Appendix B

Technical Memoranda and Reports

Technical memoranda and reports were prepared as independent documents to support the preparation of the Draft Environmental Impact Statement (DEIS) for the Cotton Belt Corridor Regional Rail Project. Information from these documents was incorporated into the DEIS to provide information on existing conditions, and in some cases assess potential impacts to the resources. Information contained in the DEIS is the most current and supersedes information in the technical memoranda and reports.
B-11

Air Quality Technical Memorandum
Memo

Date: Thursday, July 27, 2017
Project: Task Order #32 – Cotton Belt Corridor
To: John Hoppie, Project Manager, DART Capital Planning
From: Tom Shelton, GPC6 Program Manager
Subject: DART GPC VI; Contract Number: C-2012668; Cotton Belt Corridor Air Quality Existing Conditions Technical Memorandum

**Introduction:** This technical memorandum summarizes the regulatory guidance, methodology and existing conditions related to air quality along the Dallas Area Rapid Transit (DART) Cotton Belt Corridor. As part of DART Board policy, environmental documentation was prepared to Federal standards. This allows DART to pursue federal funding as part of its funding strategy.

The U.S. Environmental Protection Agency (EPA) regulates air quality. The EPA delegates this authority to the governor, who has delegated authority to the Texas Commission on Environmental Quality (TCEQ) for monitoring and enforcing air quality regulations in Texas. The North Central Texas Council of Governments (NCTCOG) conducts air quality modeling for the region.

**Regulatory Context:** The federal Clean Air Act (CAA) of 1970 and the Clean Air Act Amendments (CAAA) of 1977 and 1990 require that states adopt ambient air quality standards. The standards have been established, TCEQ, to protect the public from potentially harmful amounts of pollutants. The EPA has set national ambient air quality standards (NAAQS) for the following six criteria pollutants: ozone ($O_3$), particulate pollution (PM10, PM2.5), nitrogen dioxide ($NO_2$), carbon monoxide (CO), sulfur dioxide ($SO_2$) and lead (Pb). Table 1 lists the NAAQS for these six pollutants. The CAA established two types of standards for these major pollutants: primary and secondary. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation and buildings.

The CAAA requires all states to submit a list identifying those air quality regions, or portions thereof, which meet or exceed the NAAQS or cannot be classified because of insufficient data. Portions of air quality control regions that are shown by monitored data or air quality modeling to exceed the NAAQS for any criteria pollutant are designated “nonattainment” areas for that pollutant. The CAAA also establishes time schedules for the states to attain the NAAQS.
Table 1. Air Pollution Concentrations Required to Exceed the NAAQS

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Averaging Period</th>
<th>Standard</th>
<th>Primary NAAQS*</th>
<th>Secondary NAAQS**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ozone (O₃)</td>
<td>8-hour</td>
<td>The average of the annual fourth highest daily eight-hour maximum over a three-year period is not to be at or above this level.</td>
<td>0.070 ppm</td>
<td>0.070 ppm</td>
</tr>
<tr>
<td>Carbon Monoxide (CO)</td>
<td>1-hour</td>
<td>Not to be exceeded more than once per calendar year.</td>
<td>35 ppm</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>8-hour</td>
<td>Not to be exceeded more than once per year calendar year.</td>
<td>9 ppm</td>
<td>--</td>
</tr>
<tr>
<td>Sulfur Dioxide (SO₂)</td>
<td>1-hour</td>
<td>Three year average of the annual 99th percentile of the daily maximum 1-hour average is not to be at or above this level.</td>
<td>75 ppb</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>3-hour</td>
<td>Not to be at or above this level more than once per calendar year.</td>
<td>--</td>
<td>0.05 ppm</td>
</tr>
<tr>
<td>Nitrogen Dioxide (NO₂)</td>
<td>1-hour</td>
<td>Three year average of the annual 98th percentile of the daily maximum 1-hour average is not to be at or above this level.</td>
<td>100 ppb</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>Annual</td>
<td>Not to be at or above this level.</td>
<td>53 ppb</td>
<td>53 ppb</td>
</tr>
<tr>
<td>Particulate Pollution (10 microns or less) (PM₁₀)</td>
<td>24-hour</td>
<td>Not to be at or above this level on more than three days over three years with daily sampling.</td>
<td>150 µg/m³³</td>
<td>150 µg/m³³</td>
</tr>
<tr>
<td>Particulate Pollution (2.5 microns or less) (PM₂.₅)</td>
<td>24-hour</td>
<td>The three-year average of the annual 98th percentile for each population-oriented monitor within an area is not to be at or above this level.</td>
<td>35 µg/m³³</td>
<td>36 µg/m³³</td>
</tr>
<tr>
<td></td>
<td>Annual</td>
<td>The three-year average of annual arithmetic mean concentrations from single or multiple community-oriented monitors is not to be at or above this level.</td>
<td>12 µg/m³³</td>
<td>15.0 µg/m³³</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>3-Month</td>
<td>Three-month rolling average not to be at or above this level.</td>
<td>0.15 µg/m³³</td>
<td>0.15 µg/m³³</td>
</tr>
</tbody>
</table>

Source: USEPA, April 2017 (USEPA, 2017)

*Primary NAAQS: the levels of air quality that the EPA judges necessary, with an adequate margin of safety, to provide public health protection.

