	9.1	12.0			9.2	15.8	15.9		51.5		38.9	34.7
Progression Factor	0.98	0.82			0.52	0.78	1.69		1.00		1.00	1.00
Incremental Delay, d2	0.8	0.1			0.1	0.5	1.2		4.6		12.4	0.1
Delay (s)	9.7	9.9			4.9	12.8	28.0		56.1		51.2	34.8
Level of Service	A	A			A	B	C		E		D	C
Approach Delay (s)		9.8				17.5			56.1			46.0
Approach LOS		A				B			E			D

Intersection Summary

HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

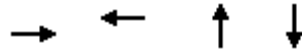
c Critical Lane Group



Movement	SWR
Lane Configurations	
Traffic Volume (vph)	47
Future Volume (vph)	47
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.64
Adj. Flow (vph)	73
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Lanes, Volumes, Timings  
6: Riverchase Pkwy & Riverchase Office Rd

Future Imp. AM  
10/23/2023



Lane Group	EBT	WBT	NBT	SBT	Ø1	Ø5
Lane Configurations	↕↕	↕↕	↕↕	↕↕		
Traffic Volume (vph)	0	0	650	400		
Future Volume (vph)	0	0	650	400		
Turn Type	NA	NA	NA	NA		
Protected Phases	4	8	2	6	1	5
Permitted Phases						
Detector Phase	4	8	2	6		
Switch Phase						
Minimum Initial (s)	4.0	4.0	20.0	20.0	4.0	4.0
Minimum Split (s)	20.0	20.0	25.0	25.0	9.0	9.0
Total Split (s)	32.0	32.0	62.0	64.0	26.0	24.0
Total Split (%)	26.7%	26.7%	51.7%	53.3%	22%	20%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		
Total Lost Time (s)	5.0	5.0	5.0	5.0		
Lead/Lag			Lag	Lag	Lead	Lead
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	None	None

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 78 (65%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated




















Splits and Phases: 6: Riverchase Pkwy & Riverchase Office Rd





HCM Signalized Intersection Capacity Analysis  
6: Riverchase Pkwy & Riverchase Office Rd

Future Imp. AM  
10/23/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	5	0	0	10	0	650	150	0	400	150
Future Volume (vph)	0	0	5	0	0	10	0	650	150	0	400	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.86			0.86			0.97			0.96	
Flt Protected		1.00			1.00			1.00			1.00	
Satd. Flow (prot)		1611			1611			3440			3395	
Flt Permitted		1.00			1.00			1.00			1.00	
Satd. Flow (perm)		1611			1611			3440			3395	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	5	0	0	11	0	707	163	0	435	163
RTOR Reduction (vph)	0	5	0	0	11	0	0	3	0	0	6	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	867	0	0	592	0
Turn Type		NA			NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		1.3			1.3			108.7			108.7	
Effective Green, g (s)		1.3			1.3			108.7			108.7	
Actuated g/C Ratio		0.01			0.01			0.91			0.91	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		4.0			4.0			5.0			5.0	
Lane Grp Cap (vph)		17			17			3116			3075	
v/s Ratio Prot		0.00			c0.00			c0.25			0.17	
v/s Ratio Perm												
v/c Ratio		0.00			0.01			0.28			0.19	
Uniform Delay, d1		58.7			58.7			0.7			0.6	
Progression Factor		1.00			1.00			2.88			2.86	
Incremental Delay, d2		0.1			0.2			0.2			0.1	
Delay (s)		58.8			58.9			2.3			2.0	
Level of Service		E			E			A			A	
Approach Delay (s)		58.8			58.9			2.3			2.0	
Approach LOS		E			E			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			2.8					HCM 2000 Level of Service			A	
HCM 2000 Volume to Capacity ratio			0.29									
Actuated Cycle Length (s)			120.0					Sum of lost time (s)		15.0		
Intersection Capacity Utilization			34.4%					ICU Level of Service		A		
Analysis Period (min)			15									

c Critical Lane Group

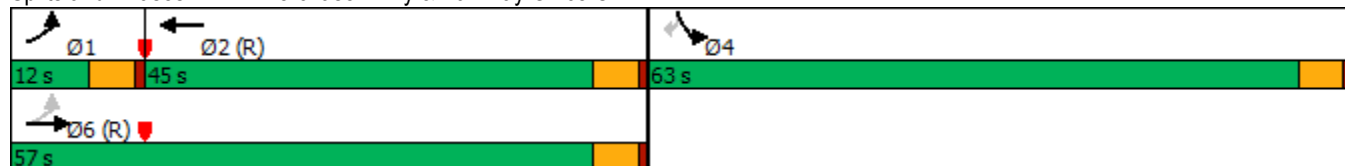


Lane Group	EBT	WBT	SBR	Ø1
Lane Configurations	↑↑	↑↓	↗	
Traffic Volume (vph)	600	550	100	
Future Volume (vph)	600	550	100	
Turn Type	NA	NA	Perm	
Protected Phases	6	2		1
Permitted Phases				4
Detector Phase	6	2	4	
Switch Phase				
Minimum Initial (s)	20.0	20.0	4.0	4.0
Minimum Split (s)	25.0	25.0	20.0	9.0
Total Split (s)	57.0	45.0	63.0	12.0
Total Split (%)	47.5%	37.5%	52.5%	10%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	
Lead/Lag		Lag		Lead
Lead-Lag Optimize?				
Recall Mode	C-Min	C-Min	None	None

**Intersection Summary**

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 50 (42%), Referenced to phase 2:WBT and 6:EBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated

**Splits and Phases: 7: Riverchase Pkwy & Parkway Office Cir N**



HCM Signalized Intersection Capacity Analysis  
7: Riverchase Pkwy & Parkway Office Cir N

Future Imp. AM  
10/23/2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↷		↶	↶
Traffic Volume (vph)	0	600	550	150	0	100
Future Volume (vph)	0	600	550	150	0	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0			5.0
Lane Util. Factor		0.95	0.95			1.00
Frt		1.00	0.97			0.85
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		3539	3426			1583
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		3539	3426			1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	652	598	163	0	109
RTOR Reduction (vph)	0	0	4	0	0	104
Lane Group Flow (vph)	0	652	757	0	0	5
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	1	6	2		4	
Permitted Phases	6					4
Actuated Green, G (s)		104.5	104.5			5.5
Effective Green, g (s)		104.5	104.5			5.5
Actuated g/C Ratio		0.87	0.87			0.05
Clearance Time (s)		5.0	5.0			5.0
Vehicle Extension (s)		5.0	5.0			3.0
Lane Grp Cap (vph)		3081	2983			72
v/s Ratio Prot		0.18	c0.22			
v/s Ratio Perm						c0.00
v/c Ratio		0.21	0.25			0.07
Uniform Delay, d1		1.2	1.3			54.8
Progression Factor		0.44	0.53			1.00
Incremental Delay, d2		0.2	0.2			0.4
Delay (s)		0.7	0.9			55.2
Level of Service		A	A			E
Approach Delay (s)		0.7	0.9		55.2	
Approach LOS		A	A		E	

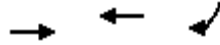
Intersection Summary

HCM 2000 Control Delay	4.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	34.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
 8: Parkway River Rd & Riverchase Pkwy

Future Imp. AM  
 10/23/2023

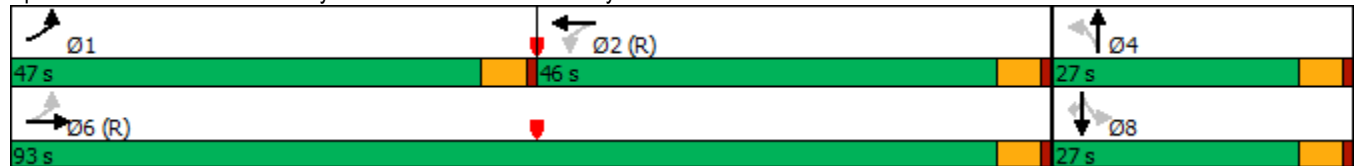


Lane Group	EBT	WBT	SBR	Ø1	Ø4
Lane Configurations	↑↑	↑↑	↗		
Traffic Volume (vph)	621	400	30		
Future Volume (vph)	621	400	30		
Turn Type	NA	NA	Perm		
Protected Phases	6	2		1	4
Permitted Phases				8	
Detector Phase	6	2	8		
Switch Phase					
Minimum Initial (s)	20.0	20.0	4.0	4.0	4.0
Minimum Split (s)	25.0	25.0	20.0	9.0	20.0
Total Split (s)	93.0	46.0	27.0	47.0	27.0
Total Split (%)	77.5%	38.3%	22.5%	39%	23%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		
Total Lost Time (s)	5.0	5.0	5.0		
Lead/Lag		Lag		Lead	
Lead-Lag Optimize?					
Recall Mode	C-Min	C-Min	None	None	None

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 31 (26%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated

Splits and Phases: 8: Parkway River Rd & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
8: Parkway River Rd & Riverchase Pkwy

Future Imp. AM  
10/23/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	621	150	0	400	200	0	0	0	0	0	30
Future Volume (vph)	0	621	150	0	400	200	0	0	0	0	0	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0							5.0
Lane Util. Factor		0.95			0.95							1.00
Frt		0.97			0.95							0.85
Flt Protected		1.00			1.00							1.00
Satd. Flow (prot)		3436			3363							1583
Flt Permitted		1.00			1.00							1.00
Satd. Flow (perm)		3436			3363							1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	675	163	0	435	217	0	0	0	0	0	33
RTOR Reduction (vph)	0	7	0	0	9	0	0	0	0	0	0	32
Lane Group Flow (vph)	0	831	0	0	643	0	0	0	0	0	0	1
Turn Type	pm+pt	NA			NA							Perm
Protected Phases	1	6			2			4				8
Permitted Phases	6			2			4			8		8
Actuated Green, G (s)		106.7			106.7							3.3
Effective Green, g (s)		106.7			106.7							3.3
Actuated g/C Ratio		0.89			0.89							0.03
Clearance Time (s)		5.0			5.0							5.0
Vehicle Extension (s)		5.0			5.0							3.0
Lane Grp Cap (vph)		3055			2990							43
v/s Ratio Prot		c0.24			0.19							
v/s Ratio Perm												c0.00
v/c Ratio		0.27			0.22							0.02
Uniform Delay, d1		1.0			0.9							56.8
Progression Factor		1.00			0.28							1.00
Incremental Delay, d2		0.2			0.2							0.2
Delay (s)		1.2			0.4							57.0
Level of Service		A			A							E
Approach Delay (s)		1.2			0.4			0.0			57.0	
Approach LOS		A			A			A			E	

Intersection Summary			
HCM 2000 Control Delay	2.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	29.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings  
9: US-31 & Riverchase Pkwy

Future Imp. AM  
10/23/2023

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	141	74	6	15	391	20	1056	64	683	801	61
Future Volume (vph)	141	74	6	15	391	20	1056	64	683	801	61
Turn Type	Prot	NA	Prot	NA	pt+ov	pm+pt	NA	Perm	Prot	NA	Free
Protected Phases	3	8	7	4	4 5	1	6		5	2	
Permitted Phases						6		6			Free
Detector Phase	3	8	7	4	4 5	1	6	6	5	2	
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	9.0	20.0	9.0	20.0		9.0	25.0	25.0	9.0	25.0	
Total Split (s)	25.0	20.0	25.0	20.0		12.0	85.0	85.0	30.0	103.0	
Total Split (%)	15.6%	12.5%	15.6%	12.5%		7.5%	53.1%	53.1%	18.8%	64.4%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.5	0.5	1.5	0.5		0.5	1.0	1.0	0.5	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	4.0	5.0	4.0		4.0	5.0	5.0	4.0	5.0	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	C-Min	C-Min	None	C-Min	

Intersection Summary

Cycle Length: 160  
 Actuated Cycle Length: 160  
 Offset: 30 (19%), Referenced to phase 2:SBT and 6:NBTL, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated

Splits and Phases: 9: US-31 & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
 9: US-31 & Riverchase Pkwy

Future Imp. AM  
 10/23/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↖↗	↖	↗↗	↖	↖↗	↗↗	↖
Traffic Volume (vph)	141	74	13	6	15	391	20	1056	64	683	801	61
Future Volume (vph)	141	74	13	6	15	391	20	1056	64	683	801	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.0		5.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	0.88	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1822		1770	1863	2787	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.30	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1822		1770	1863	2787	566	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.85	0.85	0.85	0.93	0.93	0.93	0.92	0.92	0.92	0.85	0.85	0.85
Adj. Flow (vph)	166	87	15	6	16	420	22	1148	70	804	942	72
RTOR Reduction (vph)	0	3	0	0	0	86	0	0	41	0	0	0
Lane Group Flow (vph)	166	99	0	6	16	334	22	1148	29	804	942	72
Turn Type	Prot	NA		Prot	NA	pt+ov	pm+pt	NA	Perm	Prot	NA	Free
Protected Phases	3	8		7	4	4 5	1	6		5		2
Permitted Phases							6		6			Free
Actuated Green, G (s)	19.1	36.8		1.5	19.2	60.0	70.8	66.9	66.9	36.8	99.8	160.0
Effective Green, g (s)	19.1	36.8		1.5	19.2	60.0	70.8	66.9	66.9	36.8	99.8	160.0
Actuated g/C Ratio	0.12	0.23		0.01	0.12	0.38	0.44	0.42	0.42	0.23	0.62	1.00
Clearance Time (s)	5.0	4.0		5.0	4.0		4.0	5.0	5.0	4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	
Lane Grp Cap (vph)	211	419		16	223	1045	279	1479	661	789	2207	1583
v/s Ratio Prot	c0.09	0.05		0.00	0.01	c0.12	0.00	c0.32		c0.23	0.27	
v/s Ratio Perm							0.03		0.02			0.05
v/c Ratio	0.79	0.24		0.38	0.07	0.32	0.08	0.78	0.04	1.02	0.43	0.05
Uniform Delay, d1	68.5	50.2		78.8	62.5	35.5	25.2	40.1	27.6	61.6	15.4	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	17.4	0.3		14.1	0.1	0.2	0.1	4.1	0.1	36.9	0.6	0.1
Delay (s)	85.8	50.4		92.9	62.6	35.7	25.3	44.2	27.7	98.5	16.0	0.1
Level of Service	F	D		F	E	D	C	D	C	F	B	A
Approach Delay (s)		72.4			37.4			42.9			51.9	
Approach LOS		E			D			D			D	

