State Government Related Comments

UNC CHARLOTTE
The University of North Carolina at Charlotte
9201 University City Boulevard
Charlotte, N.C. 28223-0001

VW funds Request for Information

UNC Charlotte would like to submit to DEQ the request for information. We wanted to address all the questions written to help DEQ understand our stance on the funds and how they could be utilized for clean air projects.

Questions

1. How should DEQ prioritize projects?

The DEQ should look at non-attainment areas for the distribution of funds. I do believe all counties should have access to the funds, the former non-attainment counties should be dis-proportionate to 60 percent of the funds.

2. What is the anticipated demand for each eligible project type?

The focus is on zero emission diesel replacement. Many off road, heavy polluters (mowers, tractors, construction equipment) does not have a direct zero emission replacement for these. I propose a much lower emission replacement of propane for various equipment.

3. The percentage of trust funds, if any, that DEQ should devote to Light Duty Zero Emission Vehicle Supply Equipment?

This is the easiest to convert and the most easily replaced. A light duty (1 ton or less) diesel truck can be an electric hybrid easily. Many small utility vehicles running on diesel can be converted or replaced to electric with no loss of benefits. A share of 30% would be fair.

4. What is the anticipated demand for specific types of diesel emission reduction projects not eligible under the VW settlement but otherwise eligible under DERA or other state programs?

Not sure

5. Should a certain percentage of available VW funds be allocated to each eligible project type and if so how should the percentage be determined?

Determined by impact for air quality.

6. Should a certain percentage of available Mitigation Trust funds be reserved for government projects?

I believe a good project should go through no matter the proposer if it clans the air; however, government projects may be able to achieve oversight and economies of scale that would allow for a greater impact per dollar spent. Public-Private partnerships should be encouraged to achieve the economy of scale. An example might be a grant to a municipality that can hire a single contractor to install equipment like EV chargers at both public and private business locations.

7. Should funds be geographically distributed, and if so how?

Historical non-attainment areas first.

8. Should governmental entities be required to provide matching funds and if so, how much?

Not on these funds, should be for projects not otherwise attainable. If matching funds are required the qualified matching should include in-kind and depreciated or current market value of retired and disabled equipment.

9. Should DEQ establish a minimum project size and if so, what size?

Yes at least $100,000

10. In addition to evaluating a proposed project's total cost effectiveness ($/ton), what other key factors should DEQ consider when evaluating projects?

Duration of the clean air. If a vehicle will only have a 5 year usefulness, then this project would be lower priority than a 10 year usefulness. Proposers should describe their capacity and experience in maintaining the equipment and its fuel source.

11. What other feedback do you have on project evaluation and/or scoring criteria?

Public visibility, market development for emerging technologies, and educational opportunities should earn credit in scoring.

12. What publicly available tool(s) should be used to quantify anticipated emission reductions/offsets for eligible mitigation projects? What, if any, additional resources should be provided and made available?

Point scoring for impact based upon current metrics like amount reduced and impact. DEQ should make provisions to provide technical assistance with any emissions models they require proposers to use.

13. What methods could DEQ employ to reduce barriers and increase participation in future solicitations for projects?

Greater communication through independent sources like NC Clean Energy or Clean Fuels Coalition. Consider having application categories for two or more scales, ranging from simple, brief, low cost proposals to complex, better documented, more expensive proposals. Multiple-scale applications could

also allow DEQ to focus its selection and oversight efforts on spending and performance of larger projects. The largest projects (e.g. >$5 million) might be required to host a sight review as part of the selection process.

14. What information/resources would be most valuable for stakeholders interested in submitting projects and what is the best way to communicate those?

Templates for financial and emission estimates, to reduce confusion on meeting the submission requirements. These should be part of an RFP package, but DEQ should also provide technical assistance (e.g. FAQ pages, contacts, tutorial videos/pages ect.).

Project ideas

We believe the funds could be used by UNC Charlotte and other university campuses especially in the former non attainment areas to replace older trucks, diesel transportation systems, and off road diesel equipment.

At UNC Charlotte we have 58 older (>10 years) Ford Rangers that could be replaced with electric vehicles. We currently replace these as needed with electric vehicles as funds allow. NOx can run as high as 3400 ppm at 25mph (speed limit on campus) by independent tests on these vehicles. Switching to electric will greatly reduce this pollutant.

Estimated cost to cover the three largest campuses in the UNC system, all located in the fomer non attainment areas: $2.8 million.

UNC Charlotte operates 12 buses, all diesel powered. The NOx measured on a 2014 New Flyer bus is 81.8 pounds a year at 18mph average speed. We believe we can save over 486 pounds by using 6 electric buses to replace half of our fleet.

Estimated cost for 6 Electric Buses with Charging infrastructure: $3.5 million

Mowers account for a large percentage of diesel emissions. Currently there is not an electric variant that will cover all aspects of landscape coverage. Propane is a good alternative with no loss of power and extended maintenance. EPA standards are 7.5 NOx grams per hour on the current design engines. Buy switching to Propane we can reduce this to 1.7 NOx grams per hour.

Estimated cost for 6 mowers within former non-attainment campuses: $270,000.

Summary

These are the areas of ease of infrastructure and adaptation to help attain cleaner air in the non-attainment areas and across the state. In addition, university campuses provide high visibility for many visitors to our state. Students express interest in attending a school focused on clean air and

sustainability, and a cutting edge campus will familiarize them with technologies that can be implemented in their future workplaces and communities.

December 31, 2017

College of Engineering
N.C. Clean Energy Technology Center
Campus Box 7409
Raleigh, NC 27695-7401
919.515.2788 (P)
resapienza@ncsu.edu
www.nccleantech.ncsu.edu

NCDEQ VW Mitigation Plan RFI Response

Submitted by:
Organization: NC Clean Energy Technology Center
Clean Transportation Program
College of Engineering
NC State University

Contact: Richard Sapienza, Clean Transportation Program Director

Address: Campus Box 7409
Raleigh NC 27695

Phone: 919-515-2788

Email: resapienza@ncsu.edu

NC Clean Energy Technology Center Clean Transportation Program Background

The NC Clean Energy Technology Center's Clean Transportation Program is over 12 years old. Housed within the College of Engineering at NC State University, the NC Clean Energy Technology Center is able to leverage the experience of its staff with the resources of a world-class research university.

The NC Clean Energy Technology Center (NCCETC) has experience working in statewide, regional, and nationwide coalitions to promote clean transportation technologies. Since 2006 within the State of North Carolina, NCCETC has administered the Clean Fuels Advanced Technologies grant program, which provides grants from Congestion Mitigation and Air Quality (CMAQ) funds for the purchase of clean transportation technologies. The total spend on clean transportation technologies from 2006 through 2016 has been $14.5 million, with $4 million additional allocated through 2018. From 2009-2011 NCCETC served as the principle investigator on the Clean Transportation Education Project grant, a DOE funded project, where we coordinated with local Clean Cities across the country to organize 38 educational workshops about alternative fuels. From 2013-2015, NCCETC lead the U.S. DOE-funded Alternative Fuel Implementation Team (AFIT) project. In this project, NCCETC worked with Clean Cities

College of Engineering
N.C. Clean Energy Technology Center
Campus Box 7409
Raleigh, NC 27695-7401
919.515.2788 (P)
resapienza@ncsu.edu
www.nccleantech.ncsu.edu

Coalitions in the Southeast to do the following: work with stakeholders to identify barriers to alternative fuel adoption, create an Alternative Fuels Implementation Toolkit with information on the commercially available alternative fuels, and put on the Southeast Alternative Fuels Conference Expo in 2014. We hosted the Sustainable Fleet Technology Conference and Expo in 2017. The Clean Transportation Program is also a member of the NC Plug-In Steering Committee led by Advanced Energy and the NC EV Working Group led by NCSEA. In all of these activities, NCCETC has severed as a technical expert and coordinator of stake holders to promote adoption of alternative fuel vehicle technologies and coordinate both regionally and nationally with technology providers and Clean Cities Coalitions. The Clean Transportation Program has the respect and network connections to successfully bring groups of vendors, suppliers, technical experts, and current and potential users together to exchange ideas, assist each other and drive integration of technology and efficiency to the transportation industry.

VW Program and Solicitation Design Questions

1. How should DEQ prioritize projects?
   Prioritization of projects should be based on several primary dimensions. The first being emissions reductions with weighting on NO_X criteria pollutant emissions which is the primary criteria pollutant of concern for air quality in NC. This is also the primary objective of the VW Mitigation fund. Other primary considerations should be efficiency of the reductions ($ per kg or ton reduction), risk or likelihood of technology/project success, likelihood that project will contribute to further technology adoption by being a pilot or primer, technology diversity, and contributions to local job market and economy. On road vehicle repower should be discouraged or low priority due to liability issues. We do not know the condition of body, frame or suspension of an older vehicle.

2. What is the anticipated demand for each eligible project type?
   That is very difficult to answer. Based on what we have seen with CMAQ, FTA, and DERA funding application, and industry experience overall requests for funding will exceed available funding by a factor of 2 to 5 times. There will be strong demand for funding of CNG projects 7-8 vehicles which includes short haul freight, refuse, dump trucks and transit buses. Propane paratransit and shuttle buses will be another strong category. Recently, there has been significant electric transit bus technology advances and industry coverage. Therefore, we expect that there will be demand for electric transit buses. With NC having the 5th largest ferry fleet[1] and it is an aging ferry fleet in need of upgrades[2], they might be potential projects. Also, there is a similar situation regarding the NCDOT rail which would be good candidate projects, if mitigation money were allocated for the DERA option.