**Secondary NAAQS: the levels of air quality that the EPA judges necessary to protect the public welfare from any known or anticipated adverse effects including protection against decreased visibility and damage to animals, crops, vegetation and buildings.

Notes: ppb = parts per billion, ppm = parts per million, µg/m³³ = microgram per cubic meter
According to the EPA, the Dallas-Fort Worth region does not meet NAAQS for Ozone and is classified as a “moderate” nonattainment area for that pollutant effective July 20, 2012 (NCTCOG, 2017). For Ozone, the federal CAA establishes nonattainment area classifications ranked according to the severity of the area’s air pollution problem. These classifications—marginal, moderate, serious, severe and extreme—translate to varying requirements with which Texas and nonattainment areas must comply. Each classification requires that certain strategies are implemented under federal law; these get more stringent as the classification escalates. State regulations that apply to emissions from the DART vehicle fleet include Section 382.201 of the Health and Safety Code and Chapters 451-53 of the Texas Transportation Code.

Conformity
The project study area is located in Tarrant, Dallas and Collin counties, which have been designated as a “moderate” nonattainment area for eight-hour Ozone by the EPA. Therefore, the transportation air quality conformity rule does apply to the region and is subject to a regional air quality analysis. In addition, Collin County has been designated as a nonattainment area for lead due to localized emissions from industrial sources; however, transportation conformity requirements do not apply for lead (NCTCOG, 2016a). Transportation conformity ensures that federal funding and approval goes to projects which are consistent with the region’s air quality goals. Under Section 176(c) of the CAA [42 USC Section 7670(c)], federal agencies such as the Federal Transit Administration (FTA) and Federal Highway Administration (FHWA) are prohibited from engaging in, supporting in any way, providing financial assistance for, licensing or permitting or approving any activity that does not conform to an approved State Implementation Plan (SIP). Because this project is located in a nonattainment area, the federal implementing agency would be responsible for ensuring that projects conform to the SIP. A conforming project definition is one that conforms to the SIP objectives of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of those standards.

Under Section 176(c)(4) of the CAAA of 1990, Metropolitan Planning Organizations (MPOs) must conduct an air quality conformity analysis to ensure Metropolitan Transportation Plans (MTP) and Transportation Improvement Programs (TIP) are consistent with the region’s air quality goals, for areas that are in nonattainment for ozone (NCTCOG, 2016a). Conformity measures the amount of two pollutants which are precursors to the formation of ground-level ozone, NOx, and VOCs. The SIP establishes a Motor Vehicle Emissions Budget (MVEB) for those two pollutants to limit the formation of ozone. On January 11, 2016, the EPA published the Adequacy Status of the Dallas-Fort Worth, TX Reasonable Further Progress 8-Hour Ozone Motor Vehicle Emission Budgets for Transportation Conformity Purposes (NCTCOG, 2016a), establishing the use of NCTCOG’s developed MVEB for 2017. If a project is included in the emissions analysis of the MTP or TIP, and the plan or program has been approved as confirming to the SIP, then the project is presumed to conform. If the project’s emissions are not analyzed in the MTP or TIP, then a separate project-level conformity determination is required. Showing that emissions under a build
alternative are less than the no build alternative demonstrates project level conformity. Projects included in the region’s approved MTP and TIP are projected to be below the set MVEB.

In March 2016, the Regional Transportation Council of NCTCOG adopted *Mobility 2040: The Metropolitan Transportation Plan for North Central Texas* and approved the results of the 2016 Transportation Conformity (NCTCOG, 2016b; NCTCOG, 2016a). The Cotton Belt project is included in Mobility 2040, and is part of the approved 2016 Transportation Conformity. Mobility 2040 meets all transportation air quality conformity requirements of the CAAA, the air quality plan, the transportation conformity rule, and the transportation conformity-related provisions contained in the United States Code, Title 42 §7506 (NCTCOG, 2016a).