Intersection Summary

HCM 2000 Control Delay	48.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

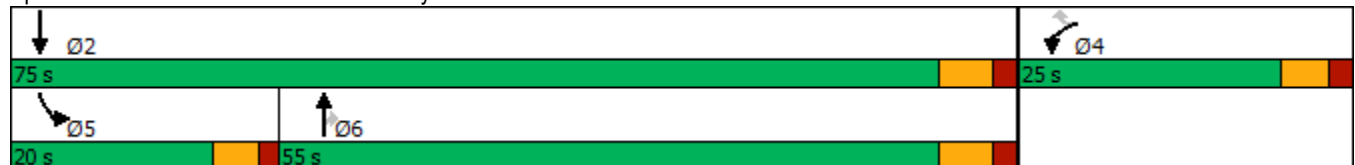


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶↶	↶	↕↕	↷	↶↶	↕↕
Traffic Volume (vph)	27	46	1073	76	102	699
Future Volume (vph)	27	46	1073	76	102	699
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6		
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	20.0	20.0	4.0	20.0
Minimum Split (s)	10.0	10.0	26.0	26.0	9.5	26.0
Total Split (s)	25.0	25.0	55.0	55.0	20.0	75.0
Total Split (%)	25.0%	25.0%	55.0%	55.0%	20.0%	75.0%
Yellow Time (s)	3.5	3.5	4.0	4.0	3.5	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	Min

Intersection Summary

Cycle Length: 100  
 Actuated Cycle Length: 71.7  
 Natural Cycle: 50  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 10: US-31 & Parkway Lake Dr





HCM Signalized Intersection Capacity Analysis  
 10: US-31 & Parkway Lake Dr

Future Imp. AM  
 10/23/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↑↑	↔	↔↔	↑↑
Traffic Volume (vph)	27	46	1073	76	102	699
Future Volume (vph)	27	46	1073	76	102	699
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	3539	1583	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	3539	1583	3433	3539
Peak-hour factor, PHF	0.79	0.79	0.92	0.92	0.87	0.87
Adj. Flow (vph)	34	58	1166	83	117	803
RTOR Reduction (vph)	0	54	0	28	0	0
Lane Group Flow (vph)	34	4	1166	55	117	803
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6		
Actuated Green, G (s)	5.7	5.7	44.9	44.9	7.0	56.9
Effective Green, g (s)	5.7	5.7	44.9	44.9	7.0	56.9
Actuated g/C Ratio	0.08	0.08	0.61	0.61	0.09	0.77
Clearance Time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Vehicle Extension (s)	4.0	4.0	6.0	6.0	4.0	6.0
Lane Grp Cap (vph)	264	121	2144	959	324	2717
v/s Ratio Prot	c0.01		c0.33		0.03	c0.23
v/s Ratio Perm		0.00		0.03		
v/c Ratio	0.13	0.04	0.54	0.06	0.36	0.30
Uniform Delay, d1	31.9	31.7	8.6	6.0	31.5	2.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.2	0.6	0.1	0.9	0.2
Delay (s)	32.2	31.8	9.2	6.0	32.4	2.8
Level of Service	C	C	A	A	C	A
Approach Delay (s)	32.0		9.0			6.5
Approach LOS	C		A			A

Intersection Summary

HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	74.1	Sum of lost time (s)	16.5
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings  
1: Valleydale Rd & Riverchase Pkwy

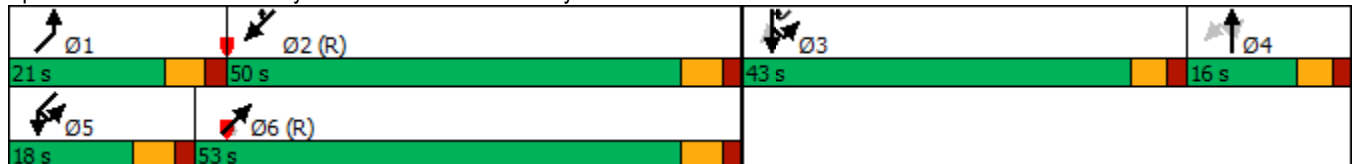
Future Imp PM  
10/25/2023

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	12	9	44	1102	0	122	135	967	3	3	480	542
Future Volume (vph)	12	9	44	1102	0	122	135	967	3	3	480	542
Turn Type	Perm	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	pt+ov
Protected Phases		4		3	3		1	6		5	2	2 3
Permitted Phases	4		4			3			6			
Detector Phase	4	4	4	3	3	3	1	6	6	5	2	2 3
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	10.0	10.0	10.0	20.0	20.0	20.0	10.0	26.0	26.0	12.0	26.0	
Total Split (s)	16.0	16.0	16.0	43.0	43.0	43.0	21.0	53.0	53.0	18.0	50.0	
Total Split (%)	12.3%	12.3%	12.3%	33.1%	33.1%	33.1%	16.2%	40.8%	40.8%	13.8%	38.5%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	

Intersection Summary





























Cycle Length: 130  
 Actuated Cycle Length: 130  
 Offset: 18 (14%), Referenced to phase 2:SWT and 6:NET, Start of Green  
 Natural Cycle: 75  
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Valleydale Rd & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
 1: Valleydale Rd & Riverchase Pkwy

Future Imp PM  
 10/25/2023

													
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWU	SWL	SWT	
Lane Configurations				  				  			 	 	
Traffic Volume (vph)	12	9	44	1102	0	122	135	967	3	9	3	480	
Future Volume (vph)	12	9	44	1102	0	122	135	967	3	9	3	480	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00	0.91	0.91	1.00	1.00	0.91	1.00		1.00	0.95	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	
Flt Protected		0.97	1.00	0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)		1811	1583	3221	1610	1583	1770	5085	1583		1770	3539	
Flt Permitted		0.61	1.00	0.95	0.95	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (perm)		1129	1583	3221	1610	1583	1770	5085	1583		1770	3539	
Peak-hour factor, PHF	0.57	0.57	0.57	0.93	0.93	0.93	0.84	0.84	0.84	0.97	0.97	0.97	
Adj. Flow (vph)	21	16	77	1185	0	131	161	1151	4	9	3	495	
RTOR Reduction (vph)	0	0	72	0	0	79	0	0	2	0	0	0	
Lane Group Flow (vph)	0	37	5	794	391	52	161	1151	2	0	12	495	
Turn Type	Perm	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	
Protected Phases		4		3	3		1	6		5	5	2	
Permitted Phases	4		4			3			6				
Actuated Green, G (s)		8.0	8.0	46.2	46.2	46.2	14.8	49.4	49.4		3.4	38.0	
Effective Green, g (s)		8.0	8.0	46.2	46.2	46.2	14.8	49.4	49.4		3.4	38.0	
Actuated g/C Ratio		0.06	0.06	0.36	0.36	0.36	0.11	0.38	0.38		0.03	0.29	
Clearance Time (s)		5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0		4.0	3.0	
Lane Grp Cap (vph)		69	97	1144	572	562	201	1932	601		46	1034	
v/s Ratio Prot				c0.25	0.24		c0.09	c0.23			0.01	0.14	
v/s Ratio Perm		c0.03	0.00			0.03			0.00				
v/c Ratio		0.54	0.05	0.69	0.68	0.09	0.80	0.60	0.00		0.26	0.48	
Uniform Delay, d1		59.2	57.4	35.9	35.7	27.9	56.2	32.3	25.0		62.1	37.9	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		9.9	0.3	2.0	3.7	0.1	21.0	1.4	0.0		4.1	1.6	
Delay (s)		69.1	57.7	37.8	39.3	28.0	77.2	33.7	25.0		66.2	39.4	
Level of Service		E	E	D	D	C	E	C	C		E	D	
Approach Delay (s)		61.4			37.3			39.0				22.8	
Approach LOS		E			D			D				C	
<b>Intersection Summary</b>													
HCM 2000 Control Delay			34.5		HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.68										
Actuated Cycle Length (s)			130.0		Sum of lost time (s)				23.0				
Intersection Capacity Utilization			66.4%		ICU Level of Service				C				
Analysis Period (min)			15										

c Critical Lane Group



Movement	SWR
Lane Configurations	TT
Traffic Volume (vph)	542
Future Volume (vph)	542
Ideal Flow (vphpl)	1900
Total Lost time (s)	6.0
Lane Util. Factor	0.88
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	2787
Flt Permitted	1.00
Satd. Flow (perm)	2787
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	559
RTOR Reduction (vph)	171
Lane Group Flow (vph)	388
Turn Type	pt+ov
Protected Phases	2 3
Permitted Phases	
Actuated Green, G (s)	90.2
Effective Green, g (s)	90.2
Actuated g/C Ratio	0.69
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	1933
v/s Ratio Prot	0.14
v/s Ratio Perm	
v/c Ratio	0.20
Uniform Delay, d1	7.1
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	7.1
Level of Service	A
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Timings  
2: Riverchase Pkwy & Woods of Riverchase Dr

Future Imp PM  
10/25/2023



Lane Group	EBL	EBT	WBL	WBT	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	63	4	33	1	20	166	729	29	15	894
Future Volume (vph)	63	4	33	1	20	166	729	29	15	894
Turn Type	Perm	NA	Perm	NA	pm+pt	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		4		8	1	1	6		5	2
Permitted Phases	4		8		6	6		6	2	
Detector Phase	4	4	8	8	1	1	6	6	5	2
Switch Phase										
Minimum Initial (s)	4.0	4.0	10.0	10.0	4.0	4.0	10.0	10.0	4.0	10.0
Minimum Split (s)	9.0	9.0	15.0	15.0	9.0	9.0	20.0	20.0	9.0	20.0
Total Split (s)	26.0	26.0	26.0	26.0	24.0	24.0	70.0	70.0	24.0	70.0
Total Split (%)	21.7%	21.7%	21.7%	21.7%	20.0%	20.0%	58.3%	58.3%	20.0%	58.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.0	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5		4.5	4.5	4.5	5.0	4.5
Lead/Lag					Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Min	C-Min	None	C-Min

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green, Master Intersection  
 Natural Cycle: 50  
 Control Type: Actuated-Coordinated

Splits and Phases: 2: Riverchase Pkwy & Woods of Riverchase Dr



HCM Signalized Intersection Capacity Analysis  
2: Riverchase Pkwy & Woods of Riverchase Dr

Future Imp PM  
10/25/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	63	4	101	33	1	17	20	166	729	29	15	894
Future Volume (vph)	63	4	101	33	1	17	20	166	729	29	15	894
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5			4.5	4.5	4.5	5.0	4.5
Lane Util. Factor	1.00	1.00			1.00			1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.86			0.96			1.00	1.00	0.85	1.00	0.99
Flt Protected	0.95	1.00			0.97			0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1594			1724			1770	3539	1583	1770	3506
Flt Permitted	0.75	1.00			0.52			0.22	1.00	1.00	0.36	1.00
Satd. Flow (perm)	1406	1594			928			402	3539	1583	672	3506
Peak-hour factor, PHF	0.77	0.77	0.77	0.92	0.92	0.92	0.95	0.95	0.95	0.95	0.90	0.90
Adj. Flow (vph)	82	5	131	36	1	18	21	175	767	31	17	993
RTOR Reduction (vph)	0	117	0	0	16	0	0	0	0	8	0	3
Lane Group Flow (vph)	82	19	0	0	39	0	0	196	767	23	17	1056
Turn Type	Perm	NA		Perm	NA		pm+pt	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		4			8		1	1	6			5
Permitted Phases	4			8			6	6		6		2
Actuated Green, G (s)	13.0	13.0			13.0			98.0	90.6	90.6	83.9	81.5
Effective Green, g (s)	13.0	13.0			13.0			98.0	90.6	90.6	83.9	81.5
Actuated g/C Ratio	0.11	0.11			0.11			0.82	0.75	0.75	0.70	0.68
Clearance Time (s)	4.5	4.5			4.5			4.5	4.5	4.5	5.0	4.5
Vehicle Extension (s)	3.0	3.0			3.0			3.0	5.0	5.0	3.0	5.0
Lane Grp Cap (vph)	152	172			100			465	2671	1195	491	2381
v/s Ratio Prot		0.01						c0.04	0.22		0.00	c0.30
v/s Ratio Perm	c0.06				0.04			0.30		0.01	0.02	
v/c Ratio	0.54	0.11			0.39			0.42	0.29	0.02	0.03	0.44
Uniform Delay, d1	50.7	48.3			49.8			4.3	4.6	3.7	5.5	8.8
Progression Factor	1.00	1.00			1.00			1.00	1.00	1.00	0.63	0.41
Incremental Delay, d2	3.7	0.3			2.5			0.6	0.3	0.0	0.0	0.6
Delay (s)	54.3	48.6			52.3			4.9	4.9	3.7	3.5	4.2
Level of Service	D	D			D			A	A	A	A	A
Approach Delay (s)		50.7			52.3				4.8			4.2
Approach LOS		D			D				A			A

Intersection Summary

HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR
Lane Configurations	
Traffic Volume (vph)	59
Future Volume (vph)	59
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.90
Adj. Flow (vph)	66
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

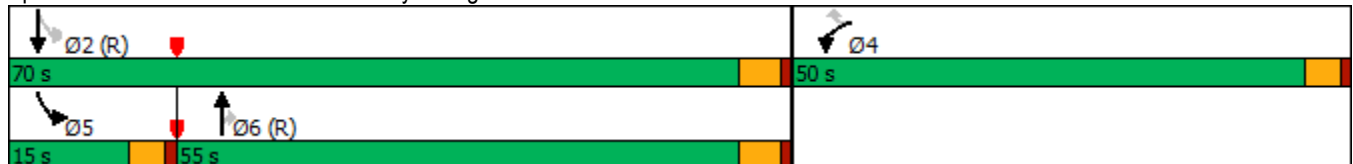
Timings  
3: Riverchase Pkwy & Regions Dr