[1] https://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/subject_areas/ncfo/highlights
[2] http://www.wral.com/money-to-replace-north-carolina-s-aging-ferry-fleet-could-dock-drivers-/15131937/

College of Engineering
N.C. Clean Energy Technology Center
Campus Box 7409
Raleigh, NC 27695-7401
919.515.2788 (P)
resapienza@ncsu.edu
www.nccleantech.ncsu.edu

3. The percentage of trust funds, if any, that DEQ should devote to Light Duty Zero Emission Vehicle Supply Equipment?
   The allowable 15% of mitigation trust should be allocated to ZEV infrastructure. According to Electrify America, despite the $2.0 billion National ZEV Plan expenditure on ZEV infrastructure, less than 10% of US charging needs will be met. See attached documents from NCSEA EV Working Group and Plug-In NC Steering Committee.

4. What is the anticipated demand for specific types of diesel emission reduction projects not eligible under the VW settlement but otherwise eligible under DERA or other state programs?
   Similar to question 2, this is a tough question to answer. However, we fully support using mitigation funds to supplement DERA for locomotive eligible projects (repower and exhaust after treatment), as well as stationary (parking space electrification) and mobile idle reduction technologies (APUs and battery banks). In evaluating these types of projects for CMAQ funding, these types of projects have some of the highest emissions reductions per dollar spent. I would use DERA for only these types of projects, because the requirements of DREA are more rigorous than that of the mitigation decree. Keep projects that would be eligible under both DERA and Mitigation Trust under the Mitigation Trust.

5. Should a certain percentage of available VW funds be allocated to each eligible project type and if so how should the percentage be determined?
   We would not set allocations for each eligible project type. Allow for the flexibility to let the market mechanism do its thing and demand will fall where it does. There should be attention and approval checks that a disproportionate amount of funding does not go to a specific technology and vehicle type due to a strong coalition alignment. As stated over and over in the clean transportation world, there is no silver bullet or one size does not fit all. There are certain applications and good fits for the available technologies. It is an all of the above solution. In the situation where funds are going to be used to supplement existing programs or be comingled with Federal funds then it is likely that an allocation amount will be required.

6. Should a certain percentage of available Mitigation Trust funds be reserved for government projects?
   There is an argument that can be made on both sides. Private sector entities are for profit and some are very profitable. Why don't they use their own money? On the same hand government fleets have tight budgets and many cannot and will not without the assistance, as well as benefit holistic benefit to the tax payer base. However, the private fleets typically have higher utilization of the vehicles and burn more fuel. Funding private fleets will have a bigger impact. And, for government fleets, there is more cooperation and communication, funding them will result in faster and wider spread

NC STATE UNIVERSITY

NC CLEAN ENERGY TECHNOLOGY CENTER
Formerly the NC Solar Center

College of Engineering
N.C. Clean Energy Technology Center
Campus Box 7409
Raleigh, NC 27695-7401
919.515.2788 (P)
resapienza@ncsu.edu
www.nccleantech.ncsu.edu

adoption. Overall, we are asking both types of fleets to do something different and no matter how proven a technology, there is inherent organizational risk. The funding is a motivator that helps reduce the project risk. We think that both private and government entities should be included with a possible minimum allocation of 30% to 50% of the NC Mitigation Trust for government projects.

7. Should funds be geographically distributed, and if so how?
   There should be no geographic restrictions on fund distribution. There have been a number of areas in NC that been excluded from funding opportunities and have pent-up demand for clean transportation technologies. Some of these areas, eastern and western NC, have leadership and a demographic that meets the profile of an early adopter of these technologies. Furthermore, there is a halo effect. When one area adopts clean transportation technologies, their neighbors and competitors get interested. Also, there are some entities that operate across regions and restrictions will act as a barrier for changing technologies in that they will have a mix of technologies. We have seen that occur with CMAQ regional restrictions. There might be concern regarding areas that have a disproportionate negative air quality impact. Those regions have higher populations and population density. By that virtue there will be more project demand from those areas. Finally, we view clean transportation as a holistic approach that provides benefit every time and everywhere deployed.

8. Should governmental entities be required to provide matching funds and if so, how much?
   Yes, all entities should have some skin in the game. This will ensure that due diligence is done. If the 100% level of funding is employed, technology might be deployed in the wrong application and fail. The failure will have a negative ripple effect doing further damage. Many programs are successful funding less than 100% of the project. Some fund a percentage of the plus cost of the technology feature over a conventional vehicle. Where there is the requirement to scrap the engine or vehicle, we support funding a percentage of the total cost of the project. A target funding amount for government entities should be 25% to 50%. DERA is currently using 25% to 35%.

9. Should DEQ establish a minimum project size and if so, what size?
   Yes. This will help with administrative efficiency. It is typically about the same amount of work administratively for a small project as is a large project. Minimum project size should be $25,000 to $50,000. We suggest allowing multiple entities to collaborate and put together a group application with a lead organization such as a non-profit, trade association or supplier.

10. In addition to evaluating a proposed project's total cost effectiveness ($/ton), what other key factors should DEQ consider when evaluating projects?
    Same as stated in question 1. Prioritization of projects should be based on several primary dimensions. The first being emissions reductions with weighting on NO_X criteria

NC STATE UNIVERSITY

NC CLEAN ENERGY TECHNOLOGY CENTER
Formerly the NC Solar Center

College of Engineering
N.C. Clean Energy Technology Center
Campus Box 7409
Raleigh, NC 27695-7401
919.515.2788 (P)
resapienza@ncsu.edu
www.nccleantech.ncsu.edu

pollutant emissions which is the primary criteria pollutant of concern for air quality in NC. This is also the primary objective of the VW Mitigation fund. Other primary considerations should be efficiency of the reductions ($ per kg or ton reduction), risk or likelihood of technology/project success, likelihood that project will contribute to further technology adoption by being a pilot or primer, technology diversity, and contributions to local job market and economy.

11. What other feedback do you have on project evaluation and/or scoring criteria?
    NCCETC respectfully offers and would welcome the opportunity to be involved on the project review board and be involved in the approval process. We have been doing similar for the past 12 years and have experience and knowledge regarding the eligible technologies.

12. What publicly available tool(s) should be used to quantify anticipated emission reductions/offsets for eligible mitigation projects? What, if any, additional resources should be provided and made available?
    Available resources to estimate emissions impacts include the EPA Diesel Emissions Quantifier, the AFLEET Tool, the CMAQ Toolkit, MOVES, and GREET. GREET returns well-to-wheel emissions results and ideally that would be the best way to evaluate projects. For example, pure electric vehicles can boast zero source or tailpipe emissions. Looking at projects that way is misleading, because unless the electricity was produced by wind or solar, there are emission associated with the electricity. The Diesel Emissions Quantifier is the least attractive of the possible tools in that it is not as up to date as the other tools. AFLEET and CMAQ Toolkit are very easy to use.

13. What methods could DEQ employ to reduce barriers and increase participation in future solicitations for projects?
    A multi-channel approach should be employed, using brochures on a website, a series of regional informational sessions, and online live webinars. These would provide a platform to explain what projects are eligible, as well as provide high level technical information on the options. Primers with best practices and lessons learned should be part of all of these channel communications. A help center with a call-in number or question submission website should be established to clarify any confusion and address potentially unique situations. These questions should be complied and added to an FAQ document. An extensive distribution list of target project participants needs to be compiled from past projects, professional groups and associations, trade publications, internal information sign-up lists, NC Clean Cities, NCCETC . . .

14. What information/resources would be most valuable for stakeholders interested in submitting projects and what is the best way to communicate those?
    See question 13 response above. A multi-channel approach should be employed, using brochures on a website, a series of regional informational sessions, and online live

College of Engineering
N.C. Clean Energy Technology Center
Campus Box 7409
Raleigh, NC 27695-7401
919.515.2788 (P)
resapienza@ncsu.edu
www.nccleantech.ncsu.edu

webinars. These would provide a platform to explain what projects are eligible, as well as provide high level technical information on the options. Primers with best practices and lessons learned should be part of all of these channel communications. A help center with a call-in number or question submission website should be established to clarify any confusion and address potentially unique situations. These questions should be complied and added to an FAQ document. An extensive distribution list of target project participants needs to be compiled from past projects, professional groups and associations, trade publications, internal information sign-up lists, NC Clean Cities, NCCETC . . .

Submitting Your Project Information

NCCETC does not have the level of detail requested for a project submission at this time. However, we would like to put forth two high level concept project proposals at this time.

Proposal 1: Mitigation Trust Supplementing CFAT Project

Currently under the CFAT Project, CMAQ money funds 80% of the plus cost of clean transportation vehicle technologies. A portion of the Mitigation Trust and CFAT money could be co-mingled. This would reduce the level of Mitigation Trust funding for each project, making the money go further and be able to fund more projects. Currently, CFAT is authorized for $1.5 million per year. This number could be increased to at least $3.0 million, which would be a 30% increase in project money over the Mitigation Trust alone.

Proposal 2: ZEV Infrastructure

NCCETC, through CFAT and its involvement in the Plug-In NC Steering Committee and the NCSEA EV Working group, has experience, knowledge and a network that would make us successful administering funding for ZEV infrastructure deployment. Due to recent changes, CFAT will no longer be funding alternative fueling infrastructure in North Carolina. It is proposed that NCCETC be designated as the lead for the ZEV allocation of the Mitigation Trust. The proposed plan fills this hole and utilizes the developed knowledge and expertise.