**Pollutants of Concern**

Air quality is affected by pollutants that are generated by both natural and man-made sources. In general, the largest man-made contributors to air emissions are transportation vehicles and power-generating equipment, both of which typically burn fossil fuels. The main criteria pollutants of interest for transportation projects are CO, particulate matter, ozone and the ozone precursors, volatile organic compounds (VOCs) and oxides of nitrogen (NOx). Both federal and state standards regulate these pollutants, along with two other criteria pollutants, SO$_2$ and Pb.

The largest contributors of pollution related to transportation projects are motor vehicles. The main pollutants emitted from motor vehicles are CO, particulates, ozone, greenhouse gases and air toxic pollutants. Motor vehicles also emit pollutants that contribute to the formation of ground-level ozone. This section discusses the main pollutants of concern and their effect on public health and the environment.

**Carbon Monoxide**

In assessing the localized air quality impacts of transportation projects, CO is the main pollutant of concern. CO is a colorless, odorless and tasteless gas that results from the incomplete combustion of fuel. CO is ingested into the body by breathing. In low concentrations, CO can cause fatigue in healthy people and reduced oxygen levels and chest pain in people with heart conditions. At higher concentrations, CO can cause dizziness, impaired vision and coordination, confusion, headaches and nausea. In exceptionally high concentrations, CO can be fatal. Very high levels of CO are unlikely to occur outdoors. Along with the serious health effects, CO also contributes to the formation of ground level ozone (NCTCOG, 2017; EPA, 2017).

The major source of CO is vehicular traffic, along with industry, wood stoves and slash burns. For urban areas, the internal combustion engines of motor vehicles are the principal sources of CO that cause ambient air quality levels to exceed the NAAQS. CO concentration increases occur during vehicle coldstarts and winter months when meteorological conditions favor the build-up of directly emitted
contaminants. CO is a pollutant whose impact is usually localized, with the highest ambient concentrations of CO occurring near congested roadways and intersections, or where topographic or meteorological characteristics inhibit diffusion.

Particulate Matter

The EPA has set standards for two different size categories of PM. The first standard set is for PM$_{10}$: particles that are larger than 2.5 micrometers and smaller than 10 micrometers in size. These particles are considered “inhalable course particles” and can be found near roadways and dusty industries. The second set of standards is for PM$_{2.5}$: particles that measure 2.5 micrometers in size and smaller, roughly 1/28$^{th}$ the diameter of a human hair. These particles are called “fine particles” and can usually be found in smoke and haze. These particles are normally directly emitted from forest fires or they can be formed from gases emitted from power plants and automobiles. The EPA has also determined the health effects of fine PM and has set the standard PM of 2.5 microns or less (PM$_{2.5}$) to ensure the protection of public health. The Dallas-Fort Worth region is in attainment for PM$_{2.5}$.

Particulate matter consists of small particles of dirt, soot, metals and organic matter. PM of 10 micrometers in diameter and smaller pose the greatest health problems because it can bypass the natural filtration systems of the nose and throat and enter deep into the lungs, heart and even the bloodstream, which can cause difficulty with breathing, aggravation of asthma, irregular heartbeat, nonfatal heart attacks and death in people with heart or lung problems. Due to the size of PM$_{10}$ and PM$_{2.5}$, the wind easily picks up the particles and transports them over long distances to settle on either the ground or water. PM that lands on the ground has the potential to deplete nutrients in the soil, damage sensitive crops and change the structure of the ecosystem. PM that lands on water can change the acidity in lakes and streams and change the nutrient balance in coastal waters and large river basins. Major sources of PM are construction activity, smokestacks, fires, power plants and automobiles (EPA, 2017).

Ozone

Normally, ozone is not emitted directly into the air; however, at ground level, NOx and VOCs react under the presence of sunlight to form ozone. Emissions from industrial and electric facilities, motor vehicle exhaust, gasoline vapors and chemical solvents are major sources of NOx and VOCs.

Ground-level and stratosphere-level ozone share the same chemical structure; however, their effects differ greatly due to their positions in the atmosphere. Ground-level ozone has adverse effects due to its potential impacts to human health, while stratospheric ozone has a protective effect by shielding the earth’s surface from harmful radiation. When ozone is inhaled, it can cause a variety of health problems, such as chest pain, coughing, throat irritation and congestion. The effects can potentially worsen to bronchitis, emphysema and asthma, reducing lung function and inflaming the linings of the lungs. Repeated exposure can eventually lead to permanent scarring of the lung tissue. Not only does ozone
cause negative human health effects, but it also causes damage to the environment. Ozone can cause sensitive plants to be more susceptible to certain diseases, insects and other pollutants, which can lead to reduced crop yields, forest growth and potential impacts on species diversity in ecosystems.