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑↑	↗	↘	↑↑
Traffic Volume (vph)	147	77	735	68	35	907
Future Volume (vph)	147	77	735	68	35	907
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	2
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	15.0	15.0	25.0	25.0	1.0	25.0
Minimum Split (s)	20.0	20.0	30.0	30.0	5.2	30.0
Total Split (s)	50.0	50.0	55.0	55.0	15.0	70.0
Total Split (%)	41.7%	41.7%	45.8%	45.8%	12.5%	58.3%
Yellow Time (s)	3.2	3.2	3.9	3.9	3.2	3.9
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	None	C-Min

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 22 (18%), Referenced to phase 2:SBTL and 6:NBT, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated

Splits and Phases: 3: Riverchase Pkwy & Regions Dr





HCM Signalized Intersection Capacity Analysis  
3: Riverchase Pkwy & Regions Dr

Future Imp PM  
10/25/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	147	77	735	68	35	907
Future Volume (vph)	147	77	735	68	35	907
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.30	1.00
Satd. Flow (perm)	1770	1583	3539	1583	556	3539
Peak-hour factor, PHF	0.73	0.73	0.90	0.90	0.85	0.85
Adj. Flow (vph)	201	105	817	76	41	1067
RTOR Reduction (vph)	0	88	0	13	0	0
Lane Group Flow (vph)	201	17	817	63	41	1067
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	2
Actuated Green, G (s)	19.7	19.7	81.9	81.9	91.2	91.2
Effective Green, g (s)	19.7	19.7	81.9	81.9	91.2	91.2
Actuated g/C Ratio	0.16	0.16	0.68	0.68	0.76	0.76
Clearance Time (s)	4.2	4.2	4.9	4.9	4.2	4.9
Vehicle Extension (s)	3.0	3.0	6.0	6.0	3.0	6.0
Lane Grp Cap (vph)	290	259	2415	1080	474	2689
v/s Ratio Prot	c0.11		0.23		0.00	c0.30
v/s Ratio Perm		0.01		0.04	0.06	
v/c Ratio	0.69	0.07	0.34	0.06	0.09	0.40
Uniform Delay, d1	47.3	42.4	7.9	6.3	4.1	4.9
Progression Factor	1.00	1.00	0.83	0.59	1.14	1.09
Incremental Delay, d2	7.0	0.1	0.4	0.1	0.1	0.3
Delay (s)	54.3	42.5	6.9	3.8	4.7	5.7
Level of Service	D	D	A	A	A	A
Approach Delay (s)	50.2		6.7			5.7
Approach LOS	D		A			A

Intersection Summary

HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.3
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
4: Riverchase Pkwy & Regions Gated Access

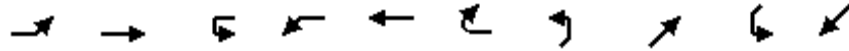
Future Imp PM  
10/25/2023



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑↑	↑↑	↗		↗
Traffic Volume (veh/h)	0	941	712	116	0	208
Future Volume (Veh/h)	0	941	712	116	0	208
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.84	0.84	0.85	0.85	0.92	0.92
Hourly flow rate (vph)	0	1120	838	136	0	226
<b>Pedestrians</b>						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		586	794			
pX, platoon unblocked	0.93				0.95	0.93
vC, conflicting volume	974				1398	419
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	826				999	230
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	69
cM capacity (veh/h)	746				229	720
<b>Direction, Lane #</b>	<b>SE 1</b>	<b>SE 2</b>	<b>NW 1</b>	<b>NW 2</b>	<b>NW 3</b>	<b>SW 1</b>
Volume Total	560	560	419	419	136	226
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	136	226
cSH	1700	1700	1700	1700	1700	720
Volume to Capacity	0.33	0.33	0.25	0.25	0.08	0.31
Queue Length 95th (ft)	0	0	0	0	0	34
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	12.3
Lane LOS						B
Approach Delay (s)	0.0		0.0			12.3
Approach LOS						B
<b>Intersection Summary</b>						
Average Delay			1.2			
Intersection Capacity Utilization			39.2%	ICU Level of Service	A	
Analysis Period (min)			15			

Timings  
5: Parkway Lake Dr/Parkway Office Cir S & Riverchase Pkwy

Future Imp PM  
10/25/2023

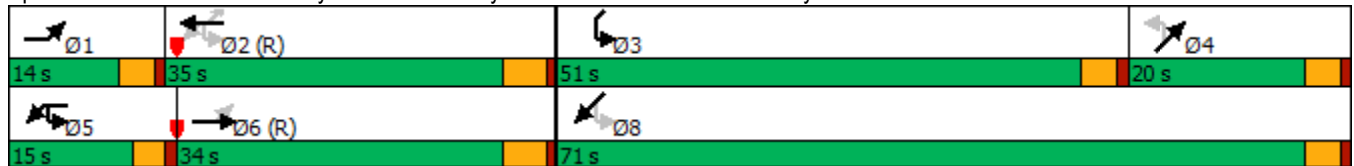


Lane Group	EBL	EBT	WBU	WBL	WBT	WBR	NEL	NET	SWL	SWT
Lane Configurations										
Traffic Volume (vph)	111	332	1	140	527	277	2	28	502	51
Future Volume (vph)	111	332	1	140	527	277	2	28	502	51
Turn Type	pm+pt	NA	pm+pt	pm+pt	NA	Perm	Perm	NA	pm+pt	NA
Protected Phases	1	6	5	5	2			4	3	8
Permitted Phases	6		2	2		2	4		8	
Detector Phase	1	6	5	5	2	2	4	4	3	8
Switch Phase										
Minimum Initial (s)	4.0	15.0	4.0	4.0	15.0	15.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	30.0	12.0	12.0	30.0	30.0	12.0	12.0	9.0	12.0
Total Split (s)	14.0	34.0	15.0	15.0	35.0	35.0	20.0	20.0	51.0	71.0
Total Split (%)	11.7%	28.3%	12.5%	12.5%	29.2%	29.2%	16.7%	16.7%	42.5%	59.2%
Yellow Time (s)	3.2	3.9	3.0	3.0	3.9	3.9	3.2	3.2	3.2	3.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.2	4.9		4.0	4.9	4.9		4.2	4.2	4.2
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	C-Min	None	None	C-Min	C-Min	None	None	None	None

Intersection Summary

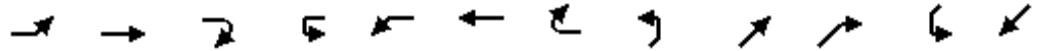
Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 25 (21%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated

Splits and Phases: 5: Parkway Lake Dr/Parkway Office Cir S & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
 5: Parkway Lake Dr/Parkway Office Cir S & Riverchase Pkwy

Future Imp PM  
 10/25/2023



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT
Lane Configurations												
Traffic Volume (vph)	111	332	7	1	140	527	277	2	28	97	502	51
Future Volume (vph)	111	332	7	1	140	527	277	2	28	97	502	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9			4.0	4.9	4.9		4.2		4.2	4.2
Lane Util. Factor	1.00	0.95			1.00	0.95	1.00		1.00		1.00	1.00
Frt	1.00	1.00			1.00	1.00	0.85		0.90		1.00	0.88
Flt Protected	0.95	1.00			0.95	1.00	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1770	3528			1770	3539	1583		1669		1770	1643
Flt Permitted	0.29	1.00			0.41	1.00	1.00		0.99		0.31	1.00
Satd. Flow (perm)	548	3528			758	3539	1583		1658		569	1643
Peak-hour factor, PHF	0.79	0.79	0.79	0.87	0.87	0.87	0.87	0.85	0.85	0.85	0.78	0.78
Adj. Flow (vph)	141	420	9	1	161	606	318	2	33	114	644	65
RTOR Reduction (vph)	0	1	0	0	0	0	161	0	105	0	0	126
Lane Group Flow (vph)	141	428	0	0	162	606	157	0	44	0	644	179
Turn Type	pm+pt	NA		pm+pt	pm+pt	NA	Perm	Perm	NA		pm+pt	NA
Protected Phases	1	6		5	5	2			4		3	8
Permitted Phases	6			2	2		2	4			8	
Actuated Green, G (s)	49.1	38.7			50.7	39.4	39.4		8.9		56.9	56.9
Effective Green, g (s)	49.1	38.7			50.7	39.4	39.4		8.9		56.9	56.9
Actuated g/C Ratio	0.41	0.32			0.42	0.33	0.33		0.07		0.47	0.47
Clearance Time (s)	4.2	4.9			4.0	4.9	4.9		4.2		4.2	4.2
Vehicle Extension (s)	3.0	6.0			3.0	6.0	6.0		3.0		3.0	3.0
Lane Grp Cap (vph)	330	1137			415	1161	519		122		708	779
v/s Ratio Prot	c0.04	0.12			0.04	c0.17					c0.33	0.11
v/s Ratio Perm	0.14				0.13		0.10		0.03		c0.10	
v/c Ratio	0.43	0.38			0.39	0.52	0.30		0.36		0.91	0.23
Uniform Delay, d1	23.5	31.3			22.3	32.7	30.0		52.9		27.9	18.6
Progression Factor	1.00	1.00			0.77	0.81	0.52		1.00		1.00	1.00
Incremental Delay, d2	0.9	0.9			0.6	1.7	1.5		1.8		15.5	0.2
Delay (s)	24.3	32.2			17.7	28.1	17.2		54.7		43.4	18.8
Level of Service	C	C			B	C	B		D		D	B
Approach Delay (s)		30.3				23.3			54.7			35.5
Approach LOS		C				C			D			D

Intersection Summary

HCM 2000 Control Delay	30.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		

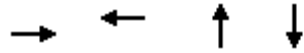
c Critical Lane Group



Movement	SWR
Lane Configurations	
Traffic Volume (vph)	187
Future Volume (vph)	187
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.78
Adj. Flow (vph)	240
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Timings  
6: Riverchase Pkwy & Riverchase Office Rd

Future Imp PM  
10/25/2023

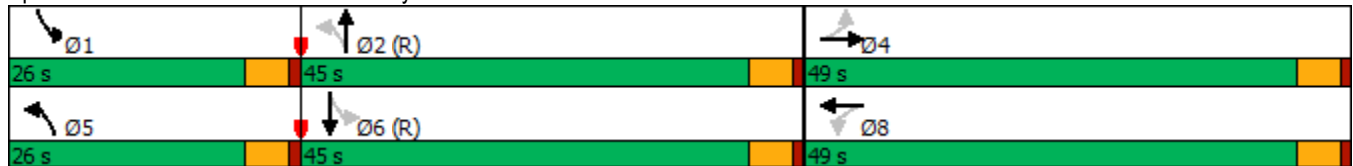


Lane Group	EBT	WBT	NBT	SBT	Ø1	Ø5
Lane Configurations	↔	↔	↑↔	↑↔		
Traffic Volume (vph)	0	0	575	416		
Future Volume (vph)	0	0	575	416		
Turn Type	NA	NA	NA	NA		
Protected Phases	4	8	2	6	1	5
Permitted Phases						
Detector Phase	4	8	2	6		
Switch Phase						
Minimum Initial (s)	4.0	4.0	20.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	25.0	20.0	9.0	9.0
Total Split (s)	49.0	49.0	45.0	45.0	26.0	26.0
Total Split (%)	40.8%	40.8%	37.5%	37.5%	22%	22%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		
Total Lost Time (s)	5.0	5.0	5.0	5.0		
Lead/Lag			Lag	Lag	Lead	Lead
Lead-Lag Optimize?						
Recall Mode	None	None	C-Min	C-Min	None	None

Intersection Summary




















Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 95 (79%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated

Splits and Phases: 6: Riverchase Pkwy & Riverchase Office Rd



HCM Signalized Intersection Capacity Analysis  
6: Riverchase Pkwy & Riverchase Office Rd

Future Imp PM  
10/25/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	10	0	0	250	0	575	200	0	416	10
Future Volume (vph)	0	0	10	0	0	250	0	575	200	0	416	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.86			0.86			0.96			1.00	
Flt Protected		1.00			1.00			1.00			1.00	
Satd. Flow (prot)		1611			1611			3402			3527	
Flt Permitted		1.00			1.00			1.00			1.00	
Satd. Flow (perm)		1611			1611			3402			3527	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	11	0	0	272	0	625	217	0	452	11
RTOR Reduction (vph)	0	10	0	0	257	0	0	6	0	0	0	0
Lane Group Flow (vph)	0	1	0	0	15	0	0	836	0	0	463	0
Turn Type		NA			NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.7			6.7			103.3			103.3	
Effective Green, g (s)		6.7			6.7			103.3			103.3	
Actuated g/C Ratio		0.06			0.06			0.86			0.86	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		4.0			4.0			5.0			5.0	
Lane Grp Cap (vph)		89			89			2928			3036	
v/s Ratio Prot		0.00			c0.01			c0.25			0.13	
v/s Ratio Perm												
v/c Ratio		0.01			0.17			0.29			0.15	
Uniform Delay, d1		53.5			54.0			1.5			1.3	
Progression Factor		1.00			1.00			0.52			0.99	
Incremental Delay, d2		0.0			1.2			0.2			0.1	
Delay (s)		53.5			55.2			1.0			1.4	
Level of Service		D			E			A			A	
Approach Delay (s)		53.5			55.2			1.0			1.4	
Approach LOS		D			E			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			10.8					HCM 2000 Level of Service			B	
HCM 2000 Volume to Capacity ratio			0.29									
Actuated Cycle Length (s)			120.0					Sum of lost time (s)		15.0		
Intersection Capacity Utilization			46.1%					ICU Level of Service		A		
Analysis Period (min)			15									

c Critical Lane Group

Timings  
7: Riverchase Pkwy & Parkway Office Cir N

Future Imp PM  
10/25/2023

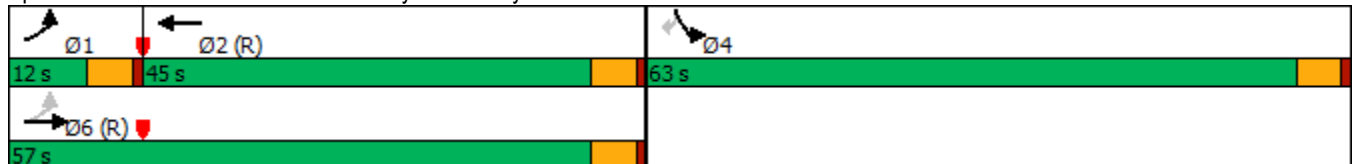


Lane Group	EBT	WBT	SBR	Ø1
Lane Configurations	↑↑	↑↓	↗	
Traffic Volume (vph)	426	716	275	
Future Volume (vph)	426	716	275	
Turn Type	NA	NA	Perm	
Protected Phases	6	2		1
Permitted Phases				4
Detector Phase	6	2	4	
Switch Phase				
Minimum Initial (s)	20.0	20.0	4.0	4.0
Minimum Split (s)	25.0	25.0	20.0	9.0
Total Split (s)	57.0	45.0	63.0	12.0
Total Split (%)	47.5%	37.5%	52.5%	10%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	
Lead/Lag		Lag		Lead
Lead-Lag Optimize?				
Recall Mode	C-Min	C-Min	None	None