Summary

The proposal objective is to accelerate plug-in vehicle adoption in North Carolina through targeted funding of workplace and multi-unit residential EVSE deployment, and initiation of building out the US DOT Electric Alternative Fuel Corridors in North Carolina. Because most vehicles frequently spend prolonged periods at each location, home and workplace present ideal opportunities for charging. Prioritizing these types of locations will maximize the impact of effort and investment.

College of Engineering
N.C. Clean Energy Technology Center
Campus Box 7409
Raleigh, NC 27695-7401
919.515.2788 (P)
resapienza@ncsu.edu
www.nccleantech.ncsu.edu

Workplace charging, data from the US DOE shows that an individual is twenty times more likely to consider purchasing a plug-in vehicle, if they have access to charging at work. The multi-unit dwelling situation represents an interested high potential plug-in owner demographic. Many of these residents would consider purchase of a plug-in vehicle, but do not, because of lack of access to charging.

Another piece to the puzzle is covering the range concern for longer weekend, business or vacation travel. This can be achieved with initiation of build out of the Alternative Fuel Corridors with strategic placement of fast chargers along these routes. It makes sense that these corridors be given priority.

To enhance the adoption, partnerships with vehicle & EVSE OEMs seeking group buy discounts & incentives for awardees will be established. There is significant data that shows incentives have an impact on plug-in purchases. The discounts on EVSE would allow for the investment to go further & have increased impact. In addition, benefactors would be required to provide financial benefit to those in their organization purchasing plug-in vehicles to be used at their new EVSE sites.

Proposal

The ZEV infrastructure proposal would be for the 10-year Mitigation Trust expenditure period. A steady sustained spend would allow progress throughout the project period and the flexibility to take advantage of technological advancements during the period. A front end loaded expenditure would potentially have obsolete technologies deployed by the end of the project period. The proposal objective is to accelerate EV and PHEV adoption in the North Carolina. This is to be accomplished through targeted funding of workplace and multi-unit residential EVSE deployment, and strategic initiation of building out the US DOT National Designated Electric Alternative Fuel Corridors in North Carolina.

Because most vehicles spend prolonged periods of time at each location on a frequent basis, home and workplace (office parks, parking lots and parking structures) present ideal and significant opportunities for charging. However, because they are typically not 100% publically accessible, these high yield/high utilization sites are excluded from a number of grant opportunities. One example, where multi-unit residences and workplace charging projects are excluded from funding, is the USDOT CMAQ Program. As demonstrated by the US DOE EV project and ChargePoint project, the locations of home and workplace statistically show significantly higher utilization rates than other charging location options. According to Idaho National Laboratory's analysis of survey data from the EV Project, 57% of charging typically takes place at home, followed by 39% at work. Therefore by focusing and prioritizing these types of locations, the impact of effort and investment would be maximized. This represents a tremendous opportunity that can be leveraged by funding this proposal.

College of Engineering
N.C. Clean Energy Technology Center
Campus Box 7409
Raleigh, NC 27695-7401
919.515.2788 (P)
resapienza@ncsu.edu
www.nccleantech.ncsu.edu

Looking specifically at workplace charging, data from the US DOE shows that an individual is twenty times more likely to consider purchasing a plug-in vehicle, if they have access to charging at work.

Higher end MUDs, including luxury apartments and condos, match the demographics of PEV buyers in that they have inhabitants who can afford an electric vehicle and likely have a college degree or graduate degree. However, the percentage of MUDs offering EVSEs is low. Even in California, which is ahead of the rest of the nation in terms of EV adoption, MUDs have lagged behind in terms of installations of EVSEs. The MUD situation represents an underserved, but interested high potential plug-in owner. Per the US Census, 25% of the population lives in MUDs, with that number higher for metropolitan areas (e.g. 50% for Miami and 61% for DC). Many of these residents would consider purchasing a plug-in vehicle, but do not, because of a lack of charging access.

Another piece to the puzzle is meeting the need/covering the range concern for longer weekend, business or vacation travel. This capability can be achieved with initiation of build out of the USDOT National Designated Electric Alternative Fuel Corridors with strategic placement of DC fast chargers along these routes. These national designations were given after study and thorough investigation regarding traffic volume and travel patterns across states. It makes sense that these designated corridors be given priority.

To enhance the plug-in vehicle adoption tied to this effort, partnerships with vehicle and EVSE OEMs seeking group buy discounts and incentives for awardees will be established. There is significant data that shows that rebates, tax credits and other incentives have an impact on EV and PHEV purchase or any vehicle type purchase for that matter. The discounts on EVSE equipment and installation would allow for the investment to go further and have increased impact. In addition, due to the financial assistance of the initiative and the group buying discount, award recipients would be required to provide financial benefit to those in their organization purchasing plug-in vehicles to be used at their new EVSE sites. Examples of companies that already offer employees incentives for purchase of plug-in vehicles include Bank of America ($3,000) and Bob Barker Company ($2,000). Nissan is a current interested vehicle OEM partner. EVSE OEMs interested partners include ChargePoint, EV Box and Clipper Creek.

The tasks to execute the initiative the following tasks are required:

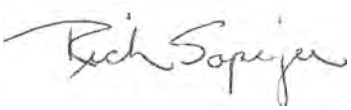
- Recruiting and negotiating group buy incentive programs with vehicle and EVSE OEMs.
- Recruiting developers, multi-unit owners, business and other potential benefactors to participate in the initiative.
- Educating benefactors regarding benefits, options and best practices for EVSE deployment. The objective it to have them be comfortable and make an intelligent and informed decision.

College of Engineering
N.C. Clean Energy Technology Center
Campus Box 7409
Raleigh, NC 27695-7401
919.515.2788 (P)
resapienza@ncsu.edu
www.nccleantech.ncsu.edu

- At benefactor locations, educating potential end users on incentives, benefits and general information to drive the decision to purchase plug-in vehicles through print, live and online information dissemination.
- Streamlined transparent application and award process—modeled after existing successful programs that partners have led or been involved with.
- Documenting and reporting activities, efforts, results and impact. Refocusing methods and efforts as required to achieve success.

I, Richard Sapienza—Clean Transportation Program Manager for the NCCETC, respectfully submit these concept proposals and input for consideration on behalf of the NCCETC. We believe that the proposals have merit and will contribute to making the NC Mitigation Trust have maximum positive impact on the State of North Carolina. NCCETC welcomes the opportunity to discuss any issues further.

Sincerely,



Richard Sapienza
Clean Transportation Program Director
NC Clean Energy Technology Center
NC State University

NC ELECTRIC VEHICLE
WORKING GROUP

The Honorable Roy Cooper, Governor of North Carolina
North Carolina Office of the Governor
20301 Mail Service Center
Raleigh, NC 27699-0301

Dear Governor Cooper,

The North Carolina Electric Vehicle Working Group (NCEVWG) is pleased to offer our support and submit recommendations to inform the development of North Carolina's Beneficiary Mitigation Plan under the Volkswagen (VW) settlement. Funding available through the VW Mitigation Trust presents a rare opportunity for our state to make investments in transportation infrastructure and equipment that can unlock a range of benefits, including cost savings for vehicle and fleet owners, increased competition, reduced dependence on conventional fuels, economic and employment growth, grid and electricity market benefits, and significant reductions in air pollution. With that in mind, **the working group recommends that North Carolina allocate the maximum allowable amount (15%) of settlement funds for electric vehicle charging infrastructure and installations**. We also encourage that North Carolina, whenever possible, prioritize EVs for medium, heavy duty and buses for replacement with the other 85% of the settlement funds because doing so will maximize both the local economic impact and the reduction of NOx. North Carolina is already leading in EVs in some areas - the City of Raleigh was selected by Electrify America as one of 16 focus markets.

This funding's impact is even greater because it comes at a pivotal time when advanced EV models have reached technological maturity but have not yet achieved widespread deployment. In developing a Beneficiary Mitigation Plan, we face choices that will mark the difference between simply achieving emission reductions, or laying the groundwork for a transformative shift in the transportation landscape that enables economic development and deeper emissions reductions.

The NCEVWG membership includes members of the private sector, government agencies, and non-profit organizations that represent thousands of North Carolina employers and residents.

As you develop the Beneficiary Mitigation Plan, please consider the NC Electric Vehicle Working Group as a resource for recommendations and information on both technology and policy issues. Our members look forward to helping NC in its transition to a 21st century transportation system.

Sincerely,

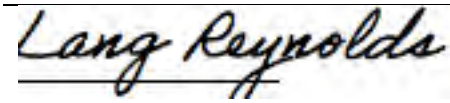
The NC Electric Vehicle Working Group

NC ELECTRIC VEHICLE WORKING GROUP

NC SUSTAINABLE ENERGY ASSOCIATION

DUKE ENERGY

Ward Lenz, Development Director, NC Sustainable Energy Association



Lang Reynolds, Electric Transportation Manager, Duke Energy

cleanenergy.org Southern Alliance for Clean Energy

Electrification Coalition

Anne Blair, Director, Clean Fuels, Southern Alliance for Clean Energy

Ben Prochazka, Vice-President, Electrification Coalition

EVgo

NC CLEAN ENERGY TECHNOLOGY CENTER

David Schembri, CEO, EVgo

Rick Sapienza, Director, Clean Transportation Program, NC Clean Energy Technology Center

NC ELECTRIC VEHICLE WORKING GROUP

chargepoint

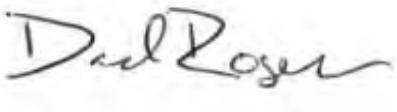
advanced energy

David Schatz, Director, Public Policy, ChargePoint, Inc.