Ozone is also the primary element of smog. Sunlight and hot weather are the main causes of the formation of ground-level ozone. As a result, ozone is referred to as a summertime air pollutant. Many urban areas tend to have high levels of ozone, although even rural areas are subject to increased ozone levels because the wind can carry ozone and the pollutants that form ozone miles away from their original sources.

Climate Change and Greenhouse Gases

Global climate change refers to changes in average climatic conditions on Earth as a whole, including changes in temperature, wind patterns, precipitation, storms, glacial-retreat, and sea-level rise. Global climate change is a regional and ultimately a worldwide concern. Historical records indicate that global climate changes have occurred in the past due to natural phenomena. However, data indicate that the current global conditions differ from past climate changes in rate and magnitude (NASA, 2017). Since greenhouse gas (GHG) effects are experienced on a global scale, it is impossible to discuss direct effects of a single development project with future specific climate change.

GHGs include CO$_2$, methane (CH$_4$), water vapor, nitrous oxide (N$_2$O), and chlorofluorocarbons (CFCs). CO$_2$ is a minor but very important component of the atmosphere and the primary GHG pollutant emitted by the combustion of fossil fuels. Although CO$_2$ is released by natural processes, the burning of fossil fuels by humans produces substantial amounts of these gases. Changes in global CO$_2$ emissions from fossil fuel combustion are influenced by many long-term and short-term factors, including population and economic growth, energy price fluctuations, technological changes and seasonal temperatures.

GHG emissions have been decreasing, largely driven by a decrease in emissions from fossil fuel combustion, and 2015 GHG emissions were 11.5 percent below 2005 levels (EPA, 2017a). Two of the largest contributors to GHG emissions in the U.S. are transportation and energy production, although industrial, residential and commercial, and agriculture sectors contribute as well. In 2015, it was found that combustion of transportation fuels, the second largest source of CO$_2$, contributed 27 percent of the U.S. GHG emissions (electricity production contributed 29 percent of the U.S. GHG emissions) (EPA, 2017a).

GHG emissions from transportation sources are directly related to energy consumption and primarily result from the combustion of fossil fuels in vehicles. Over half of the GHG emissions from transportation sources come from passenger cars and light-duty trucks, including sport utility vehicles, pickup trucks and minivans. The remainder of the GHG emissions comes from other modes of transportation including freight trucks, commercial aircraft, ships, boats and trains, as well as pipelines and lubricants. To reduce GHG emissions from transportation sources, effective planning must incorporate modes of transport that use less energy per person per mile traveled and/or use energy derived from fuels that have lower carbon
content per unit of energy. For example, by changing bus fleets from diesel or gasoline to compressed natural gas, GHG emissions can be reduced through the use of a lower-carbon or non-fossil fuel, and they can be further reduced by increasing regional transit ridership, which uses less energy per person per mile traveled than single-occupant vehicles (EPA, 2017a).

Currently, transit is expected to reduce the automobile use that causes a high percentage of GHG emissions. It is anticipated that the Cotton Belt project would result in lower vehicle miles traveled and would reduce GHG emissions. Additional savings in vehicle miles traveled can be attained from transit-oriented development that is expected to occur around rail stations.

**Mobile Source Air Toxics**

In addition to the criteria, air pollutants for which there are NAAQS, EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes, heavy equipment, marine vessels), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries). Air toxics are pollutants that cause or may cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental and ecological effects. Mobile Source Air Toxics (MSATs) are a subset of the 187 toxic air pollutants defined by the CAAA. The MSATs are compounds emitted from highway vehicles (motorcycles, passenger cars and trucks, and commercial trucks and buses) and non-road vehicles and engines (aircraft, heavy equipment, locomotives, marine vessels, recreation vehicles, and small engines and tools) (EPA, 2017b). Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

The EPA is the lead federal agency for administering the CAAA and has certain responsibilities regarding the health effects of MSATs. The EPA issued a Final Rule for Control of Air Pollution from Motor Vehicles: Tier 3 Motor Vehicle Emission and Fuel Standards (40 CFR Parts 79, 80, 85, 86, 600, 1036, 1037, 1039, 1042, 1048, 1054, 1065, and 1066 [March, 2014]). This rule established the Tier 3 program as part of a comprehensive approach to reduce the impacts of motor vehicles on air quality and public health. The program sets new vehicle emissions standards and a new gasoline sulfur standard to reduce both tailpipe and evaporative emissions from many on-road vehicles, and the new gasoline sulfur standard would enable emissions control systems to become more effective. FHWA emissions trends indicate, that even with a 45 percent increase in vehicle miles traveled from 2010 to 2050 as forecast, these programs would reduce annual emissions of the priority MSATs by 91 percent (FHWA, 2016).

The technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects prevent meaningful or reliable estimates of MSAT emissions and effects of this project. Reliable methods do not exist to estimate accurately the health impacts of MSATs at the project level.
Methodology:

Air monitoring station locations were identified using the NCTCOG Geographic Information System (GIS) database and determining the nearest active federal air monitoring stations. Specific monitor readings were obtained through the TCEQ air monitoring data web site. The NCTCOG web site for air quality identified specific programs implemented by the region to improve air quality.

Existing Conditions:

Air quality is a regional concern, not a localized condition. The project study area is located in Tarrant, Dallas and Collin counties, which has been designated as a moderate nonattainment area for eight-hour ozone and Pb in Frisco, TX—Collin County by the EPA. The NCTCOG eight-hour ozone nonattainment region includes Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise counties (NCTCOG, 2017). The formation of ozone is directly related to emissions from motor vehicles and point sources (Figure 1) (AIRNow, 2017). The primary pollutants from motor vehicles are VOCs, CO, and NOx. VOCs and NOx can combine under the right conditions in a series of photochemical reactions to form ozone. The Dallas-Fort Worth region is in attainment for CO, sulfur dioxide, nitrogen dioxide and PM.

Meteorology plays a critical role in ozone formation, as wind and temperature dictate if this pollutant forms; and if so, how long it remains in the atmosphere. Calm weather days with low wind speed and warm temperatures are favorable conditions for ozone formation. As expected, daily ozone concentrations are highest during the summer months, which is why the period between March 1 and October 31 is designated as “Ozone Season” in North Central Texas. The intensity of sunlight necessary for photochemically initiated reactions is highest during this time period. (NCTCOG, 2016a)

The modeling procedures for ozone require long-term meteorological data, detailed area-wide emission rates and activity levels for all emission sources (on-road, non-road, point and area). Accordingly, concentrations of ozone are modeled by the regional air quality planning agency for the SIP. The TCEQ monitors airborne pollutants in the Dallas-Fort Worth region on a continuous basis. ozone is monitored every hour of the day, every day. Table 2 lists the four highest daily maximum eight-hour ozone concentrations recorded annually from 2005 to 2017 at the Dallas North No. 2 (Continuous Air Monitoring Station [CAMs] 63) and Grapevine Fairway (CAMS 70) monitoring stations, which are the closest active...
monitoring stations to the study area. **Figure 2** shows the locations of the air monitoring sites in relation to the study area. According to the US EPA NAAQS, attainment is reached when, at each monitor, the Design Value (three-year average of the annual fourth-highest daily maximum eight-hour average ozone concentration) is equal to or less than 70 parts per billion (ppb). **Figure 3** shows the NCTCOG region’s ozone historical trends.