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 111 (93%), Referenced to phase 2:WBT and 6:EBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated

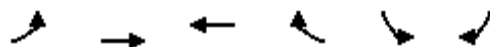
Splits and Phases: 7: Riverchase Pkwy & Parkway Office Cir N





HCM Signalized Intersection Capacity Analysis  
7: Riverchase Pkwy & Parkway Office Cir N

Future Imp PM  
10/25/2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷↷	↷↷		↶	↶
Traffic Volume (vph)	0	426	716	200	0	275
Future Volume (vph)	0	426	716	200	0	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0			5.0
Lane Util. Factor		0.95	0.95			1.00
Frt		1.00	0.97			0.85
Flt Protected		1.00	1.00			1.00
Satd. Flow (prot)		3539	3423			1583
Flt Permitted		1.00	1.00			1.00
Satd. Flow (perm)		3539	3423			1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	463	778	217	0	299
RTOR Reduction (vph)	0	0	7	0	0	179
Lane Group Flow (vph)	0	463	988	0	0	120
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	1	6	2		4	
Permitted Phases	6					4
Actuated Green, G (s)		95.6	95.6			14.4
Effective Green, g (s)		95.6	95.6			14.4
Actuated g/C Ratio		0.80	0.80			0.12
Clearance Time (s)		5.0	5.0			5.0
Vehicle Extension (s)		5.0	5.0			3.0
Lane Grp Cap (vph)		2819	2726			189
v/s Ratio Prot		0.13	c0.29			
v/s Ratio Perm						c0.08
v/c Ratio		0.16	0.36			0.64
Uniform Delay, d1		2.9	3.5			50.3
Progression Factor		0.59	0.47			1.00
Incremental Delay, d2		0.1	0.4			6.9
Delay (s)		1.8	2.0			57.2
Level of Service		A	A			E
Approach Delay (s)		1.8	2.0		57.2	
Approach LOS		A	A		E	

Intersection Summary

HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings  
8: Parkway River Rd & Riverchase Pkwy

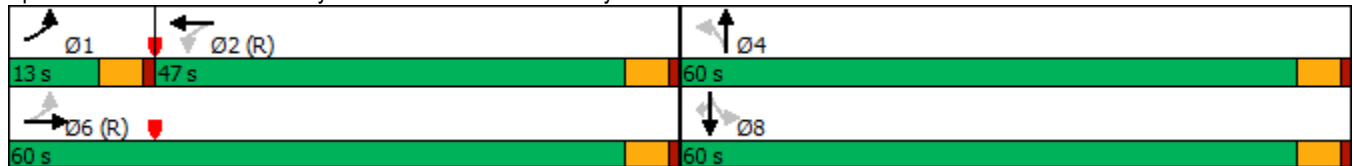


Lane Group	EBL	EBT	WBT	NBT	SBL	SBT	SBR
Lane Configurations	↶	↶↷	↶↷	↶		↷	↷
Traffic Volume (vph)	10	401	1066	0	10	0	250
Future Volume (vph)	10	401	1066	0	10	0	250
Turn Type	pm+pt	NA	NA	NA	Perm	NA	Perm
Protected Phases	1	6	2	4		8	
Permitted Phases	6				8		8
Detector Phase	1	6	2	4	8	8	8
Switch Phase							
Minimum Initial (s)	4.0	20.0	20.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	25.0	25.0	20.0	20.0	20.0	20.0
Total Split (s)	13.0	60.0	47.0	60.0	60.0	60.0	60.0
Total Split (%)	10.8%	50.0%	39.2%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0
Lead/Lag	Lead		Lag				
Lead-Lag Optimize?							
Recall Mode	None	C-Min	C-Min	None	None	None	None

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 96 (80%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated

Splits and Phases: 8: Parkway River Rd & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
8: Parkway River Rd & Riverchase Pkwy

Future Imp PM  
10/25/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	401	25	0	1066	0	0	0	25	10	0	250
Future Volume (vph)	10	401	25	0	1066	0	0	0	25	10	0	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0			5.0	5.0
Lane Util. Factor	1.00	0.95			0.95			1.00			1.00	1.00
Frt	1.00	0.99			1.00			0.86			1.00	0.85
Flt Protected	0.95	1.00			1.00			1.00			0.95	1.00
Satd. Flow (prot)	1770	3508			3539			1611			1770	1583
Flt Permitted	0.20	1.00			1.00			1.00			0.74	1.00
Satd. Flow (perm)	382	3508			3539			1611			1378	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	436	27	0	1159	0	0	0	27	11	0	272
RTOR Reduction (vph)	0	1	0	0	0	0	0	24	0	0	0	163
Lane Group Flow (vph)	11	462	0	0	1159	0	0	3	0	0	11	109
Turn Type	pm+pt	NA			NA			NA		Perm	NA	Perm
Protected Phases	1	6			2			4			8	
Permitted Phases	6			2			4			8		8
Actuated Green, G (s)	96.4	96.4			90.0			13.6			13.6	13.6
Effective Green, g (s)	96.4	96.4			90.0			13.6			13.6	13.6
Actuated g/C Ratio	0.80	0.80			0.75			0.11			0.11	0.11
Clearance Time (s)	5.0	5.0			5.0			5.0			5.0	5.0
Vehicle Extension (s)	4.0	5.0			5.0			3.0			3.0	3.0
Lane Grp Cap (vph)	323	2818			2654			182			156	179
v/s Ratio Prot	0.00	c0.13			c0.33			0.00				
v/s Ratio Perm	0.03										0.01	c0.07
v/c Ratio	0.03	0.16			0.44			0.02			0.07	0.61
Uniform Delay, d1	3.3	2.7			5.6			47.3			47.6	50.7
Progression Factor	1.00	1.00			0.50			1.00			1.00	1.00
Incremental Delay, d2	0.1	0.1			0.5			0.0			0.2	5.7
Delay (s)	3.4	2.8			3.3			47.3			47.7	56.4
Level of Service	A	A			A			D			D	E
Approach Delay (s)		2.8			3.3			47.3			56.1	
Approach LOS		A			A			D			E	

Intersection Summary

HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings  
9: US-31 & Riverchase Pkwy

Future Imp PM  
10/25/2023

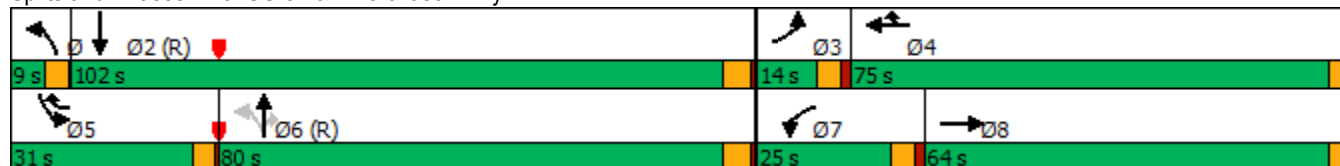


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↗↖	↖	↗↗	↖	↖↖	↗↗	↗↗
Traffic Volume (vph)	65	31	82	88	1234	35	1059	10	410	1232	150
Future Volume (vph)	65	31	82	88	1234	35	1059	10	410	1232	150
Turn Type	Prot	NA	Prot	NA	pt+ov	pm+pt	NA	Perm	Prot	NA	Free
Protected Phases	3	8	7	4	4 5	1	6		5	2	
Permitted Phases						6		6			Free
Detector Phase	3	8	7	4	4 5	1	6	6	5	2	
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	20.0	20.0	4.0	20.0	
Minimum Split (s)	9.0	20.0	9.0	20.0		9.0	25.0	25.0	9.0	25.0	
Total Split (s)	14.0	64.0	25.0	75.0		9.0	80.0	80.0	31.0	102.0	
Total Split (%)	7.0%	32.0%	12.5%	37.5%		4.5%	40.0%	40.0%	15.5%	51.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.5	0.5	1.5	0.5		0.5	1.0	1.0	0.5	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	4.0	5.0	4.0		4.0	5.0	5.0	4.0	5.0	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None		None	C-Min	C-Min	None	C-Min	

Intersection Summary
























Cycle Length: 200  
 Actuated Cycle Length: 200  
 Offset: 25 (13%), Referenced to phase 2:SBT and 6:NBTL, Start of Green  
 Natural Cycle: 130  
 Control Type: Actuated-Coordinated

Splits and Phases: 9: US-31 & Riverchase Pkwy



HCM Signalized Intersection Capacity Analysis  
 9: US-31 & Riverchase Pkwy

Future Imp PM  
 10/25/2023

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	65	31	14	82	88	1234	35	1059	10	410	1232	150	
Future Volume (vph)	65	31	14	82	88	1234	35	1059	10	410	1232	150	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.0	4.0		5.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	0.88	1.00	0.95	1.00	0.97	0.95	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1775		1770	1863	2787	1770	3539	1583	3433	3539	1583	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.09	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1775		1770	1863	2787	163	3539	1583	3433	3539	1583	
Peak-hour factor, PHF	0.79	0.79	0.79	0.81	0.81	0.81	0.84	0.84	0.84	0.89	0.89	0.89	
Adj. Flow (vph)	82	39	18	101	109	1523	42	1261	12	461	1384	169	
RTOR Reduction (vph)	0	8	0	0	0	19	0	0	8	0	0	0	
Lane Group Flow (vph)	82	49	0	101	109	1504	42	1261	5	461	1384	169	
Turn Type	Prot	NA		Prot	NA	pt+ov	pm+pt	NA	Perm	Prot	NA	Free	
Protected Phases	3	8		7	4	4 5	1	6		5		2	
Permitted Phases							6		6			Free	
Actuated Green, G (s)	9.0	64.3		15.7	71.0	102.0	79.0	75.0	75.0	27.0	98.0	200.0	
Effective Green, g (s)	9.0	64.3		15.7	71.0	102.0	79.0	75.0	75.0	27.0	98.0	200.0	
Actuated g/C Ratio	0.04	0.32		0.08	0.36	0.51	0.40	0.38	0.38	0.14	0.49	1.00	
Clearance Time (s)	5.0	4.0		5.0	4.0		4.0	5.0	5.0	4.0	5.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0		
Lane Grp Cap (vph)	79	570		138	661	1421	96	1327	593	463	1734	1583	
v/s Ratio Prot	c0.05	0.03		0.06	0.06	c0.54	0.01	c0.36		0.13	0.39		
v/s Ratio Perm							0.16		0.00			0.11	
v/c Ratio	1.04	0.09		0.73	0.16	1.06	0.44	0.95	0.01	1.00	0.80	0.11	
Uniform Delay, d1	95.5	47.3		90.1	44.2	49.0	42.3	60.7	39.2	86.4	42.7	0.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	112.1	0.1		18.0	0.1	41.1	3.2	15.4	0.0	40.4	3.9	0.1	
Delay (s)	207.6	47.4		108.1	44.3	90.1	45.5	76.1	39.2	126.9	46.7	0.1	
Level of Service	F	D		F	D	F	D	E	D	F	D	A	
Approach Delay (s)		141.9			88.3			74.7			61.1		
Approach LOS		F			F			E			E		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			75.8									HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			1.04										
Actuated Cycle Length (s)			200.0									Sum of lost time (s)	18.0
Intersection Capacity Utilization			86.9%									ICU Level of Service	E
Analysis Period (min)			15										

c Critical Lane Group

Timings  
10: US-31 & Parkway Lake Dr

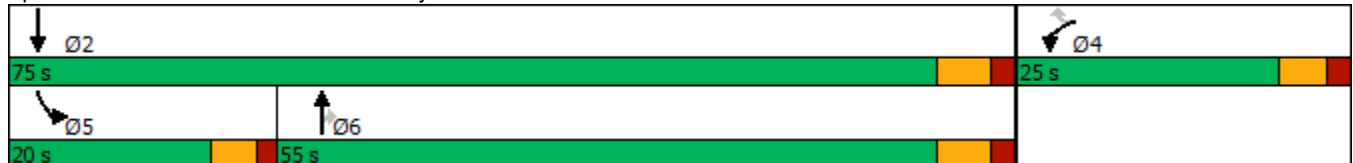
Future Imp PM  
10/25/2023

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖↗	↖	↖↗	↖	↖↗	↖↗
Traffic Volume (vph)	115	97	961	29	40	1247
Future Volume (vph)	115	97	961	29	40	1247
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6		
Detector Phase	4	4	6	6	5	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	20.0	20.0	4.0	20.0
Minimum Split (s)	10.0	10.0	26.0	26.0	9.5	26.0
Total Split (s)	25.0	25.0	55.0	55.0	20.0	75.0
Total Split (%)	25.0%	25.0%	55.0%	55.0%	20.0%	75.0%
Yellow Time (s)	3.5	3.5	4.0	4.0	3.5	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	Min

Intersection Summary

















Cycle Length: 100  
 Actuated Cycle Length: 73.6  
 Natural Cycle: 50  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 10: US-31 & Parkway Lake Dr