Lisa Poger, Project Manager, **Advanced Energy**

SIERRA CLUB

Brightfield



David Rogers, North Carolina Representative Beyond Coal Campaign, Sierra Club

Stan Cross, CEO, Brightfield Transportation Solutions

Air Quality and Economic Benefits of Electric Transportation

Plug-In NC recommendations for Volkswagen environmental mitigation funds:

- Allocating the maximum 15% of the funds to increasing electric vehicle charging infrastructure in North Carolina.
- Accelerating the proven benefits of light-duty electric vehicle adoption by immediately expanding EV charging networks into low coverage/high impact areas.
- Prioritizing medium and heavy duty vehicle replacements with available electric vehicles.

Why support electric vehicles?

Environmental Improvements

- Air quality improvements are the goal of the Volkswagen Settlement funds.
- Investing in EV infrastructure can help move the consumer marketplace from diesel to electric vehicles and have a big impact on NOx emissions for North Carolina.
- The electric grid gets cleaner every day and emissions benefits will grow over time.

Economic Development

- Several NC companies work with electric vehicles, including charging station manufacturers and grid integration suppliers. Including ABB, General Electric, Siemens and Brightfield Transportation Solutions.
- Electric vehicles are locally generated.

Cost savings

- Electricity is a $1 per gallon equivalent fuel alternative.
- Federal tax credits and dealer incentives make electric vehicle purchases attractive.
- Low maintenance costs.

Energy Independence

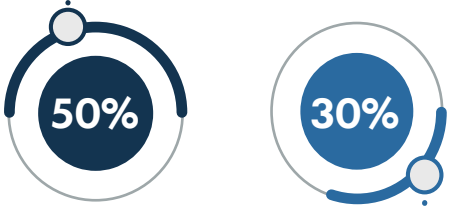
- Electric vehicles are locally generated.
- Domestic fuels not as subject to international influences and/or severe weather events.
- Variable mix of electric generation fuels provides stability in electricity pricing.

Beneficial Grid Asset

- Encourage greater integration of renewable generation, help manage peak loads, optimize energy efficiency and enable vehicle-to-grid power supply.

EV Growth

NC growth in light-duty electric vehicles:
NC 50% year over year growth in sales.



Public charging station growth:
30% over the last year

Still need more...

- NC has a good charging network, however there are still a lot of gaps!
- The Electric Power Research Institute (EPRI) recommends 1 public charging station for every 4 vehicles.

Value Proposition

Charging Infrastructure Investment

Charging infrastructure is easy to install

- Electric infrastructure already in place
- No underground storage tank or hazardous material permits, etc.

This is a Turning-Point Opportunity!

- New technology adoption curve is exponential
- Consumer confidence has compounding effect

Other Benefits

TOURISM destinations can attract more visitors.
Electric vehicles can charge while visiting attractions across the state, including rural destination areas.

Visitors from other states will stop in NC to charge while traveling.

NC will be seen as a state that promotes green tourism.

MEDIUM and **HEAVY DUTY** electric vehicles
What is available?

Reduced emissions even with plug-in hybrids!

There are more emissions reductions per mile for medium and heavy-duty vehicles due to the low per gallon mileage.

Who is Plug-In NC?

Plug-in nc

- State wide collaborative industry group promoting electric vehicle adoption since 2011.
- Long time planning partner with the Department of Energy and North Carolina's Clean Cities Coalitions.
- Promote electric vehicle adoption through education and outreach, consulting and resource development.
- Provide a collaborative opportunity for stakeholders to work together to ensure a seamless integration of plug-in electric vehicles into our local communities.

Class	Type	Example Manufacturers
Class 4	Hybrid-Electric Ford Transit Van	XL Hybrids
Class 5	Hybrid-Electric Box Truck	HINO
Class 6	All-Electric Refuse Truck	BYD
Class 7	Kalmar All-Electric T2 Yard Tractor	TransPower
Class 8	All-Electric Class 8 Tractor	US Hybrid
Forklifts	All-Electric Lithium Ion BYD Forklift	BYD
Transit Buses	All-Electric Transit Bus (35 or 40 foot)	Proterra
School Buses	All-Electric School Bus	Blue Bird

How to Connect:

(919) 857-9000
pluginnc@advancedenergy.org
pluginnc.com

Plug-in nc

Plug-In NC Member Organizations

- Aerie Bed and Breakfast
- Asheville Outlets
- Bernhardt Furniture Company
- Black Bear Solar Institute
- Blue Ridge Energy
- Blue Ridge EV Club
- Brentwood Solar House
- Brightfield Transportation Solutions
- Brunswick Electric Membership Corporation
- Campbell University
- Canyons of the Blue Ridge
- Centralina Council of Governments
- Centralina Clean Fuels Coalition
- Cisco
- City of Asheville
- City of Charlotte
- City of Hendersonville
- City of Winston-Salem
- Correll Associates
- Country Inn & Suites
- Courtyard Raleigh Crabtree
- Double Tree Rocky Mount
- Duke Energy
- Durham County Government
- Earth Shine Nature Programs
- Eastern Carolina Council of Governments
- Economy Inn Greenville
- Elon University
- Front Street Village
- General Electric
- Hanna House
- Hybrid Shop of the Carolinas
- Land of Sky Clean Vehicles Coalition
- Land of Sky Regional Council
- Lord Corporation
- Mayfaire Town Center
- Mills-Rentals
- NC Clean Energy Technology Center
- NC Electric Membership Corporation
- North Carolina State University
- Orange County
- Pecan Tree Inn Bed and Breakfast
- Piedmont EMC
- Piedmont Triad International Airport
- Piedmont Triad Regional Council
- Southern Alliance for Clean Energy
- Stanhope Apartments
- Tanger Outlets Mebane
- The Inn on Pamlico Sound
- The Mayton Inn
- Town of Black Mountain
- Town of Cary
- Town of Chapel Hill
- Town of Edenton
- Town of Montreat
- Town of Morrisville
- Town-Chapel-Hill
- Triangle Clean Cities Coalition
- Triangle J Council of Governments
- UNC Asheville
- UNC Chapel Hill
- UNC Charlotte
- UNC Pembroke
- Western Carolina University
- Wildhorse Adventures

How to Connect:

(919) 857-9000
pluginnc@advancedenergy.org
pluginnc.com

Plug-in nc

NORTH CAROLINA PORTS

December 14, 2017

NC VW Settlement RFI
Division of Air Quality – Mobile Sources
217 WEST JONES STREET
1641 MAIL SERVICE CENTER
RALEIGH NC 27699-1641
NC_VWGrants@ncdenr.gov

RE: North Carolina VW Settlement RFI response

To Whom It May Concern,

Thank you for the opportunity to provide input on the North Carolina VW Settlement. My name is Stephanie Ayers and I am the Director of Planning & Development for the North Carolina State Ports Authority (NC Ports).

NC Ports is an enterprise economic development agency for the State of North Carolina, established by the North Carolina General Assembly in 1954 and is now considered an independent agency of the North Carolina Department of Transportation (NCDOT). NC Ports owns and maintains the Port of Wilmington, the Port of Morehead City as well as two inland facilities, the Charlotte Intermodal facility and the Piedmont Triad Inland Terminal.

While the North Carolina Ports are physically located in Wilmington and Morehead City, the economic benefits of vibrant, growing ports reach from the coastal plains to the Blue Ridge Parkway. NC Ports support more than 76,000 jobs across the State and generate more than $700 million in annual state and local taxes. Goods moving through NC Ports contribute more than $14 billion to North Carolina's economy. These economic contributions are heavily reliant on the existence of North Carolina's container business.

NC Ports are a conduit of economic development. Business and industry need access to the global markets where their products are sold and their resources are found. Recent investments in port terminal, channel and inland infrastructure, coupled with operational efficiencies have led, in part, to recent service additions at the Port of Wilmington to more than double the current container services. New partnerships include *Mediterranean Shipping Company (MSC)* and *Maersk Line* with the addition of a new Europe-

2202 Burnett Blvd, Wilmington, NC 28401 | 800-334-0682 | ncports.com

NORTH CAROLINA PORTS

U.S. East Coast container service, a new partnership with *THE Alliance* with the addition of an all-water Asia-U.S. East Coast container service, a new partnership with *ZIM Integrated Shipping Ltd.* with an all-water Asia-U.S. East Coast service rotation. This weekly service will begin calling on the port in June and provides unprecedented access to major markets in South China, Southeast Asia and India Subcontinent. Finally, NC Ports has partnered with *StreamLines*, a specialized refrigerated container operations.

A moderate capital infusion from the VW settlement in support of NC Ports' capital investment plan will significantly boost NC Ports' ability to provide better service to existing and future container customers. Economists agree that international trade directly contributes to a successful and progressive business climate. An efficient supply chain will attract and retain producers, importers and other logistics related industries to a region. An improved international gateway for North Carolina will also enhance the State's ability to attract new business. As manufacturing and logistics firms continue to migrate to the U.S. East Coast, especially the U.S. southeast region, a significant portion of their site selection analysis is determined by an efficient supply chain that includes a global gateway.

There are Port Cargo Handling Equipment investments that would support these economic activities. Under Section 8 of the eligible mitigation actions, Forklifts and Port Cargo Handling Equipment needs at the Port of Wilmington include:

- Reefer container storage and electrical infrastructure at the Port of Wilmington (reefer receptacles on racks) in support of refrigerated containers. Cost $4.9M with expected need in 2018/2019.
- One Ship to Shore electrified container crane at the Port of Wilmington to replace an aging diesel crane in support of the increased container activity at the Port. Cost $11.8M with expected need in 2019/2020.