Table 2 Four Highest Eight-Hour Ozone Concentrations

<table>
<thead>
<tr>
<th>Year</th>
<th>Highest Date</th>
<th>Highest Level*</th>
<th>Second Highest Date</th>
<th>Second Highest Level*</th>
<th>Third Highest Date</th>
<th>Third Highest Level*</th>
<th>Fourth Highest Date</th>
<th>Fourth Highest Level*</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAMS 63 Dallas North No. 2</td>
<td>2005 06/15/05</td>
<td>120</td>
<td>07/14/05</td>
<td>120</td>
<td>09/01/05</td>
<td>117</td>
<td>05/20/05</td>
<td>116</td>
</tr>
<tr>
<td></td>
<td>2006 08/31/06</td>
<td>103</td>
<td>07/21/06</td>
<td>100</td>
<td>09/01/06</td>
<td>96</td>
<td>07/18/06</td>
<td>93</td>
</tr>
<tr>
<td></td>
<td>2007 08/14/07</td>
<td>101</td>
<td>09/21/07</td>
<td>101</td>
<td>08/15/07</td>
<td>94</td>
<td>06/05/07</td>
<td>91</td>
</tr>
<tr>
<td></td>
<td>2008 08/14/08</td>
<td>108</td>
<td>07/01/08</td>
<td>92</td>
<td>08/21/08</td>
<td>92</td>
<td>06/23/08</td>
<td>91</td>
</tr>
<tr>
<td></td>
<td>2009 08/25/09</td>
<td>111</td>
<td>07/01/09</td>
<td>107</td>
<td>07/07/09</td>
<td>105</td>
<td>07/02/09</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>2010 08/12/10</td>
<td>94</td>
<td>08/17/10</td>
<td>88</td>
<td>08/23/10</td>
<td>87</td>
<td>08/05/10</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>2011 09/29/11</td>
<td>113</td>
<td>08/26/11</td>
<td>109</td>
<td>08/25/11</td>
<td>107</td>
<td>09/28/11</td>
<td>102</td>
</tr>
<tr>
<td></td>
<td>2012 06/25/12</td>
<td>106</td>
<td>06/26/12</td>
<td>103</td>
<td>08/07/12</td>
<td>100</td>
<td>08/06/12</td>
<td>99</td>
</tr>
<tr>
<td></td>
<td>2013 08/29/13</td>
<td>97</td>
<td>08/31/13</td>
<td>91</td>
<td>09/06/13</td>
<td>90</td>
<td>09/12/13</td>
<td>88</td>
</tr>
<tr>
<td></td>
<td>2014 08/29/14</td>
<td>96</td>
<td>05/03/14</td>
<td>85</td>
<td>07/25/14</td>
<td>80</td>
<td>04/09/14</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>2015 08/24/15</td>
<td>110</td>
<td>08/03/15</td>
<td>105</td>
<td>08/10/15</td>
<td>99</td>
<td>08/28/15</td>
<td>93</td>
</tr>
<tr>
<td></td>
<td>2016 08/05/16</td>
<td>79</td>
<td>09/28/16</td>
<td>77</td>
<td>06/07/16</td>
<td>76</td>
<td>07/01/16</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>2017** 04/03/17</td>
<td>74</td>
<td>02/23/17</td>
<td>71</td>
<td>04/07/17</td>
<td>67</td>
<td>04/04/17</td>
<td>65</td>
</tr>
<tr>
<td>CAMS 70 Grapevine Fairway</td>
<td>2005 06/15/05</td>
<td>112</td>
<td>07/14/05</td>
<td>111</td>
<td>08/02/05</td>
<td>110</td>
<td>06/22/05</td>
<td>106</td>
</tr>
<tr>
<td></td>
<td>2006 09/01/06</td>
<td>115</td>
<td>08/31/05</td>
<td>106</td>
<td>07/18/06</td>
<td>106</td>
<td>06/09/06</td>
<td>104</td>
</tr>
<tr>
<td></td>
<td>2007 08/14/07</td>
<td>123</td>
<td>07/25/07</td>
<td>108</td>
<td>08/15/07</td>
<td>107</td>
<td>09/21/07</td>
<td>102</td>
</tr>
<tr>
<td></td>
<td>2008 09/29/08</td>
<td>93</td>
<td>08/14/08</td>
<td>91</td>
<td>06/23/08</td>
<td>91</td>
<td>07/01/08</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>2009 08/25/09</td>
<td>111</td>
<td>07/02/09</td>
<td>110</td>
<td>06/05/09</td>
<td>105</td>
<td>08/26/09</td>
<td>103</td>
</tr>
<tr>
<td></td>
<td>2010 08/17/10</td>
<td>104</td>
<td>09/17/10</td>
<td>104</td>
<td>08/23/10</td>
<td>98</td>
<td>08/12/10</td>
<td>97</td>
</tr>
<tr>
<td></td>
<td>2011 09/29/11</td>
<td>107</td>
<td>08/25/11</td>
<td>107</td>
<td>07/05/11</td>
<td>104</td>
<td>08/27/11</td>
<td>104</td>
</tr>
<tr>
<td></td>
<td>2012 06/25/12</td>
<td>111</td>
<td>06/26/12</td>
<td>111</td>
<td>09/06/12</td>
<td>101</td>
<td>06/24/12</td>
<td>99</td>
</tr>
<tr>
<td></td>
<td>2013 09/06/13</td>
<td>103</td>
<td>09/12/13</td>
<td>96</td>
<td>08/30/13</td>
<td>95</td>
<td>09/25/13</td>
<td>95</td>
</tr>
<tr>
<td></td>
<td>2014 08/14/14</td>
<td>94</td>
<td>08/25/14</td>
<td>88</td>
<td>08/05/14</td>
<td>86</td>
<td>10/17/14</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>2015 08/03/15</td>
<td>108</td>
<td>08/28/15</td>
<td>101</td>
<td>08/96/15</td>
<td>96</td>
<td>06/05/15</td>
<td>91</td>
</tr>
<tr>
<td></td>
<td>2016 06/07/16</td>
<td>89</td>
<td>06/20/16</td>
<td>89</td>
<td>09/21/16</td>
<td>89</td>
<td>09/20/16</td>
<td>87</td>
</tr>
<tr>
<td></td>
<td>2017** 02/23/17</td>
<td>68</td>
<td>04/03/17</td>
<td>63</td>
<td>04/07/17</td>
<td>62</td>
<td>03/31/17</td>
<td>61</td>
</tr>
</tbody>
</table>

Source: TCEQ Air Monitoring Stations (TCEQ, 2017)

* All ozone measurements are in parts per billion

** 2017 results as of April 9, 2017
Figure 2

Air Quality Monitoring Stations
Figure 3

Eight-Hour NAAQS for Ozone Historical Trends

EIGHT-HOUR NAAQS FOR OZONE HISTORICAL TRENDS

As of May 25, 2017

1997 Standard < 85 ppb (Revoked)

2008 Standard ≤ 75 ppb¹ (by 2017)

2015 Standard ≤ 70 ppb (TBD; Marginal by 2020)

¹Attainment Goal - According to the US EPA National Ambient Air Quality Standards, attainment is reached when, at each monitor, the Design Value (three-year average of the annual fourth-highest daily maximum eight-hour average ozone concentration) is equal to or less than 70 parts per billion (ppb).