HCM Signalized Intersection Capacity Analysis  
 10: US-31 & Parkway Lake Dr

Future Imp PM  
 10/25/2023

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		 		 	 
Traffic Volume (vph)	115	97	961	29	40	1247
Future Volume (vph)	115	97	961	29	40	1247
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	3539	1583	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	3539	1583	3433	3539
Peak-hour factor, PHF	0.80	0.80	0.83	0.83	0.88	0.88
Adj. Flow (vph)	144	121	1158	35	45	1417
RTOR Reduction (vph)	0	105	0	12	0	0
Lane Group Flow (vph)	144	16	1158	23	45	1417
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6		
Actuated Green, G (s)	9.9	9.9	44.8	44.8	4.3	54.1
Effective Green, g (s)	9.9	9.9	44.8	44.8	4.3	54.1
Actuated g/C Ratio	0.13	0.13	0.59	0.59	0.06	0.72
Clearance Time (s)	5.5	5.5	6.0	6.0	5.0	6.0
Vehicle Extension (s)	4.0	4.0	6.0	6.0	4.0	6.0
Lane Grp Cap (vph)	450	207	2099	939	195	2535
v/s Ratio Prot	c0.04		0.33		0.01	c0.40
v/s Ratio Perm		0.01		0.01		
v/c Ratio	0.32	0.08	0.55	0.02	0.23	0.56
Uniform Delay, d1	29.7	28.8	9.3	6.3	34.0	5.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.2	0.7	0.0	0.8	0.6
Delay (s)	30.3	29.0	10.0	6.4	34.8	5.6
Level of Service	C	C	A	A	C	A
Approach Delay (s)	29.7		9.9			6.5
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	75.5	Sum of lost time (s)	16.5
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Valleydale Rd & Riverchase Pkwy

Movement	SB	SB	SB	SB	NE	NE	NE	NE	NE	SW	SW	SW
Directions Served	L	L	LT	R	L	T	T	T	R	UL	T	T
Maximum Queue (ft)	141	169	170	125	202	125	136	112	25	160	265	273
Average Queue (ft)	59	90	101	7	75	57	65	38	2	30	147	156
95th Queue (ft)	118	150	160	56	154	104	116	91	13	95	227	236
Link Distance (ft)		1468	1468			2616	2616	2616			2824	2824
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	350			170	300				300	170		
Storage Blk Time (%)			1	0	0							4
Queuing Penalty (veh)			1	0	0							2

Intersection: 1: Valleydale Rd & Riverchase Pkwy

Movement	SW	SW
Directions Served	R	R
Maximum Queue (ft)	314	341
Average Queue (ft)	51	69
95th Queue (ft)	226	273
Link Distance (ft)	2824	2824
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Riverchase Pkwy & Woods of Riverchase Dr

Movement	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	LTR	UL	T	T	R	L	T	TR
Maximum Queue (ft)	128	120	87	106	234	249	61	33	81	83
Average Queue (ft)	67	50	32	20	76	104	3	5	11	18
95th Queue (ft)	119	92	74	63	177	219	28	23	45	58
Link Distance (ft)		679	952		1468	1468			1150	1150
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	120			130			115	115		
Storage Blk Time (%)	3	0			1	5			0	
Queuing Penalty (veh)	3	0			1	1			0	



Intersection: 3: Riverchase Pkwy & Regions Dr

Movement	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	R	L	T	T
Maximum Queue (ft)	102	58	284	335	115	73	79	88
Average Queue (ft)	50	15	87	124	33	31	12	19
95th Queue (ft)	98	40	215	279	99	62	46	62
Link Distance (ft)	829	829	1150	1150			762	762
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)					90	100		
Storage Blk Time (%)				8	0	0	0	
Queuing Penalty (veh)				11	0	0	0	

Intersection: 4: Riverchase Pkwy & Regions Gated Access

Movement	NW	NW	SW
Directions Served	T	R	R
Maximum Queue (ft)	13	7	59
Average Queue (ft)	1	0	24
95th Queue (ft)	8	6	48
Link Distance (ft)	762		243
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		115	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Parkway Lake Dr/Parkway Office Cir S & Riverchase Pkwy

Movement	EB	EB	EB	WB	WB	WB	WB	NE	SW	SW
Directions Served	L	T	TR	UL	T	T	R	LTR	L	TR
Maximum Queue (ft)	122	169	107	124	268	334	150	122	191	111
Average Queue (ft)	59	21	21	36	82	135	94	50	89	36
95th Queue (ft)	123	91	68	87	192	289	205	106	152	78
Link Distance (ft)		328	328		555	555		702	1925	1925
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	100			180			125			
Storage Blk Time (%)	3	0			1	3	7			
Queuing Penalty (veh)	2	0			1	15	23			

Intersection: 6: Riverchase Pkwy & Riverchase Office Rd

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	T	TR	T	TR
Maximum Queue (ft)	28	31	46	45	63	59
Average Queue (ft)	4	8	2	2	3	3
95th Queue (ft)	21	30	19	19	31	28
Link Distance (ft)	409	455	1172	1172	728	728
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)					0	
Queuing Penalty (veh)					0	

Intersection: 7: Riverchase Pkwy & Parkway Office Cir N

Movement	EB	EB	WB	WB	SB
Directions Served	T	T	T	TR	R
Maximum Queue (ft)	93	82	72	109	79
Average Queue (ft)	7	7	8	17	39
95th Queue (ft)	41	40	40	67	64
Link Distance (ft)	805	805	728	728	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					230
Storage Blk Time (%)	0				
Queuing Penalty (veh)	0				

Intersection: 8: Parkway River Rd & Riverchase Pkwy

Movement	EB	EB	WB	WB	SB
Directions Served	T	TR	LT	TR	R
Maximum Queue (ft)	57	62	21	56	53
Average Queue (ft)	4	4	1	3	21
95th Queue (ft)	27	27	9	25	48
Link Distance (ft)	984	984	805	805	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					230
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 9: US-31 & Riverchase Pkwy

Movement	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	R	L	T	T	R	L	L
Maximum Queue (ft)	248	171	30	73	231	255	250	547	535	415	170	220
Average Queue (ft)	128	65	6	16	120	133	23	284	288	37	166	218
95th Queue (ft)	215	134	23	50	206	226	126	460	460	211	181	231
Link Distance (ft)	688	688			984	984		2041	2041			
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			230	230			185			315	120	120
Storage Blk Time (%)					0			24	9		52	67
Queuing Penalty (veh)					0			5	6		210	268

Intersection: 9: US-31 & Riverchase Pkwy

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	1206	1181	39
Average Queue (ft)	1141	1043	1
95th Queue (ft)	1350	1393	32
Link Distance (ft)	1161	1161	
Upstream Blk Time (%)	60	6	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)			175
Storage Blk Time (%)	2	2	
Queuing Penalty (veh)	12	1	

Intersection: 10: US-31 & Parkway Lake Dr

Movement	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	L	L	R	T	T	L	L	T	T
Maximum Queue (ft)	46	44	65	159	135	74	98	94	111
Average Queue (ft)	14	10	26	72	48	21	43	16	25
95th Queue (ft)	40	34	54	134	104	59	83	62	79
Link Distance (ft)	2471	2471		872	872			2041	2041
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			500			180	180		
Storage Blk Time (%)					0				
Queuing Penalty (veh)					0				

Network Summary

Network wide Queuing Penalty: 563

Intersection: 1: Valleydale Rd & Riverchase Pkwy

Movement	NB	NB	SB	SB	SB	SB	NE	NE	NE	NE	NE	SW
Directions Served	LT	R	L	L	LT	R	L	T	T	T	R	UL
Maximum Queue (ft)	40	26	324	396	389	195	224	233	212	201	22	40
Average Queue (ft)	4	2	171	214	234	94	86	126	130	108	1	7
95th Queue (ft)	20	14	268	322	348	252	176	197	195	189	10	26
Link Distance (ft)	512			1468	1468			2616	2616	2616		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		150	350			170	300				300	170
Storage Blk Time (%)			0	0	23	0	0					
Queuing Penalty (veh)			0	1	28	1	1					

Intersection: 1: Valleydale Rd & Riverchase Pkwy

Movement	SW	SW
Directions Served	T	T
Maximum Queue (ft)	193	197
Average Queue (ft)	110	110
95th Queue (ft)	179	181
Link Distance (ft)	2824	2824
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)	2	
Queuing Penalty (veh)	0	

Intersection: 2: Riverchase Pkwy & Woods of Riverchase Dr

Movement	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	LTR	UL	T	T	R	L	T	TR
Maximum Queue (ft)	108	107	90	115	122	130	46	43	160	195
Average Queue (ft)	48	45	35	55	35	50	4	5	48	67
95th Queue (ft)	94	81	77	96	90	109	25	27	121	154
Link Distance (ft)		679	952		1468	1468			1150	1150
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	120			130			115	115		
Storage Blk Time (%)	0	0		0	0	0	0		1	
Queuing Penalty (veh)	0	0		0	0	0	0		0	

Intersection: 3: Riverchase Pkwy & Regions Dr

Movement	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	R	L	T	T
Maximum Queue (ft)	235	66	135	184	97	93	187	215
Average Queue (ft)	114	26	51	72	15	21	52	66
95th Queue (ft)	198	52	108	146	59	58	135	160
Link Distance (ft)	829	829	1150	1150			762	762
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)					90	100		
Storage Blk Time (%)				3	0		2	
Queuing Penalty (veh)				2	0		1	

Intersection: 4: Riverchase Pkwy & Regions Gated Access

Movement	SW
Directions Served	R
Maximum Queue (ft)	110
Average Queue (ft)	46
95th Queue (ft)	83
Link Distance (ft)	243
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Parkway Lake Dr/Parkway Office Cir S & Riverchase Pkwy

Movement	EB	EB	EB	WB	WB	WB	WB	NE	SW	SW
Directions Served	L	T	TR	UL	T	T	R	LTR	L	TR
Maximum Queue (ft)	124	232	219	158	235	312	150	146	528	279
Average Queue (ft)	44	59	66	56	95	120	47	53	319	104
95th Queue (ft)	114	171	173	114	186	239	159	119	471	214
Link Distance (ft)		328	328		555	555		702	1925	1925
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	100			180			125			
Storage Blk Time (%)	3	5		0	1	7	1			
Queuing Penalty (veh)	5	6		0	1	19	2			

Intersection: 6: Riverchase Pkwy & Riverchase Office Rd

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	T	TR	T	TR
Maximum Queue (ft)	28	138	148	174	168	184
Average Queue (ft)	7	68	25	38	17	19
95th Queue (ft)	26	112	92	118	86	92
Link Distance (ft)	409	455	1172	1172	728	728
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)			0		0	
Queuing Penalty (veh)			0		0	

Intersection: 7: Riverchase Pkwy & Parkway Office Cir N

Movement	EB	EB	WB	WB	SB
Directions Served	T	T	T	TR	R
Maximum Queue (ft)	74	86	108	102	125
Average Queue (ft)	8	8	23	27	65
95th Queue (ft)	40	46	74	77	104
Link Distance (ft)	805	805	728	728	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					230
Storage Blk Time (%)	0				
Queuing Penalty (veh)	0				

Intersection: 8: Parkway River Rd & Riverchase Pkwy

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	TR	LT	TR	LTR	LT	R
Maximum Queue (ft)	53	146	154	108	107	50	81	156
Average Queue (ft)	6	16	18	29	31	19	12	71
95th Queue (ft)	32	82	92	78	81	45	52	121
Link Distance (ft)		984	984	805	805	671	650	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	150							230
Storage Blk Time (%)		0						0
Queuing Penalty (veh)		0						0

Intersection: 9: US-31 & Riverchase Pkwy

Movement	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	R	L	T	T	R	L	L
Maximum Queue (ft)	196	128	208	330	612	632	284	630	642	301	170	220
Average Queue (ft)	97	37	88	158	399	422	59	385	392	12	159	216
95th Queue (ft)	177	97	173	373	605	612	210	595	605	126	189	233
Link Distance (ft)	688	688			984	984		2041	2041			
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			230	230			185			315	120	120
Storage Blk Time (%)			1	0	27		0	35	22		53	75
Queuing Penalty (veh)			4	1	47		0	12	2		326	462

Intersection: 9: US-31 & Riverchase Pkwy

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	1208	1205	275
Average Queue (ft)	1128	1109	85
95th Queue (ft)	1398	1411	293
Link Distance (ft)	1161	1161	
Upstream Blk Time (%)	56	28	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)			175
Storage Blk Time (%)	34	35	
Queuing Penalty (veh)	139	53	

Intersection: 10: US-31 & Parkway Lake Dr

Movement	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	L	L	R	T	T	L	L	T	T
Maximum Queue (ft)	68	73	98	191	150	47	80	178	196
Average Queue (ft)	35	36	41	85	49	7	27	71	81
95th Queue (ft)	62	67	74	151	114	30	62	157	171
Link Distance (ft)	2471	2471		872	872			2041	2041
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			500			180	180		
Storage Blk Time (%)					0			0	
Queuing Penalty (veh)					0			0	

Network Summary

Network wide Queuing Penalty: 1113

**EXHIBIT J**

OWNER'S AUTHORIZATION

See attached.



## OWNER'S AUTHORIZATION

The undersigned, REGIONS BANK, an Alabama state banking corporation ("Owner"), is the owner of that certain real property (the "Property") situated in the City of Hoover, Shelby County, Alabama which is more particularly described in Exhibit A attached hereto and incorporated herein by reference.

Owner hereby authorizes HEALTHCARE RESOURCES, LLC, an Alabama limited liability company ("Applicant"), their respective agents, employees and representatives to file with the City of Hoover, Alabama (the "City") a Planned Unit Development Zoning Application and Development Plan (the "PUD Plan") for the Property, conditioned upon the acquisition of the Property by Applicant.

In no event shall the Petition or the PUD Plan bind the Property prior to the acquisition of the Property by Applicant.

*[Signature Page Attached.]*

**REGIONS BANK**, an Alabama state banking corporation

By: *Paul Stivender*  
Printed Name: PAUL D. STIVENDER  
Title: SENIOR VICE PRESIDENT

STATE OF ALABAMA  
COUNTY OF JEFFERSON

This instrument was acknowledged before me this 2 day of August, 2023 by Paul Stivender; as Senior Vice President of **REGIONS BANK**, an Alabama state banking corporation.