With the recent introduction of *StreamLines*, a specialized refrigerated container liner service, new all electric reefer container storage, stacking and electrical infrastructure at the Port of Wilmington (reefer receptacles on racks) is required. Currently, there are 138 grounded reefer receptacles and

2202 Burnett Blvd, Wilmington, NC 28401 | 800-334-0682 | ncports.com

NORTH CAROLINA PORTS

a 25 slot Power Pack genset on the terminal that is used for pre-tripping to support non-specialized container customers. Ports are moving away from Power Packs due to the high cost of fuel and maintenance and increased yard labor movements associated with pre-tripping drayage; pre-tripping at port facilities is now done at reefer receptacles. The Port is preparing for a container yard reconfiguration to include additional reefer receptacles on racks that will allow for storage, stacking, and electrical infrastructure for the growing reefer activity at the Port of Wilmington.

One (1) Ship to Shore electrified container crane at the Port of Wilmington is needed to replace an aging diesel crane in support of the increased container activity at the Port. Currently, the Port of Wilmington has four post-Panamax Ship to Shore electrified container cranes to support container activity on container Berth 9. An additional three Ship to Shore electrified container cranes are on order in support of expanded modernization on container Berth 8. In 2019/2020, the Port of Wilmington will begin the final container berth modernization at container Berth 7. Completion of this project will necessitate the purchase of the fourth Ship to Shore electrified container crane to replace the aging diesel crane that is currently in place.

There are additional Port Cargo Handling Equipment needs at both of North Carolina's marine port terminals, however, further eligibility discussions may be required. For example, at the Port of Morehead City, funding is required to replace an aging 1968 American Hoist & Derrick diesel crane with a new diesel engine (Tier 3 or 4) crane.

NC Ports is committed to an environmentally sustainable operation and is continually updating practices and equipment to reduce its carbon footprint. NC Ports converted to ultra-low-sulfur diesel fuel as its primary off-road diesel fuel three years before federal requirements. NC Ports has also installed two bio-diesel storage tanks for fuel used to operate its on-terminal equipment. Port Cargo Handling Eqiupment investments would dovetail with these efforts and further reduce NC Ports' carbon footprint. Additionally, Port Cargo Handling Eqiupment projects would provide additional sustainability in the form of infrastructure and safety improvements.

2202 Burnett Blvd, Wilmington, NC 28401 | 800-334-0682 | ncports.com

NORTH CAROLINA PORTS

Maintaining and improving efficiency at the port terminals through more modern equipment is essential for North Carolina port users to stay competitive in an increasing competitive global environment.

Thank you in advance for your consideration.

Sincerely,

Stephanie Ayers
North Carolina Ports
Director, Planning & Development
2202 Burnett Boulevard, Wilmington NC 28401
910-251-7073
Stephanie.Ayers@NCports.com

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

12/22/17

Ms. Phyllis Jones
NC Department of Environmental Quality
217 West Jones Street
Raleigh, NC 27603

Dear Ms. Jones:

The North Carolina Department of Transportation Rail Division (NCDOT) is pleased to offer the attached Request for Information (RFI) in response to the NCDEQ solicitation for ideas associated with the Volkswagen Mitigation Trust for the State of North Carolina.

The NCDOT Rail Division hopes to use a portion of the available VW funding to implement new technologies on our passenger locomotives, including catalytic emissions reduction systems and battery propulsion. Implementation of these systems will result in the State of North Carolina having one of the cleanest-running passenger locomotive fleets in the country, and will afford significantly improved air quality for the citizens of North Carolina.

The Rail Division thanks NCDEQ in advance for their consideration of this proposal.

Sincerely,

Allan Paul
Acting Rail Division Director

cc: Julie White
Jimmy Travis
Lynn Harris

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
RAIL DIVISION
1553 MAIL SERVICE CENTER
RALEIGH, NC 27699-1553

Telephone: (919) 707-4700
Fax: (919) 715-6580
Customer Service: 1-877-368-4968

Website: www.ncdot.gov
www.ncbytrain.org

Location:
1 SOUTH WILMINGTON STREET
RALEIGH, NC 27601

Section 1 – Project Applicant Information

- **Company/Agency/Organization Name:** The Mooresville Hydrail Initiative on behalf of Appalachian State University and the University of North Carolina at Charlotte, with future intentions to collaborate with NCDOT Rail Division
- **Contact Person Name:** Stan Thompson
- **Government/Non-Government:** Government
- **Mailing Address:** 518 Beaten Path Road, Mooresville NC 28117-8982
- **Phone Number:** (704) 458-9410
- **Email Address:** hst2nd@aol.com

Section 2 – VW Program and Solicitation Design Questions

Respondents should consider providing information in response to the following questions:

1. **How should DEQ prioritize projects?**
   DEQ should prioritize projects based on the maximum incremental mass of avoided carbon dioxide and health-affecting particulates kept out of the earth's atmosphere by the projects. The supplanting by hydrail of diesel rail traction with electric traction power onboard by hydrogen fuel cells will be one of the most massive GHG mitigations on the planet during the next decade.

   Recommend that DEQ should consider the following when determining priority of projects:
   - Synergy with similar international projects in China, Germany, Canada and Japan with enhance North Carolina's diesel-to-hydrail climate and pollution contribution.
   - Opportunities to introduce new emissions reduction technologies. Embracing hydrail will establish North Carolina as a national leader in air pollution reduction efforts, which will in turn put the State at the forefront of opportunities for future related green rail infrastructure funding for additional emissions reduction. This includes funding research and manufacturing initiatives for new, clean technology that can be implemented onto urban and intercity rail vehicles that have traditionally used diesel engines.
   - Ability to leverage VW money as seed money to expedite inevitable changes that would have evolved much later should be given high priority.

2. **What is the anticipated demand for each eligible project type?**
   A paradigm shift to hydrail is in progress world-wide because of its dramatically lower cost and role as an enabling technology for intermittent renewable energy (wind, solar, tide) to power rail transportation as well as zero-carbon nuclear energy.

3. **The percentage of trust funds, if any, that DEQ should devote to Light Duty Zero Emission Vehicle Supply Equipment?**

The percentage of funds devoted to LDZEV supply equipment should be proportional to the amount these vehicles contribute to total air pollution for the State.

4. **What is the anticipated demand for specific types of diesel emission reduction projects not eligible under the VW settlement but otherwise eligible under DERA or other state programs?**
   There will be a significant demand for DERA-eligible projects under the VW settlement. MHI's request is in fact a good example of this – hydrail equipment is not eligible for VW funds directly but could be funded as a DERA project, and if funded would have a significant impact on emissions reduction.

5. **Should a certain percentage of available VW funds be allocated to each eligible project type and if so how should the percentage be determined?**
   If DEQ determines that the fundamental change from diesel to wireless electric railways will afford the maximum climate protection and pollution mitigation that should substantially apportion VW resource allocation.

6. **Should a certain percentage of available Mitigation Trust funds be reserved for government projects?**
   Yes, assuming universities are included – government funded/collaborated projects often have significant impact on public wellbeing.

7. **Should funds be geographically distributed, and if so how?**
   In accordance with question 6, if DEQ determines addressing the hydrail transition will yield the most massive climate and pollution mitigation, the geography is less relevant.

8. **Should governmental entities be required to provide matching funds and if so, how much?**
   DEQ should abide by the indicated VW criteria for percent matching funds for indicated projects; this should be applied equally to governmental and non-governmental agencies.

9. **Should DEQ establish a minimum project size and if so, what size?**
   DEQ should allocate VW funds in such a way the greatest mass of CO2 emission is avoided.

10. **In addition to evaluating a proposed project's total cost effectiveness ($/ton), what other key factors should DEQ consider when evaluating projects?**
    DEQ should also consider the permanent and global impact of implementing new technologies like hydrail that have recently begun to be deployed in other countries. The Mooresville Hydrail Initiative brought zero carbon railway technology to China and Germany perhaps a decade sooner than would otherwise have occurred. Continuing to lead in introducing this new technology onshore will establish North Carolina nationally in air pollution reduction efforts while helping the State attract Federal funds to manufacture hydrail rolling stock, creating massive commerce and jobs.

11. What other feedback do you have on project evaluation and/or scoring criteria?
Request that DEQ continue to keep all interested parties apprised of the project schedule to ensure that all critical applications and other documentation is received within proper timeframes.

12. What publicly available tool(s) should be used to quantify anticipated emission reductions/offsets for eligible mitigation projects? What, if any, additional resources should be provided and made available?
Emissions information from the recent publicly available Ernst and Young national study for converting Germany's diesel to hydrail should inform NC's decision considerably.

13. What methods could DEQ employ to reduce barriers and increase participation in future solicitations for projects?
DEQ has done a good job of communicating solicitations for projects. Continued communication of future solicitations to previous applicants is important to ensure these solicitations receive positive feedback. DEQ should continue to encourage applicants to communicate opportunities for funding to their colleagues to increase interest and potential number of applicants.

14. What information/resources would be most valuable for stakeholders interested in submitting projects and what is the best way to communicate those?
Information such as scope, funding limits, and application requirements are critical for submitting proposals. DEQ communicates this information well in RFPs and announcements associated with funding solicitations.