²Not a full year of data.

Source: NCTCOSTR Dept
In addition to controls included in the next SIP and in the MTP, several efforts have been initiated at the local level through the NCTCOG to improve air quality. The following list gives some of the major programs that NCTCOG has implemented to improve air quality (NCTCOG, 2017):

**Air North Texas** – A regional public awareness campaign and partnership that provides resources to individuals, businesses, and governments related to improving air quality.

**AirCheckTexas Drive a Clean Machine Program** – Provides financial aid of up to $600 for vehicles failing the emissions portion of the state inspection for specific financially constrained persons and families. Also, individuals whose vehicles meet certain requirements may be eligible for a replacement voucher up to $3,500 toward a qualifying replacement vehicle.

**Clean Fleet Policy** – Outlines goals and provides workable, cost-effective solutions to reduce emissions from local fleets and support regional efforts to attain federal air quality standards. Entities which adopt the policy are eligible for clean vehicle funding made available through the RTC and fleet recognition from the Dallas-Fort Worth Clean Cities coalition.

**Diesel Idling Reduction Program** – A program to assist owners of heavy-duty diesel vehicles with the purchase of idle reduction technology.

**Light-Emitting Diode (LED) Traffic Signal Replacement Program** – A program to convert incandescent traffic signal lamps with LED lamps, thereby reducing energy needs.

**North Central Texas Clean School Bus Program** – Provides grant funding for projects that reduce emissions from older, high-emitting school buses, promotes implementation and enforcement of anti-idling policies for school buses, and provide educational resources for reducing school bus emissions.

**North Texas Green & Go Partnership** – Encourages the purchase and use of low-emitting and alternative fuel taxicabs and limousines. Provides a list of air-friendly taxi companies.

**Parking Cash-Out Pilot Program** - Effort to have employers who provide free parking to offer a cash allowance to employees who choose not to use a parking space and instead find an alternative means to commute to the worksite.

**Regional Smoking Vehicle Program** – Encourages drivers to voluntarily repair and maintain their vehicles through public awareness and vehicle reporting.

**Try Parking It** – A web site that provides a method to track, log, and reward work-based trips that utilize alternative commutes and also provides statistics on reduced miles and trips.

The ongoing improvements in vehicle emissions and industry emissions will have positive impacts on reducing air pollution for the future. Regional programs will also contribute in the decrease from NAAQS and MSATs. With the combined federal and local efforts, air quality is expected to improve in the future.
Source Information and References


APPENDIX A – ENVIRONMENTAL ASSESSMENT METHODOLOGY TECHNICAL MEMORANDUM
Technical Memorandum

Date:  Wednesday, March 22, 2017

Project:  Task Order 32, Cotton Belt Corridor PE/EIS

To:  John Hoppie, Project Manager, DART Capital Planning

From:  Tom Shelton, GPC6 Program Manager

Subject:  DART GPC VI; Contract Number: C-2012668; Cotton Belt Corridor Environmental (WOTUS, Ecosystems, EJ, Air Quality and Land Use) Assessment Methodology

Introduction: This technical memorandum presents the proposed methodology for conducting field surveys for identifying and updating the following resources within the Cotton Belt Corridor project in support of the EIS preparation: Waters of the U.S. and Wetlands (WOTUS), Ecosystems, and Environmental Justice (EJ) populations, Air Quality and Land Use. Existing technical memorandums (2013) prepared for the Cotton Belt Corridor Project Alternatives and Environmental Considerations Report (AECR) have been reviewed by the GPC6 team and will provide a baseline for the current studies. Additional technical memorandums will be prepared under separate cover for other resource categories. As the alignment and station locations are refined, additional field surveys may be necessary.