*Randi L. Dicus*  
Notary Public  
My Commission Expires: 6/26/2024

**RANDI L. DICUS**  
Notary Public  
Alabama State at Large

## EXHIBIT A

### Legal Description of the Property

Lots 1 and 2, according to the plat of AmSouth Riverchase, as recorded in Map Book 18, Page 83, in the Office of the Judge of Probate of Shelby County, Alabama.

Tax Parcel Numbers:

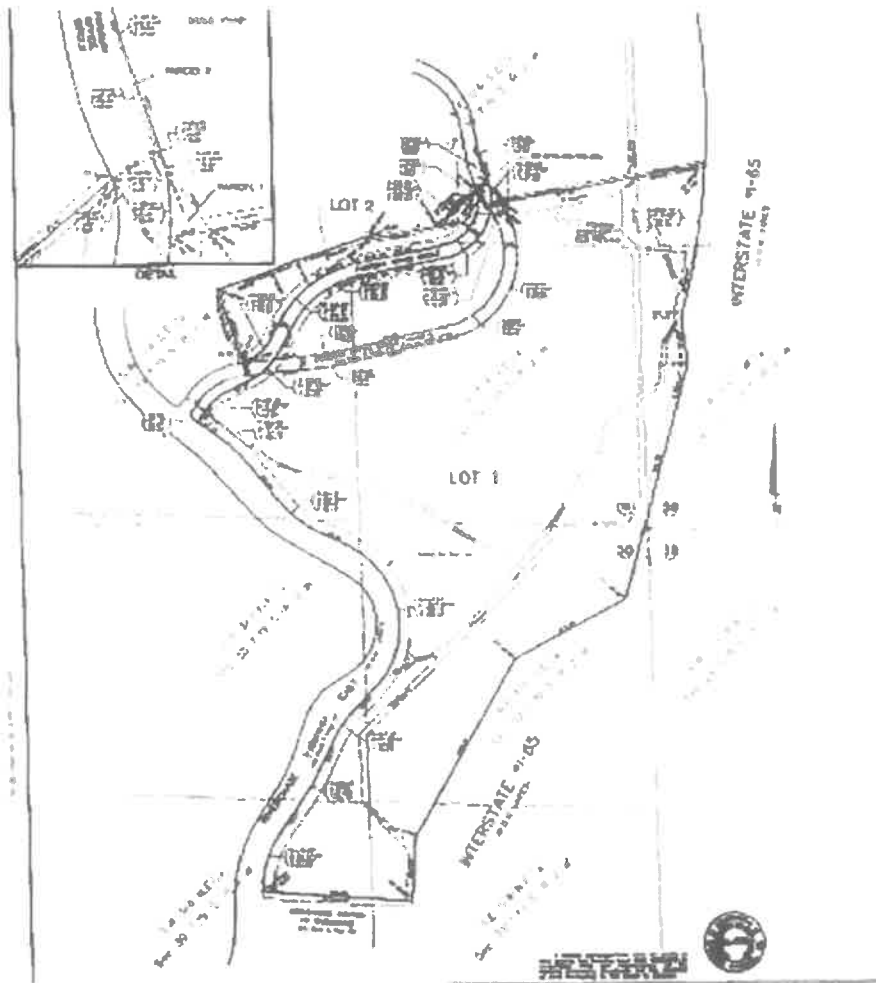
10 4 19 0 001 001.029

10 4 19 0 001 001.030

10 4 20 0 001 048.000

10 9 30 0 001 002.000

*[as more particularly depicted as follows]*



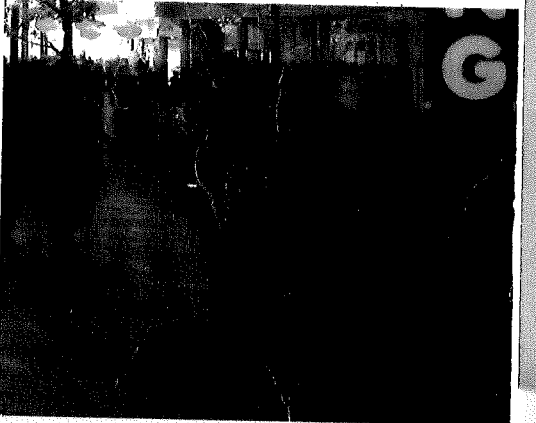
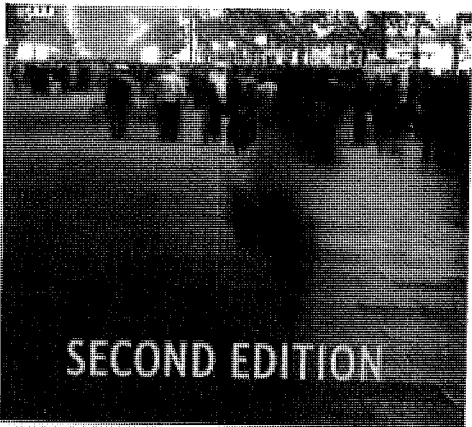
## **EXHIBIT K**

### **SHARED PARKING ANALYSIS**

A shared parking assessment will be conducted based upon the land uses proposed for the project in conjunction with the proposed site plan. The goals of the shared parking analysis would be to identify the actual parking demand for the proposed development and assist the design team in developing the parking demand for the site. The findings of the shared parking assessment would be documented in a report format for use by the Developer and design team. It is anticipated the Consultant will work with the design team in formulating the actual location of parking facilities within the project boundaries. The *Shared Parking, Third Edition* manual would be used as the basis for evaluating parking across the mixed-use development.

See Attached.

# SHARED PARKING



SECOND EDITION

# Foreword

Since the first edition of this book was published in 1983, the concept of shared parking has become well established as an important element of mixed-use developments, probably beyond the wildest dreams of its authors. That pioneering study demonstrated that when developments with complementary parking patterns were able to use the same parking, less was required. At the time, there was not even a generally accepted source of documented parking needs for individual land uses, so such data were developed as part of the original study. Over the subsequent two decades, shared parking has become a routine part of the design and approval of mixed-use developments. Parking needs have changed as a result of the evolution in mixed-use developments and changes in transportation, requiring a new look at the shared parking parameters advocated in 1983. With this publication, we are pleased both to validate the original study and to provide current data for a more complex mix of different potential land uses.

It is a tribute to the ground-breaking nature and thoroughness of the original shared parking study that it has taken so long to update it, and ULI could not have done it alone. Growing concerns from within and outside the ULI community made this project a priority for the Policy and Practice Committee. The publication of the third edition of *Parking*

*Generation* by the Institute of Transportation Engineers provided a rich source of current parking data for single land uses that served as a foundation for an updated shared parking study. The International Council of Shopping Centers partnered with us to make the study a reality. A national study team of experts was established and a lead consultant selected to direct and manage the work.

This new publication provides up-to-date parking parameters that will be useful now and well in the future for many users, including local governments, developers, shopping center owners, and lenders. These new guidelines should help those users to integrate parking and development in the most responsible way.

**Robert T. Dunphy**

*Project Director*

# Introduction

## The Concept of Shared Parking

Shared parking is the use of a parking space to serve two or more individual land uses without conflict or encroachment. The ability to share parking spaces is the result of two conditions:

- variations in the accumulation of vehicles by hour, by day, or by season at the individual land uses, and
- relationships among the land uses that result in visiting multiple land uses on the same auto trip.

Although the ULI methodology for shared parking analysis was developed in the early 1980s,<sup>1</sup> the concept of shared parking was already well established: a fundamental principle of downtown planning from the earliest days of the automobile has always been to share parking resources rather than to allocate parking for each use or building. The resurgence of many central cities resulting from the addition of vibrant residential, retail, restaurant, and entertainment developments continues to rely heavily on shared parking for economic viability. In addition, mixed-use

projects in many different settings have benefited from shared parking.

Parking is a key element of any site development plan. Parking can consume 50 percent or more of the building and land area of a development. An oversupply of parking can result in excess storm drainage impacts and unnecessarily high expenses (surface stalls can cost \$2,000 to \$3,000 per space and structured spaces \$15,000 to \$25,000 or more). Insufficient parking can result in the intrusion of parking into neighborhoods or adjoining properties, excessive vehicle circulation, and unhappy users. Ultimately, great parking alone won't make a mixed-use project successful; however, inadequate or poorly designed parking can limit its potential success.

The key goal of shared parking analysis, then, is to find the balance between providing adequate parking to support a development from a commercial viewpoint and minimizing the negative aspects of excessive land area or resources devoted to parking. Mixed-use developments that share parking result in greater density, better pedestrian connec-

tions, and, in turn, reduced reliance on driving, typically because multiple destinations can be accessed by walking. Higher-density development, especially on infill sites, is also more likely to support alternative modes of travel, including transit and carpools.

Concern for the negative impacts of growth has stimulated a search for better ways to develop land. "Smart growth" is a collection of planning principles and strategies designed to facilitate development without sprawl. Smart growth projects typically are designed to create transportation options and reduce driving, especially for short trips. Walkable live/work/play environments, located near established transportation and infrastructure resources, are central to the concept. Some communities are questioning the economic costs of abandoning infrastructure in the city only to rebuild it further out.<sup>2</sup> Ironically, a critical element of such pedestrian-oriented districts is adequate parking.

One of the hottest real estate trends is known as "place making," the development of town centers and urban villages with mixed uses in pedestrian-friendly settings. Another significant trend today is transit-oriented development, which seeks to cluster development near transit stations. With housing located within walking distance of rail transit, some trips and, in turn, some parking spaces can be eliminated.

Shared parking is a critical factor in the success of all these development approaches, and thus the importance of shared parking will continue to grow in future years. This report aims to provide planners, engineers, developers, and agencies with tools to better quantify and understand how shared parking can be successful.

## Objective of the Second Edition

The widely accepted methodology for shared parking analysis was established in 1983 with the publication of the first edition of *Shared Parking*. Two decades later, ULI and ICSC convened a working group of parking experts to examine the question of

whether shared parking is still appropriate, given changes in society, transportation, and mixed-use development trends. The consensus was that the underlying concept and methodology are still viable, but that an update of the default factors would be appropriate. The following three examples illustrate how changing trends have affected parking needs.

■ When *Shared Parking* was first published, a multiscreen cinema complex had two or three screens. By the late 1990s, new cinema developments had as many as 30 screens. It is far less likely that every seat in a 30-screen cineplex is filled than in a two- or three-screen cinema. The proliferation of these complexes has had a profound impact on the movie industry, and the parking needs of cineplexes will be discussed later in this report.

■ Changing lifestyles have led to a significant increase in the proportion of family meals eaten outside the home, which has caused a marked increase in the proportion of newly developed space that is occupied by restaurants. In 1955, 25 percent of expenditures for food in the United States was spent in restaurants (both limited and full service); in 2003, restaurants' share of the food dollar was 46.4 percent.<sup>3</sup>

■ As more women have joined the workforce, there has been an increase in the proportion of shopping trips that occur in evenings and a significant increase in "trip-chaining," owing to commuters making multiple stops to drop off or pick up children at daycare and to take care of household errands.

A committee of the Institute of Transportation Engineers (ITE) also agreed that the methodology recommended in the first edition of *Shared Parking* is still the correct approach to shared parking analysis, but it called for updating some default values.<sup>4</sup> It found that almost half of all local governments had incorporated shared parking into local codes, either directly or as an option, and many of those codes cited the ULI shared parking methodology.

The development of updated references on the parking needs of individual land uses also made an update of *Shared*



*Parking* timely. In 1998, ULI and ICSC commissioned an update of *Parking Requirements for Shopping Centers*, the most widely recognized reference regarding that land use. That reference's second edition recommended a 10 percent reduction in the parking ratio for centers over 600,000 square feet and modified its recommendations for centers with more than 10 percent of GLA in restaurant, entertainment, or cineplex uses.<sup>3</sup> In particular, when more than 20 percent of the space in centers is allocated to those uses, shared parking analysis should be employed to determine the appropriate number of parking spaces.

ITE also has updated its *Trip Generation*<sup>4</sup> and *Parking Generation*<sup>5</sup> publications. The third edition of *Parking Generation* includes four times as much data as the second edition, with over 100 land uses now incorporated. This document provides much-needed information on the parking needs of individual land uses, but it simply provides statistical analysis of the data. It makes no recommendations regarding appropriate parking ratios to be used in parking studies, including shared parking analysis. In fact, the limited data in many land use classifications are not statistically reliable, and professional experience and judgment must be employed in their use. One of the purposes of this report is to formulate recommendations regarding the parking ratios to be used in shared parking analysis, using, to the extent appropriate, the data found in *Parking Generation*. Both documents are complementary.

ULI and ICSC concluded that the timely coordination of an updated *Shared Parking* publication with these other documents would result in a vastly improved set of tools for transportation planners to determine the appropriate number of parking spaces for mixed-use developments.

## Definition of Terms

A key to understanding the shared parking methodology is the definition of terms and assumptions inherent in the use of those terms.

**Parking ratio** is the number of parking spaces that should be provided per unit of land use, if parking serves only that land use. The ratios recommended herein are based on the expected peak accumulation of vehicles at the peak hour on a design day (see below), assuming nearly 100 percent modal split to auto use and minimal ridesharing. The recommended ratios also include consideration of effective supply issues.

**Parking accumulation** is the number of parked vehicles observed at a site.

**Parking supply** is the total number of spaces available to serve a destination. It may include spaces that are on site, off site, on street, or shared with other uses.

**Effective parking supply** is the number of occupied spaces at optimum operating efficiency. A parking facility will be perceived as full at somewhat less than its actual capacity, generally in the range of 85–95 percent occupancy. (The range is because regular users learn where spaces are likely to be available at a particular time of day and thus require less of an extra cushion than unfamiliar users.) It is appropriate to have a small cushion of spaces over the expected peak-hour accumulation of vehicles. The cushion reduces the need to search the entire system for the last few parking spaces, thus reducing patron frustration. It further provides for operating fluctuations, misparked vehicles, snow cover, vehicle maneuvers, and vacancies created by reserving spaces for specific users, such as disabled parking. The effective supply cushion in a system also provides for unusual peaks in activities.