Section 3 – Submitting Your Project Information

Identify Applicable Eligible Mitigation Project Category:

1. **Class 8 Local Freight Trucks and Port Drayage Trucks with 1992-2009 model year engines and a Gross Vehicle Weight Rating (GVWR) greater than 33,000 pounds (lbs.)**
2. **Class 4-8 School, Shuttle, or Transit Buses with model year 2009 or older engines and a GVWR greater than 14,001 lbs. and used for transporting people.**
3. **Class 4-7 Local Freight Trucks with 1992-2009 model year engines and a GVWR between 14,001 and 33,000 lbs.**
4. **Freight Switchers with pre-tier 4 engines and operating more than 1,000 hours per year.**
5. **Ferries/Tugs with unregulated Tier 1 -Tier 2 marine engines.**
6. **Ocean-Going Vessels Shorepower.**
7. **Airport Ground-Support Equipment with Tier 0 -Tier 2 diesel engines, and uncertified or certified to 3 grams per brake horsepower-hour spark ignition engines.**
8. **Forklifts with greater than 8,000 lbs. lift capacity and/or Port Cargo Handling Equipment.**
9. **Light Duty (LD) zero emission vehicle (ZEV) Supply Equipment (Level 1, Level 2, or fast charging equipment) and hydrogen fuel dispensing equipment.**

The Mooresville Hydrail Initiative (MHI) proposal does not fit into any of the pre-designated VW project categories as it is focused on expediting the emergence of a valuable new global technology by networking all existing expertise into an orchestrated effort—research, testing, education, manufacturing, implementation of hydrogen fuel cell railroads (hereafter referred to as "hydrail"). Accordingly, MHI requests that the DERA funding path be used for this project.

Project Summary:
Briefly describe the proposed project, including:

Geographic area where vehicles/vessels/engines are operated (e.g., city/cities, county/counties, and/or neighborhoods); This proposal is primarily focused on passenger rail agencies across the State of North Carolina. For example, MHI envisions the NCDOT Piedmont service and the Charlotte CATS service as potential customers for hydrail implementation. The Appalachian State and Charlotte Campuses of the University System and the North Carolina Transportation Museum are likely to be involved.

Fleet type (e.g., ports, airports, marine, school buses); Passenger rail and freight switching locomotives are demonstrated applications for hydrail technology

Mitigation action (e.g., engine repower, vehicle replacement, deployment of LD ZEV supply equipment/Shore power systems); replace existing diesel-electric engines generation in locomotive propulsion systems with non-polluting hydrogen fuel cells. Locomotives so electrified need no external power, cutting around $10,000,000 per mile from route electrification costs plus $150,000-per-mile-per-year from maintenance expense.

Number of engines/vehicles/vessels/equipment targeted for emission reductions;
Application of this technology would be statewide – all passenger agencies will eventually be candidates for hydrail implementation. This technology could be expanded to other agencies such as freight rail, urban rail transit. Marine and port drayage can share the energy infrastructure with hydrail yard switching locomotives.

Emission reduction/offset technology to be used; Hydrogen fuel cells in place of traditional locomotive propulsion technologies such as diesel-electric engines or overhead electric catenary systems

Estimated cost of project; $5,000,000

A description of the expected overall benefits of the proposed mitigation activity, including a description of how the proposed project mitigates the impacts of nitrogen oxides (NOx) emissions:
Hydrogen fuel cells as a means of propulsion are a fast-emerging technology in the passenger railroad industry. Multiple agencies in Europe, Canada, and Asia have successfully implemented

this technology on commuter and inter-city passenger rail lines. The technology is available for implementation of equivalent technology in the United States, specifically within North Carolina there are excellent potential customers including the NCDOT Piedmont passenger rail service, the Charlotte CATS service, and proposed future services such as the Raleigh-Durham light rail service. There is a rapidly emerging market for engineering and operations education for hydrail which the University System is already positioning to provide.

Hydrogen fuel cells offer multiple advantages over traditional mechanisms of rail propulsion such as diesel-electric engines or overhead electric catenary. Hydrogen fuel cells produce effectively no air pollution and thus offer tremendous advantages from an air pollution standpoint vs. diesel engines, many of which are EPA Tier 1 or lower within North Carolina. Additionally, hydrogen fuel cells are significantly less expensive than overhead catenary, which generally costs on the order of $10,000,000 per mile to implement; the elimination of need for overhead catenary wires also allows the train to travel through more dense urban areas where bridges would otherwise have to be raised for catenary implementation and also removes the visually unappealing aspect of residual aerial plant in populated areas where power and communications wiring has been buried for decades.

MHI envisions the following objectives for hydrail implementation within North Carolina:

- There is currently a demo hydrail locomotive stored at the NC Transportation Museum in Spencer, NC. The University would acquire this locomotive, and in conjunction with its Engineering consultants, rebuild the locomotive to like new condition with hydrogen fuel cells in place of the standard diesel-electric prime mover and head end power engines. Upon completion this locomotive could be operated at locations such as the NCTM as an engineering teaching instrument as well as a tool to elevate public awareness of the viability of hydrail technology.
- MHI has historically collaborated with UNC Charlotte and Appalachian State University regarding hydrail research. Manufacturers of hydrail equipment in China and Europe now have plants in North Carolina. The MHI is exploring expansion of these plants to manufacture hydrail rolling stock for domestic and export consumption. Development of hydrail education at UNCC and Appalachian State, and soon in the Community College system, is integral to this manufacturing possibility.

Project Detail:

Provide information on specific engines/vehicles/vessels/equipment targeted for emission reductions, including (where applicable):

- **Number of vehicles** – all diesel-electric and electric catenary passenger locomotives across North Carolina and the surrounding States are potential candidates for hydrail implementation.
- **class or equipment type** – all passenger locomotives types, both commuter and inter-city, are candidates for hydrail implementation

- **engine make, engine model, engine model year, current tier level or emission standards** – all passenger locomotive engine types are candidates for replacement with hydrogen fuel cells
- **Fuel type, amount of fuel used, annual miles travelled or annual usage rate, annual idling hours.**
  The targeted passenger locomotives typically run on standard ultra-low sulfur diesel (ULSD) or overhead electric catenary. Annual miles traveled and annual idling hours are customer specific, however any implementation of hydrail would save many thousands of gallons of fuel and of idling hours.

Provide information on the new eligible verified and/or certified diesel emission reduction technology(s) to be implemented under the proposed project, including (where applicable):

- **technology type, make, and model** – hydrogen fuel cells, specifications are to be determined but would be functionally similar to those currently in use in Europe, Canada, and Asia
- **engine model year, horsepower, tier level or emission standards** – For diesel locomotives engines, hydrogen fuel cell specifications are to be determined but upon implementation would provide equivalent horsepower as the diesel engine it replaced. Engine emissions levels would be reduced to effectively zero pollution. Note that many passenger locomotives within North Carolina are EPA Tier 1 or lower, thus the amount of reduction would be substantial.
- **Fuel type and annual idling hours reduced** – hydrogen fuel cell propulsion replaces standard diesel-electric propulsion. Idling hours reduced would be customer specific, but would likely be in the tens of thousands, thus providing significant air pollution reduction in railyards where locomotives have historically idled for extended periods of time.

Provide information on LD ZEV supply equipment (electric or hydrogen), including (where applicable):

- **number,**
- **equipment type (Level 1/2/fast chargers or hydrogen dispensing), and**
- **location (public place, workplace, or multi-unit dwelling)**

Not Applicable for MHI proposal

How should determination be made on whether a proposed project will benefit areas that have been disproportionately impacted by emissions of nitrogen oxides (NOx) or other pollutants?

- **Whether a project applicant is low income, minority, or disadvantaged or operates vehicles in these communities.**
- **Benefits to areas that have been disproportionately impacted by NOx and other pollutants**

It is common for low income / minority / disadvantaged communities to be located near rail agencies nationwide. There are multiple examples of these types of areas across North

Carolina, and as such the residents of these communities are directly impacted by air pollution. Thus any air pollution reduction efforts will have a direct positive impact on low income / minority / disadvantaged communities across the major population centers of North Carolina.

Furthermore, many counties across North Carolina, specifically in urban areas, are designated as EPA non-attainment areas for one or more pollutants; reducing air pollution levels will have a direct positive impact on reducing pollutants in these counties.

Capital and Project Costs:

Calculate and provide projected capital cost ($/unit) and total project cost. Note calculations for proposed LD ZEV projects should include operation and maintenances cost, and calculations for eligible all-electric mitigation actions should include charging infrastructure cost (where applicable)

MHI requests $5,000,000 to be used to hydrail research and implementation. Cost breakdown is as follows:

- Rebuild hydrail locomotive at NCTM – $2,000,000
- Funding for research by UNCC and Appalachian St. – $1,000,000
- Incentive money for hydrail rolling stock manufacturers – $2,000,000
  - Determine locations
  - Hire faculty
  - Identify manufacturers
  - Build or hydrail-adapt passenger trainsets and/or switch engines

MHI and NC DOT will share further cost breakdowns of the above items as necessary. Note that MHI expects if a hydrail manufacturing plant was to be partially funded by VW money, it would certainly attract the attention of commercial electrical agencies such as Duke Power, who would then provide additional funding for this effort. MHI is in conversation with the US DOE, EPA and DOT who all have policies in line with the national advent of hydrail. Given the interest and opportunity for alternative propulsion within North Carolina, MHI expects that hydrail manufacturing efforts would see a ROI within ten years of initialization.

Identify projected cost share and, if applicable, what additional sources of funds may be utilized as matching funds.

As noted above, MHI expects the University and DOT would receive matching funds dollar-for-dollar from commercial electrical utilities interested in establishing manufacturing within North Carolina.

Expected Proposed Project Benefits:

Working with India Railways on a 2007 study for an EPA Region Four sustainability Conference, MHI calculated that, world-wide, advancing the transition from diesel to hydrail by a single year

would, over the 21-year transition period, reduce CO2 emissions by 214 million tons (US). By facilitating the advent of hydrail in China and Germany, MHI believes they have expedited the technology not by one but by at least ten years.