Project Description: The 26-mile Cotton Belt Corridor extends between DFW Airport and Shiloh Road in Plano. The alignment traverses seven cities: Grapevine, Coppell, Dallas, Carrollton, Addison, Richardson and Plano. The Cotton Belt Project’s primary purpose is to provide passenger rail connections and service that will improve mobility, accessibility and system linkages to major employment, population and activity centers in the northern part of the DART Service Area. The Cotton Belt Project would interface with three DART Light Rail Transit (LRT) lines: The Red Line in Richardson/Plano, the Green Line in Carrollton and the Orange Line at DFW Airport. Also at DFW Airport, the project would connect to Fort Worth Transit Authority’s TEX Rail Regional Rail Line to Fort Worth and the DFW Airport Skylink People Mover.

Objective: DART is preparing an Environmental Impact Statement (EIS) to assess the impacts and benefits of rail passenger service on the Cotton Belt Corridor. Project oversight will be conducted by the Federal Transit Administration (FTA) in cooperation with the Federal Railroad Administration (FRA) and the Federal Aviation Administration (FAA).
METHODOLOGY

Waters of the U.S.: Recent aerial photography, U.S. Geological Survey (USGS) National Hydrography Dataset, U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory, and USGS topographic maps (7.5-minute series) of the study area will be used to identify potential locations for waters of the U.S. and areas prone to wetland development before going into the field. Potential waters of the U.S. identified, including wetlands, will be delineated and evaluated using routine on-site methods between April 3 and April 21, 2017 by GPC6 environmental scientists. The surveys will be conducted in accordance with the USACE 1987 Wetlands Delineation Manual (Environmental Laboratory, 1987) and the Regional Supplement for the Great Plains Region (USACE, 2010). The delineations will also be performed to reflect current guidance, Rapanos Guidance, from the USACE and EPA on jurisdictional determination in accordance with U.S. Supreme Court rulings. The delineations will be recorded using a Trimble® sub-meter Geo XT Global Positioning System unit and mapped as a data layer using ArcGIS 10.4. The field delineation will be conducted by foot. Vehicles for field personnel will be parked within DART right-of-way while areas are being delineated. GPC6 biologists will be collecting GPS data for the ordinary high water mark of all streams, boundaries of all wetlands, and data points in wetlands and uplands. They will also be collecting photos and taking field notes on data forms and maps.

Ecosystems: The GPC6 project team will review recent aerial photography, USGS topographic maps, Texas Parks and Wildlife Department (TPWD) Natural Diversity Database, TPWD’s Ecological Mapping Systems vegetation data, and USFWS and TPWD county list of threatened, endangered, and rare species, prior to conducting fieldwork for the DART Cotton Belt project. GPC6 environmental scientists will conduct a field survey to identify habitat types, land use, and vegetation types present within the project corridor between April 3 and April 21, 2017. During the field survey, GPC6 Environmental Scientists will record notable species (such as threatened, endangered, or rare species) or active bird nests or roosts observed during the survey.

Environmental Justice: U.S. Census data at the block (minority) and block group (low-income) level will be used to identify areas within one mile of the proposed Cotton Belt line containing minority or low-income populations. Census blocks which have a meaningfully greater percentage of minority population than the surrounding county area or more than 50 percent minority would be considered to contain a minority population. Census block groups which have a median household income that is below the 2017 Department of Health and Human Services poverty guideline for a family of four or where the percentage of residents in poverty meaningfully exceeds the level found in the surrounding county will be considered to contain a low-income population. Field investigations will identify any areas of low-income housing, services catering to particular ethnic or economic groups, or signs in languages other than English. GPC6 environmental scientists will conduct the field activities between April 3 and April 21, 2017 via windshield surveys within the study area.
**Air Quality:** Potential stationary sources of air pollutants, sites of future projects, and sensitive receptors will be noted and photographed during field investigations. Current aerial photography and comprehensive plans for the cities of Grapevine, Coppell, Dallas, Carrollton, Addison, Richardson, and Plano will be reviewed to identify potential areas of development and sources of air pollution. Current aerals and business listings will be searched prior to field investigations to identify any sensitive receivers that could be affected by impacts to air quality. The investigations will be done by GPC6 environmental scientists between April 3 and April 21, 2017. The investigations will be conducted by vehicle and on foot within the DART right-of-way.

**Land Use:** Review of existing land use along the project corridor will be accomplished by identifying and reviewing the most recent data from NCTCOG and other relevant sources. The project area will be categorized using this data to identify the most recent condition as well as trends of development through the use of ArcGIS mapping and analysis. The project study area for land use will be one-quarter mile on either side of the Cotton Belt Corridor and one-half mile radius around each proposed station location. Field verification will be conducted along the corridor during the period of April 3 to April 21, 2017. GPC6 environmental scientists will conduct field surveys. Land use will be classified by accessing DART property and public access right-of-ways. Field data collection will be performed through the use of GPS and ground level photography. Economic and residential zones will be classified, as well as public and private facilities including parks, churches, schools and other community resources.