**A design day or design hour** is one that recurs frequently enough to justify providing spaces for that level of parking activity. One does not build for an average day and have insufficient supply for the peak (if not multiple) hours on 50 percent of the days in a year. Conversely, it is not appropriate to design for the peak accumulation of vehicles ever observed at any site with that land use. That peak accumula-

tion might last only for an hour or so, while there are 8,760 hours in a year. A traffic engineer does not design a street system to handle the peak volume that would ever occur; instead, the level of activity that represents the 85th or 90th percentile of observed traffic volumes in peak hours on average days is used for design. This second edition of *Shared Parking* uses the 85th percentile of peak-hour observations for recommended parking ratios, unless otherwise noted. See chapter 3 for further discussion of design hour issues.

**Mode adjustment** is employed to adjust the base parking ratios for local transportation characteristics. Two factors must be considered in such adjustments: modal split for private auto and auto occupancy, both of which are terms commonly used in transportation planning. The parking ratios herein assume that nearly all users arrive by private auto with typical auto occupancy for the specific use. It should be noted that even in locations without transit, some walking and dropoffs occur, as well as some ridesharing. The base ratios are appropriate for conditions of free parking and negligible use of public transit. The mode adjustment then reflects local transit availability, parking fees, ride sharing programs, and so on. See chapter 3 for further discussion of mode adjustments.

**Modal split** is the percentage of persons arriving at a destination in different modes of transportation. Among the modes that may be available are commuter rail, light rail, bus, private automobile (including trucks, vans, and SUVs used for personal transportation), carpools and vanpools, walking, and bicycling. The percentage of persons who arrive at the destination by private automobile is generally called "auto mode split" and includes both driver and passengers.

**Auto occupancy** is the average number of persons per private automobile arriving at the destination. Vehicle occupancy (as employed in transportation planning) refers to the average number of persons per vehicle including all vehicle types, such as public and chartered buses.

**Noncaptive ratio** is an estimate of the percentage of parkers at a land use in a mixed-use development or district who are not already counted as being parked at another of the land uses. For example, when employees of one land use visit a nearby food court or coffee store, there usually is not any additional parking demand generated. See chapter 3 for further discussion.

### Units of Land Uses

Parking ratios are generally stated as a ratio of  $x$  spaces per  $y$  units, with the unit being the most statistically valid independent variable for that land use. In the vast majority of uses, the unit is square feet of building area. Other units that may be used are employees, dwelling units, hotel rooms, or seats. This publication uses the most widely accepted independent variable, generally in accordance with *Parking Generation*. The following terms describe specific formulas for parking ratios.

**Gross Floor Area (GFA):** Total gross floor area, including exterior building walls of all floors of a building or structure. Also referred to as gross square feet or GSF.

**Gross Leasable Area (GLA):** The portion of GFA that is available for leasing to a tenant. Generally, GLA is equal to GFA less "common" areas that are not leased to tenants, including spaces for circulation to and from tenant spaces (lobbies, elevator cores, stairs, corridors, atriums, and so on), utility/mechanical spaces, and parking areas.

**Net Floor Area (NFA):** Total floor area, excluding exterior building walls.

**Net Rental Area (NRA):** The portion of NFA that is rentable to a tenant. Also called net leasable area.

Thus, GFA and GLA are calculated out-to-out of exterior walls, while NFA and NRA are calculated between interior faces of exterior walls. GLA is commonly used for shopping centers, but GFA or NFA is more commonly used for office uses. No matter what calculation method is employed, the

vehicular parking and loading areas and the floor area occupied by mechanical, electrical, communications, and security equipment are deducted from the floor area for the purpose of calculating parking needs.

### **Organization of This Report**

Chapter 2 of this report presents key findings, including the recommended default values for shared parking analysis. Chapter 3 discusses the methodology, with an example analysis, and chapter 4 discusses the parking needs of individual land uses and the derivation of the default values. Chapter 5 presents case studies, while chapter 6 discusses the design, operation, and management of shared parking.

### **Notes**

1. ULI-the Urban Land Institute, *Shared Parking* (Washington, D.C.: ULI-the Urban Land Institute, 1983).
2. "About Smart Growth," [www.smartgrowth.org/about](http://www.smartgrowth.org/about) (October 2003).
3. 2004 Restaurant Industry Forecast, National Restaurant Association.
4. ITE Technical Council Committee 6F-52, *Shared Parking Planning Guidelines* (Washington, D.C.: Institute of Transportation Engineers, 1995).
5. ULI-the Urban Land Institute and the International Council of Shopping Centers, *Parking Requirements for Shopping Centers*, 2nd ed. (Washington, D.C.: ULI-the Urban Land Institute, 1999).
6. ITE Technical Council Committee, *Trip Generation*, 7th ed. (Washington, D.C.: Institute of Transportation Engineers, 2004).
7. ITE Technical Council Committee, *Parking Generation*, 3rd ed. (Washington, D.C.: Institute of Transportation Engineers, 2004).

**EXHIBIT L**

HARBERT EQUITABLE JOINT-VENTURE CONSENT

See attached.

## CONSENT

THIS CONSENT AGREEMENT is made and entered into as of September \_\_, 2023 by **Harbert Corporation**, a Delaware corporation, successor-by-merger to Harbert Corporation, an Alabama corporation, successor-by-merger to **Harbert Properties Corporation**, an Alabama corporation (“**Harbert**”), in favor of **HealthCare Resources, LLC**, an Alabama limited liability company or its designees (“**HCR**”).

**WHEREAS**, Blue Cross and Blue Shield of Alabama, an Alabama not for profit corporation (“**Blue Cross**”), and the Harbert-Equitable Joint Venture, an Alabama general partnership under the Joint Venture Agreement dated January 30, 1974 (the “**Venture**”), a joint venture composed of Harbert and The Equitable Life Assurance Society of the United States, entered into to that certain Land Use Agreement as recorded in Book 19, page 690, as amended by the Amendment to Agreement recorded in Book 15, page 64, and as further amended by the Amendment to Agreement recorded in Real Volume 381, page 465, in the Office of the Judge of Probate of Shelby County, Alabama (as amended, the “**Agreement**”), which identified certain properties in an area known as Riverchase and, among other things, imposing certain use restrictions on such properties;

**WHEREAS**, HCR wishes to buy certain property covered by the Agreement which is currently owned by Regions Bank as more particularly described on Exhibit A attached hereto (the “**Regions Property**”) so long as HCR can obtain the consent of Harbert for the development and use of the Regions Property in a manner permitted by the Riverwalk Planned Unit Development Zoning Application and Development Plan and First Amendment to the Riverchase Planned Unit Development Regulations, and Conditional Use Application filed with the City of Hoover, Alabama, on August 14, 2023 (the “**Riverwalk PUD Application**”); and

**WHEREAS**, Harbert is willing to consent to the development and land uses contemplated by the Riverwalk PUD Application subject to the conditions set forth below.

**NOW, THEREFORE**, in consideration of \$10.00 and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Harbert hereby Consents and agrees as follows:

1. Harbert hereby consents to and approves development and use of the Regions Property in accordance with the proposed in the Riverwalk PUD Application, including any residential uses.
2. In the event HCR or one or more of its designees (the “**Buyers**”) do not purchase the Regions Property from Regions Bank, the forgoing consent shall be null and void.
3. Upon completion of the purchase of the Regions Property by the Buyers, this Consent may be filed at the option of the Buyers in the Office of the Judge of Probate of Shelby County, Alabama.

- The remainder of this page is intentionally left blank -

IN WITNESS WHEREOF, the undersigned Harbert has caused this Consent to be executed as of the date first written above.

“Harbert:”

Harbert Corporation

By: Raymond J. Harbert

Name: Raymond J. Harbert Jr.

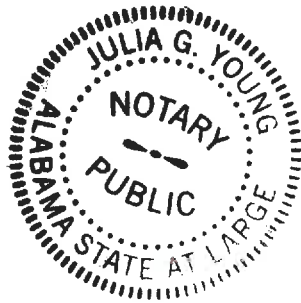
Title: VP + CFO

STATE OF Alabama )  
COUNTY OF Jefferson )

I, the undersigned, a Notary Public in and for said County and State, hereby certify that Raymond J. Harbert, Jr., whose name as VP + CFO of **Harbert Corporation**, is signed to the foregoing instrument and who is known to me (or satisfactorily proven), acknowledged before me on this day that, being informed of the contents of the instrument, he, as such officer and with full authority, executed the same voluntarily (on the day the same bears date) on behalf of such corporation for and as the act of said corporation.

Given under my hand and official seal on the 15<sup>th</sup> day of September, 2023.

[NOTARY SEAL]



Julia G. Young Notary Public

My commission expires: 4/27/27

This instrument prepared by:  
Tom Ansley  
Dentons  
2311 Highland Avenue South  
Birmingham, Alabama 35205

## **Exhibit A**

### **Legal Description of Regions Property**

Lots 1 and 2, according to the Survey of AmSouth Riverchase, as recorded in Map Book 18, Page 83, in the Office of the Judge of Probate of Shelby County, Alabama.

**EXHIBIT M**

RIVERCHASE BUSINESS ASSOCIATION CONSENT

See attached.



STATE OF ALABAMA )  
COUNTIES OF JEFFERSON AND SHELBY )

**AMENDMENT NO. 3  
TO THE DECLARATION OF PROTECTIVE COVENANTS, AGREEMENTS,  
EASEMENTS, CHARGES AND LIENS FOR RIVERCHASE (BUSINESS)**

THIS AMENDMENT NO. 3 TO THE DECLARATION OF PROTECTIVE COVENANTS, AGREEMENTS, EASEMENTS, CHARGES AND LIENS FOR RIVERCHASE (BUSINESS) (this “Amendment”) is made and entered into as of the \_\_\_\_ day of \_\_\_\_\_, 2023 by and among the undersigned owners (collectively, the “Owners”) of Member’s Property subject to the Declaration, as hereinafter defined.

**RECITALS:**

The Harbert-Equitable Joint Venture has heretofore entered into that certain Declaration of Protective Covenants, Agreements, Easements, Charges and Liens for Riverchase (Business) dated January 30, 1974 and recorded in Real 1236, Page 881 in the Office of the Judge of Probate of Jefferson County, Alabama and in Book 13, Page 30 in the Office of the Judge of Probate of Shelby County, Alabama, as amended by Amendment No. 1 thereto, as recorded in Real 1294, Page 30 in the Office of the Judge of Probate of Jefferson County, Alabama and in Book 15, Page 189 in the Office of the Judge of Probate of Shelby County, Alabama (collectively, the “Original Declaration”).

The Original Declaration was amended and restated in its entirety pursuant to Amendment No. 2 to the Declaration of Protective Covenants, Agreements, Easements, Charges and Liens for Riverchase (Business) which has been recorded in Real 1473, Page 570 in the Office of the Judge of Probate of Jefferson County, Alabama and in Book 19, Page 633 in the Office of the Judge of Probate of Shelby County, Alabama (collectively, the “Declaration”). *Capitalized terms not otherwise expressly defined herein shall have the same meanings given to them in the Declaration.*

Regions Bank is the owner of that certain real property (the “Regions Commercial Property”) which is more particularly described in **Exhibit A** attached hereto and incorporated herein by reference. The Regions Commercial Property is currently subject to all of the terms and provisions of the Declaration.

Regions Bank is also the owner of that certain real property (the “Regions Residential Property”) which is more particularly described in **Exhibit B** attached hereto and incorporated herein by reference. The Regions Residential Property is currently subject to all of the terms and provisions of the Declaration.

Regions Bank, with the consent and approval of the undersigned Owners, desires to (a) remove the Regions Commercial Property from certain provisions of the Declaration and (b) remove the Regions Residential Property from all of the terms and provisions of the Declaration.

Pursuant to Section 15.8 of the Declaration, after December 31, 2000, the Declaration may be amended by an instrument signed by not less than fifty-five percent (55%) of the Parcel Owners.

The undersigned Owners constitute at least fifty-five percent (55%) of the Parcel Owners whose Parcels are subject to the terms and provisions of the Declaration and desire to amend the Declaration as hereinafter provided.

NOW, THEREFORE, in consideration of the premises and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the undersigned Owners do hereby amend the Declaration as follows:

1. Amendments to Declaration with Respect to Regions Commercial Property.

(a) From and after the date hereof, no portion of the Regions Commercial Property shall be subject to any of the terms and provisions of Article XI of the Declaration.

(b) From and after the date hereof, the provisions of Sections 12.1.1, 12.1.2, 12.2, 12.3, 12.4, 12.11 and 15.1 of the Declaration shall no longer be applicable to or binding upon any of the Regions Commercial Property.

(c) Notwithstanding anything contained herein or in the Declaration, for the sole purposes of calculating the Annual Charge for the Regions Commercial Property pursuant to Article III of the Declaration, the Annual Charge for the Regions Commercial Property shall be no less than \$3,828.00, which is the sum of the Annual Charge in 2023 for both the Regions Commercial Property and the Regions Residential Property.

2. Amendments to Declaration with Respect to Regions Residential Property. From and after the date hereof, no portion of the Regions Residential Property shall be subject to any of the terms and provisions of the Declaration and all of the Regions Residential Property is hereby removed from all of the terms and provisions of the Declaration. Furthermore, Exhibit A to the Declaration is amended by providing that the Regions Residential Property (as described in **Exhibit B** to this Amendment) is expressly excluded and removed from, and shall no longer be considered part of, the Riverchase Property.

3. Adoption of the Amendment to Riverchase PUD. In the event the City of Hoover, Alabama fails to approve the 2023 Amendment to the Riverchase Planned Unit Development Regulations, and Conditional Use Application filed with the City of Hoover, Alabama, on August 14, 2023, this Amendment shall be null and void.

4. Full Force and Effect. Except as otherwise modified and amended herein, all of the terms and provisions of the Declaration shall remain in full force and effect.

5. Counterparts. This Amendment may be executed in two or more separate counterparts, each of which, when so executed and delivered, shall constitute an original, and such counterparts shall together constitute one and the same instrument.

IN WITNESS WHEREOF, the undersigned, constituting at least fifty-five percent (55%) of the Parcel Owners have executed this Amendment and do hereby consent to and approve of all of the terms and provisions of this Amendment.

[-Signature pages to follow-]

**APPROVAL AND CONSENT TO AMENDMENT**

The undersigned, being an owner of a commercial lot within Riverchase and a member of the Riverchase Business Association, Inc., hereby consents to and approves of all of the terms and provisions of the foregoing Amendment.