Calculate and provide capital cost effectiveness ($/short ton of NOx reduced for each unit) and total cost effectiveness ($/short ton of NOx reduced for the entire project).

Calculate and provide the expected annual and lifetime project emissions reductions/offsets for NOx.

Calculate and provide capital cost effectiveness ($/short ton of NOx reduced for each unit) and total cost effectiveness ($/short ton of NOx reduced for the entire project).

Information has been calculated using the EPA Diesel Emissions Quantifier Tool indicated below. As this hydrail implementation is new technology, the following assumptions were made: 99.99% emissions reduction for diesel engines for all pollutants. Total cost of implementation is $1 million per locomotive, initial implementation on ten (10) locomotives across North Carolina.

Note that the quantifier allows for a limited locomotive lifetime by this assessment; actual lifetime is 2-3 times the maximum allowed value, thus overall emissions reduction is increased accordingly. Additionally, this model does not take into account the previously mentioned benefits of hydrail vs. electric catenary, which include significantly reduced cost of implementation, increased accessibility of urban areas, and greater visual appeal.

Number of Vehicles	10
Model Year	1989
Retrofit Year	2011
Technology Description	Engine Upgrade Kit
Fuel Type	ULSD
Fuel Volume	3000000
Calculated Fuel Volume	3000000
Vehicle Miles Traveled/Year (VMT)	
Idling Hours/Year	
Horsepower	3000
Usage Rate/Year	7000
Number of Vehicles Retrofitted	10
New Model Year	
Diesel Fuel Reduced (gallons)	0
Reduced Idling (hours)	0
Installation Cost	$0
Unit Cost	$1,000,000
Annual Baseline of Vehicles (NOx, short tons)	535.3390975

Lifetime Baseline of Vehicles (NOx, short tons)	3212.034585
Percent Reduced (NOx, %)	100.00%
Baseline of Vehicles Retrofitted per year (NOx, short tons/year)	535.3391
Amount Reduced per Year(NOx, short tons)	535.2856
Lifetime Baseline of Vehicles Retrofitted (NOx, short tons)	3,212.03
Lifetime Amount Reduced (NOx, short tons)	3,211.71
Lifetime Amount Emitted After Retrofit, Retrofitted Vehicles (NOx, short tons)	0.3212
Capital Cost Effectiveness ($/short ton), Retrofitted Vehicles (NOx)	3,113.60

Software tools available to calculate projected emissions reductions and capital and total cost effectiveness of proposed mitigation projects:

Environmental Protection Agency's (EPA) Diesel Emissions Quantifier Tool: https://www.epa.gov/cleandiesel/diesel-emissions-quantifier-deq

Argonne National Laboratory Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) Tool (2016 rev1): https://greet.es.anl.gov/afleet

Greenhouse gases, Regulated Emissions, and Energy use in Transportation Model (GREET 2012): https://greet.es.anl.gov/carbon_footprint_calculator
Identity the method(s) used to calculate the emissions reductions/offsets and cost, and describe and document your methods.

Section 1 – Project Applicant Information

- **Company/Agency/Organization Name:** North Carolina Department of Transportation Rail Division
- **Contact Person Name:** Allan Paul, Acting Rail Division Director
- **Government/Non-Government:** Government
- **Mailing Address:** 1 S. Wilmington St., Raleigh NC 27601
- **Phone Number:** (919) 707-4712
- **Email Address:** hapaul@ncdot.gov

NCDOT Rail Division List of Proposed Project Costs for VW Funding:

- **Total Amount Requested: $16.68 million**
  - One (1) Zero Emissions Boost Locomotive (ZEBL) Battery Systems: $3.5 million
  - Four (4) Additional ZEBL Battery Systems: $9.6 million
  - Four (4) blended aftertreatment systems (BATS): $2.2 million
  - One (1) TP56ZH-300 Battery Switcher: $1.38 million

Further detail on each of the indicated projects is provided below. Projects are listed in order of priority for requested funding. The Rail Division will request that NCDEQ partially fund the indicated projects if full funding is unavailable. Summaries of each item are provided below:

1. ZEBL #1: $3.5 million

- Batteries
- Battery racks
- Power electronics
- Traction motors for regenerative braking
- To be implemented onto NCDOT CCU; project ready to start Q4 2018
- 30-40% fuel savings / emissions reduction on one train upon implementation

2. ZEBL #2-5: $2.4 million each, request qty 4: $9.6 million total

- Batteries
- Battery racks
- Power electronics
- Traction motors for regenerative braking
- To be implemented onto NCDOT CCU; project ready to start Q1 2020
- 30-40% fuel savings / emissions reduction on all trains upon implementation

3. BATS Aftertreatment systems, $550,000 each, request qty 4: $2.2 million total

- Modified locomotive dynamic brake hatch to accommodate SCR mixing chamber
- DEF tank, pump, and delivery system
- Modified engine exhaust plumbing to connect to SCR chamber
- Control electronics
- Locomotive emissions levels reduced from Tier 0+ to cleaner than Tier 4 for NOx, HC, CO, Tier 3+ for PM

4. Battery Switcher: $1.38 million

TP56ZH-300 Battery Switcher to use at the NCDOT Capital Maintenance Yard; would preclude having to operate locomotives for switching actions within the Yard. This unit is functionally equivalent to the Freight Switcher unit identified in Item #4 of the Eligible Mitigation Project Category, but for a passenger rail maintenance yard in the case of NCDOT. Acquisition of this battery switcher unit is estimated to save approximately 1500 idling hours per year.

Section 2 – VW Program and Solicitation Design Questions

Respondents should consider providing information in response to the following questions:

1. **How should DEQ prioritize projects?**
   The NCDOT Rail Division suggests that DEQ should consider the following when determining priority of projects:
   - Most optimal air pollution improvements per dollar spent
   - Opportunities to introduce new emissions reduction technologies. Embracing new technologies will establish North Carolina as a national leader in air pollution reduction efforts, which will in turn put the State at the forefront of opportunities for future funding for additional emissions reduction.
   - Ability of agencies to pay for projects without VW money; i.e. projects that otherwise may not be accomplished without VW funding should take priority over agencies that possess means to pay for emissions reduction efforts

2. **What is the anticipated demand for each eligible project type?**
   It is anticipated that there will be a significant demand for each project type.

3. **The percentage of trust funds, if any, that DEQ should devote to Light Duty Zero Emission Vehicle Supply Equipment?**
   The percentage of funds devoted to LDZEV supply equipment should be proportional to the amount these vehicles contribute to total air pollution for the State.

4. **What is the anticipated demand for specific types of diesel emission reduction projects not eligible under the VW settlement but otherwise eligible under DERA or other state programs?**
   There will be a significant demand for DERA-eligible projects under the VW settlement. The Rail Division's request is in fact a prime example of this – passenger rail equipment is not eligible for VW funds directly but could be funded as a DERA project. NCDOT's Piedmont passenger rail program passes through nine counties between Raleigh and Charlotte, NC, all of which are EPA non-attainment for one or more types of pollutant. Additionally, more than half of the population of North Carolina lives within a one-hour drive of the Piedmont corridor and as such is subject to the effects of locomotive air pollution. Thus affording the Rail Division opportunities to improve its locomotive emissions levels, via DERA funding, would have significant and far-reaching effects on the wellbeing of the citizens of North Carolina.

5. **Should a certain percentage of available VW funds be allocated to each eligible project type and if so how should the percentage be determined?**
   DEQ should determine how much each project type contributes to overall levels of air pollution across the State, taking into account regional "hot spots" and cost of upgrades/replacement vs. amount of pollution generated.

6. **Should a certain percentage of available Mitigation Trust funds be reserved for government projects?**
   Yes. The NCDOT Rail Division is an excellent example of a State government agency that has embraced state-of-the-art technology to reduce air pollution on its locomotives in the form of specialized catalytic reduction systems and battery technology, and this VW funding (via DERA) will be an excellent opportunity to continue this effort.

7. **Should funds be geographically distributed, and if so how?**
   Funds should be distributed in a manner that results in the maximum reduction of air pollution across the State, in keeping with the criteria suggested in Question #1 above.

8. **Should governmental entities be required to provide matching funds and if so, how much?**
   The Rail Division recommends that DEQ abide by the indicated VW criteria for percent matching funds for indicated projects; this should be applied equally to governmental and non-governmental agencies.

9. **Should DEQ establish a minimum project size and if so, what size?**
   The Rail Division recommends that DEQ consider all projects regardless of size and provide funding in accordance with the criteria indicated in Question #1 above.

10. **In addition to evaluating a proposed project's total cost effectiveness ($/ton), what other key factors should DEQ consider when evaluating projects?**
    DEQ should also consider the impact of implementing new technologies to combat air pollution. As noted above, the NCDOT Rail Division has implemented new air pollution reduction technologies onto one of its locomotives and has been nationally recognized for doing so. Continuing to embrace new technologies will establish North Carolina as a national leader in air pollution reduction efforts, which will in turn put the State at the forefront of opportunities for future funding for additional emissions reduction.

11. **What other feedback do you have on project evaluation and/or scoring criteria?**
    The Rail Division requests that DEQ continue to keep all interested parties apprised of the project schedule to ensure that all critical applications and other documentation is received within proper timeframes.

12. **What publicly available tool(s) should be used to quantify anticipated emission reductions/offsets for eligible mitigation projects? What, if any, additional resources should be provided and made available?**
    The emissions reduction calculation tools provided in this RFI are acceptable. The Rail Division believes DEQ has done a commendable job to date regarding rollout of the VW application process. DEQ should continue to make itself available as a resource to all parties interested in VW funding.