\_\_\_\_\_  
[Name of Owner]

By: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date of Execution: \_\_\_\_\_

STATE OF \_\_\_\_\_ )

:

COUNTY OF \_\_\_\_\_ )

I, the undersigned, a Notary Public, in and for said County in said State, hereby certify that \_\_\_\_\_, whose name as \_\_\_\_\_ of \_\_\_\_\_, is signed to the foregoing instrument and who is known to me, acknowledged before me on this day that, being informed of the contents of the instrument, he or she, as such officer and with full authority, executed the same voluntarily for and as the act of said corporation.

Given under my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2023.

\_\_\_\_\_  
Notary Public

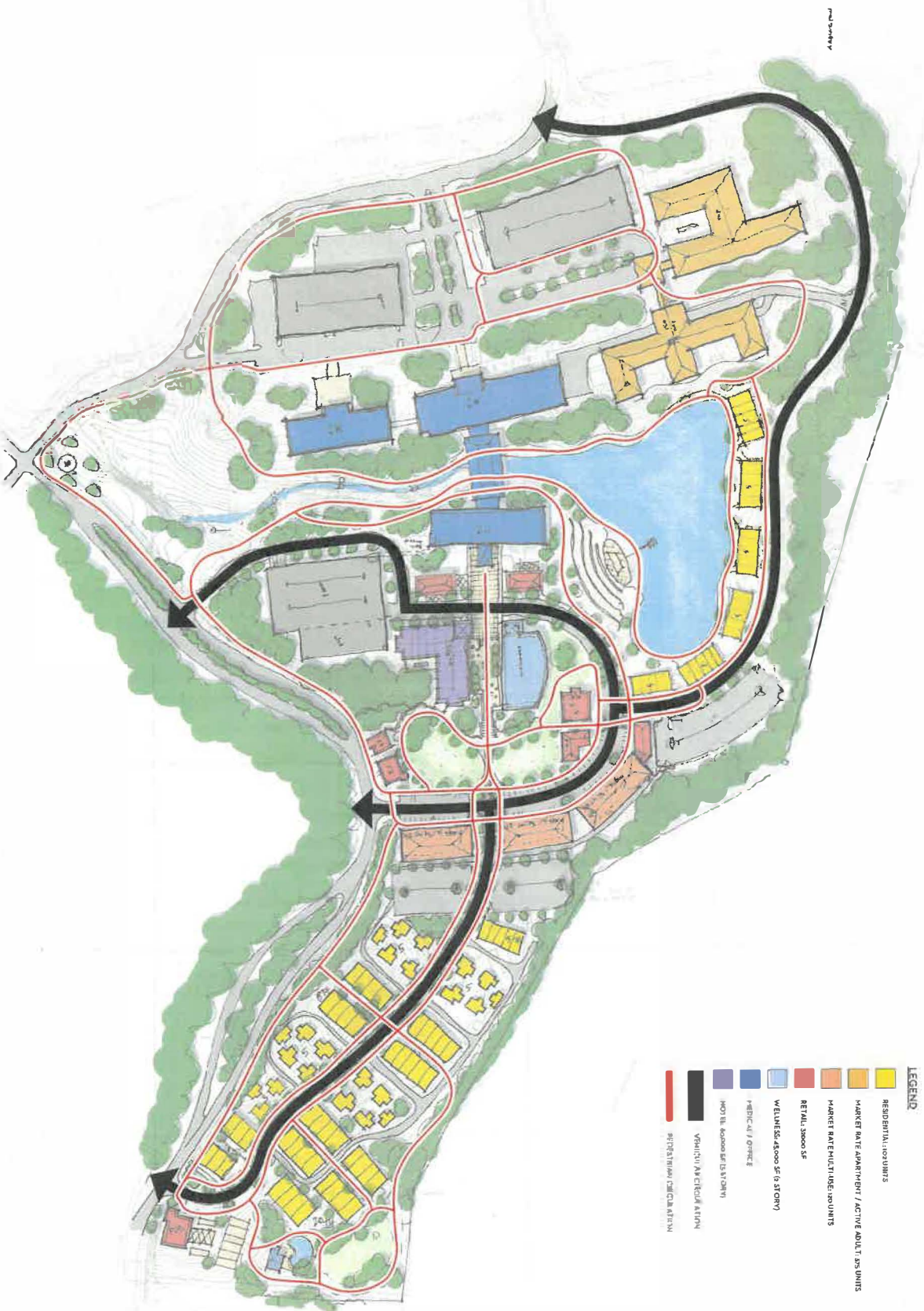
[NOTARIAL SEAL]

My commission expires: \_\_\_\_\_

**EXHIBIT N**

CIRCULATION PLAN

See attached.



- LEGEND**
- RESIDENTIAL: 100 UNITS
  - MARKET RATE APARTMENT / ACTIVE ADULT: 150 UNITS
  - MARKET RATE MULTIFAMILY: 100 UNITS
  - RETAIL: 30,000 SF
  - WELNESS: 40,000 SF (5 STORIES)
  - MEDICAL / OFFICE
  - HOTEL: 40,000 SF (2 STORIES)
  - VEHICULAR CIRCULATION
  - PREFERRED CIRCULATION

This plan is conceptual and schematic in nature. All amenities, buildings, structures, roadways, and land uses are subject to change, at any time, by the Applicants pursuant to Sections C. 5 (f), (g), and (h), of this Amendment.

# RIVERWALK CIRCULATION PLAN

10.03.2023



**SUPPLEMENT**

Deviations from Ordinances and Regulations

See attached.

**SUPPLEMENT**

**TO**

**2023 AMENDMENT TO THE RIVERCHASE PLANNED UNIT DEVELOPMENT  
ZONING REGULATIONS AND CONDITIONAL USE APPLICATION**

*Capitalized terms shall have the same meanings given to them in this Amendment.*

Deviations from the

Municipal Code of the City of Hoover, Alabama, Appendix I,  
Zoning Ordinance, as amended (the “Zoning Ordinance”),

and

Municipal Code of the City of Hoover, Alabama, Appendix II,  
Subdivision and Development Regulations, as amended (the “Subdivision Regulations”).

*This Supplement was prepared in good faith and any errors or omissions are unintentional and shall render any content or provision the of the Amendment to be excluded or nullified.*



Municipal Code of the City of Hoover, Alabama, Appendix I,  
Zoning Ordinance, as amended (the “Zoning Ordinance”).

Deviations from Articles 8, 11, 13, and Table 8.1 of the Zoning Ordinance are as follows:

Appendix I Zoning Ordinance.

§8.04.01 Planned Single Family (PR-1), and §8.04.01 Planned Multi-Family (PR-2)

B. Use regulations. The following are permitted principal uses:

All of the Land Uses set forth in the Land Use Regulations of **Exhibits F-3** as permitted uses within the Planned Commercial with Conditional Use for Mixed-Use Land Area are permitted principal uses within the Property developed as PR-1, or PR-2 including, but not limited to: community amenities (including swimming pools, clubhouses, lawns, grassed areas, gardens, detention and retention areas, ball courts and other recreational facilities, parks, open spaces, common areas and entrance signs and features.

D. Area and dimensional regulations as shown in **Exhibit G-1.**

- 1) Minimum lot width: reduce 25’ to 16’,
- 2) Building setbacks: reduce front, side, and rear to 0’,
- 3) a), b), c), and d) - Minimum livable floor area reduce to 500 sf,

§11.02.02 Location of Parking.

- A. Permit required parking on street and in common areas. Parking may not be provided on the same lot as the residential dwelling unit and/or be part of a shared parking analysis in **Exhibit K.**

§8.04.04 Planned Commercial (PC).

B. Use regulations. The following uses are permitted uses:

All of the Land Uses set forth in the Land Use Regulations of **Exhibit F-3** as permitted uses within the Planned Commercial with Conditional Use for Mixed-Use Land Area are permitted principal uses within the Property.

- C. Maximum Building Height. There is no maximum building height in this Amendment.

§8.04.04 C. Planned Commercial with Conditional Use for Mixed Use.

This Amendment also constitutes a conditional use request pursuant to §2.04 of the Zoning Ordinance to allow Planned Commercial with Conditional Use for Mixed-Use for all of the Property. This Amendment shall also be deemed an approval by the City of the conditional uses for Planned Commercial with Conditional Use for Mixed-Use for the Property allowing the mixed-use of commercial and residential land uses which include as permitted principal uses any uses found within the PR-1, PR-2, PC, and PO land use districts created under Article 8 of the Zoning Ordinance, and for Planned Industrial Conditional Uses, as shown on **Exhibit F-3** attached hereto. Accordingly, the land use table provided in **Exhibit F-3** shall supersede all use permissions set forth in Article 8 of the Zoning Ordinance. The Conceptual Master Land Use Plan and Conditional Use Plan may be amended to change the uses and configurations as set forth for a “Major Change” as defined in Section C.5(g) herein and Minor Change as defined in Section C.5(g) herein.

§8.04.06 Off-Street Parking and Loading Requirements.

Cross-parking agreements, including parking studies which reflect low use times versus peak use times for different uses within the Property (*i.e.*, office use during office hours versus hotel parking during nighttime and early morning hours) shall satisfy, in whole, or in part, required parking as set forth in **Exhibit F-2** parking and shared parking, as determined by a Shared Parking Analysis as referenced in **Exhibit K** may be utilized to satisfy the parking requirements established in **Exhibit F-2** order to reduce impervious surfaces within the Property,.

§8.08 Definitions.

In addition to the defined terms set forth elsewhere in this Amendment, terms shall have the meanings set forth **Exhibit F-1** which meanings shall be applicable to both the singular and plural forms and tenses of such terms.

Table 8.1 Use Regulations, PUD District. See **Exhibit F-3.**

Article 13. Tree Conservation, Buffers, and Landscaping.

§13.02.09: Site has previously been developed, therefore §13.02.09 and Table 13-1 shall not apply.

§13.02.9 E: Required trees per individual lot may be accommodated within the common areas, the right-of-way, or elsewhere on site.

§13.03: Walls, fences and impervious buffers create unnecessary division between compatible but varied land uses. The ARC shall regulate the required landscape requirements between lots and land uses.

§13.04.02 A.1: Up to 75% of required trees and landscape areas may be provided in Common Areas or elsewhere on the Property.

§13.04.02 B.1: The developer intends to plant some or all of the required landscaping and trees within the adjacent public street right-of-way.

§13.04.02 B.2: The ARC shall require planting beds that reduce visibility of parking areas from the right-of-way but not necessarily require shrubs to be 30” height at installation or planted in double staggered row.

§13.05: Design/Build irrigation contractor may install systems with tap of one inch or less without submitting an irrigation plan for approval.

§13.06: The Tree Conservation Plan submitted herein shall be approved without submission of financial guarantee, however, a financial guarantee may be required for building permits.

Other Provisions:

Tree Selection and Cover Guide: The ARC may allow and approve trees that may not be listed in the Ordinance.

A landscape planting plan shall be submitted to the City at the time of each submission for preliminary plat.

[Remainder of this page intentionally left blank.]

Municipal Code of the City of Hoover, Alabama, Appendix II,  
Subdivision and Development Regulations, as amended (the “Subdivision Regulations”).

Deviations from Appendix II and Appendix A are as follows:

Appendix II Subdivision Regulations.

Article V Design Standards.

§1.11 Alignment and Visibility: reduction in horizontal and vertical curves based on design speed of roadway.

§1.15 Design Speed:

[1.] Local Street: reduction of design speeds.

§3.1 Lots. Lot Dimensions for Residential Land Use are shown in **Exhibit G-1**.

Appendix A. Design Standards.

Article III Streets; minimum requirements are shown in **Exhibit G-2**.

§5 Sidewalks.

(k) Green space not required between back of curb or valley gutter and sidewalk based on design speed of roadway

Article VIII Standard Drawings

Roadway Cross Sections which may include a 12-foot lane width (measured from front of curb to front of curb).

Bicycle, jogging and similar paths, lanes and crossings may be constructed within the rights-of-way of any public or private roadways.

Sidewalks and pedestrian ways, if any, street, and accent lights (including streetlights), irrigation systems, landscaped areas, and project identification signage may be located within the rights-of-way (including medians) of any public roadways.

Permanent street signage, directional signage for Property amenities and facilities, and project identification signage shall be allowed within all public or private road rights-of-way (including medians).

**EXHIBIT 2**  
**CONDITIONS TO APPROVAL**

1. All items listed below must be addressed to the satisfaction of the City Engineer of the City of Hoover:
  - I. Indicate what additional improvements are being proposed to accommodate the excessive vehicle queuing shown in Tables 8 and 9 from the Traffic Impact Study for the study intersections as a result of the future development traffic conditions.
  - II. Re-evaluate the Riverchase Parkway/Valleydale Road intersection with the correct outbound traffic volumes, and with coordinated operation.
  - III. Provide updated traffic signal timing plans/schedules for the six (6) signalized intersections on Riverchase Parkway East between Highway 31 and Valleydale Road to accommodate the future development traffic conditions.
  - IV. Provide any needed signal timing adjustments, while maintaining the current cycle lengths, to the Riverchase Parkway East/Valleydale Road intersection to accommodate the future development traffic conditions.
  - V. Provide any needed signal timing adjustments, while maintaining the current cycle lengths, to the Riverchase Parkway East/Highway 31 intersection to accommodate the future development traffic conditions.
  - VI. Provide updated turn lane evaluations and capacity analysis for each of the study intersections based on AM & PM peak traffic conditions with all of the recommended improvements in place from the Traffic Impact Study and from the five (5) items listed above.
  - VII. Parking studies of the planned unit development are to be conducted as each phase of development is permitted.
  - VIII. Traffic calming measures are to be identified where needed as each phase of development is permitted. Two of the locations that will need to be addressed are:
    - a. The long, uninterrupted roadway that runs behind the six (6) residential buildings on the east side of the lake.
    - b. The two (2) parallel north/south running roadways that run between, and on the east side of the residential units on the south end of the site.
  - IX. The Traffic Impact Study will indicate whether each internal roadway is to be public or private.
2. Any improvements outlined in the Traffic Impact Study are the responsibility of the developers.