13. **What methods could DEQ employ to reduce barriers and increase participation in future solicitations for projects?**
    The Rail Division believes that DEQ does a good job of communicating solicitations for projects. Continued communication of future solicitations to previous applicants is important to ensure these solicitations receive positive feedback. DEQ should continue to encourage applicants to communicate opportunities for funding to their colleagues to increase interest and potential number of applicants.

14. **What information/resources would be most valuable for stakeholders interested in submitting projects and what is the best way to communicate those?**
    Information such as scope, funding limits, and application requirements are critical for submitting proposals. DEQ communicates this information well in RFPs and announcements associated with funding solicitations.

Section 3 – Submitting Your Project Information

Identify Applicable Eligible Mitigation Project Category:

1. **Class 8 Local Freight Trucks and Port Drayage Trucks with 1992-2009 model year engines and a Gross Vehicle Weight Rating (GVWR) greater than 33,000 pounds (lbs.)**
2. **Class 4-8 School, Shuttle, or Transit Buses with model year 2009 or older engines and a GVWR greater than 14,001 lbs. and used for transporting people.**
3. **Class 4-7 Local Freight Trucks with 1992-2009 model year engines and a GVWR between 14,001 and 33,000 lbs.**
4. **Freight Switchers with pre-tier 4 engines and operating more than 1,000 hours per year.**
5. **Ferries/Tugs with unregulated Tier 1 -Tier 2 marine engines.**
6. **Ocean-Going Vessels Shorepower.**
7. **Airport Ground-Support Equipment with Tier 0 -Tier 2 diesel engines, and uncertified or certified to 3 grams perbrake horsepower-hour spark ignition engines.**
8. **Forklifts with greater than 8,000 lbs. lift capacity and/or Port Cargo Handling Equipment.**
9. **Light Duty (LD) zero emission vehicle (ZEV) Supply Equipment (Level 1, Level 2, or fast charging equipment) and hydrogen fuel dispensing equipment.**

The Rail Division's primary proposal does not fit into any of the pre-designated VW project categories as it is focused on intercity passenger locomotives. Rather, the NCDOT Rail Division requests that the DERA funding path be used for these emissions reduction projects. The Rail Division has a very positive history of using DEQ DERA funds to implement emissions reduction projects on our Piedmont passenger rail fleet, and hopes to continue these efforts using available VW funds.

Project Summary:

Briefly describe the proposed project, including:

Geographic area where vehicles/vessels/engines are operated (e.g., city/cities, county/counties, and/or neighborhoods); This project affects North Carolina's Piedmont passenger rail corridor, which runs from Raleigh to Charlotte, NC and passes through the following counties – Wake, Durham, Orange, Alamance, Guilford, Davidson, Rowan, Cabarrus, and Mecklenburg – all of which are EPA non-attainment for one or more identified pollutants. The Piedmont corridor parallels the I-40/85 corridor between Raleigh and Charlotte.

Fleet type (e.g., ports, airports, marine, school buses); Railroad – locomotives and Cab Control Units (CCUs)

Mitigation action (e.g., engine repower, vehicle replacement, deployment of LD ZEV supply equipment/Shorepower systems); two separate paths of proposed emissions reduction – 1) retrofitting locomotives with specialized selective catalytic reduction (SCR) technology; 2) installation of battery technology on Cab Control Units (CCUs)

Number of engines/vehicles/vessels/equipment targeted for emission reductions;
Four (4) F59PH locomotives and five (5) Cab Control Units (CCUs)

Emission reduction/offset technology to be used; 1) selective catalytic emissions reduction system known as a blended aftertreatment system (BATS), to be retrofitted on NCDOT F59PH locomotives; 2) battery propulsion system, known as a zero emissions boost locomotive (ZEBL) to be installed in NCDOT CCUs

Estimated cost of project; The Rail Division intends to ask for funding in "blocks" and allow DEQ to fund any or all of the projects as they deem appropriate. Funding amounts will range from $2.2 million to $16.68 million if all projects are funded. A detailed listing of all requested projects is provided in the Capital and Project Costs section of this RFI response.

A description of the expected overall benefits of the proposed mitigation activity, including a description of how the proposed project mitigates the impacts of nitrogen oxides (NOx) emissions:
BATS aftertreatment system reduces locomotive emissions from Tier 0+ to cleaner than Tier 4 for NOx, HC, and CO, and Tier 3+ for PM. Locomotive exhaust is captured and combined with hot Diesel Exhaust Fluid (DEF) then pushed through heavy metal catalysts prior to release to the environment. This process converts NOx to diatomic nitrogen (N_2) and HC/CO to carbon dioxide (CO_2). Testing to date has demonstrated reduction of NOx on NCDOT's locomotives from approximately 8.0 g/bhp-hr to 1.1 g/bhp-hr.

The proposed battery technology uses stored electricity to augment the associated locomotive diesel engine and provide power when the train is at cruising speeds, and in doing so is

expected to reduce fuel usage by 30-40%. Diesel emissions levels, including NOx, will be reduced by a proportional amount.

Project Detail:

Provide information on specific engines/vehicles/vessels/equipment targeted for emission reductions, including (where applicable):

- **Number of vehicles** – nine total, four (4) F59PH locomotives and five (5) Cab Control Units (CCUs)
- **class or equipment type** – four F59PH locomotives, five cab control units (CCUs) – a CCU is an F59PH locomotive with the engine removed, intended to be run in pull-pull configuration with a standard F59PH locomotive
- **engine make, engine model, engine model year, current tier level or emission standards** – F59PH Locomotives: Electromotive Diesel (EMD) locomotive prime mover, model 12NG3A710, engine family number BEMDK0717TEJ
  CCUs: do not have an engine as they are designed to run paired with a powered locomotive; will be used to house battery technology (see below)
- **Fuel type, amount of fuel used, annual miles travelled or annual usage rate, annual idling hours.**
  Fuel type – Ultra low sulfur diesel (ULSD)
  Amount of Fuel used – 408,000 gallons per year
  Annual miles travelled – 236,640 miles per year
  Annual idling hours – 4080 hours per year

Provide information on the new eligible verified and/or certified diesel emission reduction technology(s) to be implemented under the proposed project, including (where applicable):

- **technology type, make, and model** – 1) selective catalytic emissions reduction system known as a blended aftertreatment system (BATS), to be retrofitted on NCDOT F59PH locomotives; 2) battery propulsion system, known as a zero emissions boost locomotive (ZEBL) to be installed in NCDOT CCUs.
- **engine model year, horsepower, tier level or emission standards** – N/A; new technologies are downstream emissions reduction systems and battery technologies vice replacement engine technology
- **Fuel type and annual idling hours reduced** – the proposed technologies do not use fuel as they are 1) downstream emissions reduction systems, and 2) battery systems that will discharge during train operation and recharge when the train is not in service; minimal reduction of idling hours, rather the proposed technology focuses on emissions reduction during train operation
  Note that while the additional option of a battery switcher is listed in the overall funding request for this project, NCDOT considers this a tertiary priority item and would prefer that it be only funded subsequent to the indicated battery and aftertreatment technologies. Acquisition of the battery switcher would save approximately 1500 idling hours per year at the NCDOT Capital Maintenance Yard.

Provide information on LD ZEV supply equipment (electric or hydrogen), including (where applicable):

- **number,**
- **equipment type (Level 1/2/fast chargers or hydrogen dispensing), and**
- **location (public place, workplace, or multi-unit dwelling)**

Not Applicable for NCDOT Rail Division proposal

How should determination be made on whether a proposed project will benefit areas that have been disproportionately impacted by emissions of nitrogen oxides (NOx) or other pollutants?

- **Whether a project applicant is low income, minority, or disadvantaged or operates vehicles in these communities.**
- **Benefits to areas that have been disproportionately impacted by NOx and other pollutants**

It is common for income / minority / disadvantaged communities to be located near railroad corridors nationwide. There are multiple examples of these types of areas along the Piedmont corridor, and as such the residents of these communities are directly impacted by locomotive air pollution. Thus any NCDOT Piedmont air pollution reduction efforts will have a direct positive impact on low income / minority / disadvantaged communities across the major population centers of North Carolina.

Furthermore, all counties along the Piedmont corridor between Raleigh and Charlotte are designated as EPA non-attainment areas for one or more pollutants; reducing locomotive air pollution levels will have a direct positive impact on reducing pollutants in these counties.

<u>Capital and Project Costs</u>:

Calculate and provide projected capital cost ($/unit) and total project cost. Note calculations for proposed LD ZEV projects should include operation and maintenances cost, and calculations for eligible all-electric mitigation actions should include charging infrastructure cost (where applicable)

As indicated above, the Rail Division requests funding in multiple blocks as indicated below. Projects are listed in order of priority for requested funding. Total cost of funding all projects would be $16.68 million. DEQ may fund any or all of the indicated projects.

5. <u>ZEBL #1: $3.5 million</u>

- Batteries
- Battery racks
- Power electronics
- Traction motors for regenerative braking
- To be implemented onto NCDOT CCU; project ready to start Q4 2018

- 30-40% fuel savings / emissions reduction on one train upon implementation

6. ZEBL #2-5: $2.4 million each, request qty 4: $9.6 million total

- Batteries
- Battery racks
- Power electronics
- Traction motors for regenerative braking
- To be implemented onto NCDOT CCU; project ready to start Q1 2020
- 30-40% fuel savings / emissions reduction on all trains upon implementation

Note that while the ZEBL is an all-electric implementation it is wholly onboard the CCU and thus has no associated infrastructure costs.

7. BATS Aftertreatment systems, $550,000 each, request qty 4: $2.2 million total

- Modified locomotive dynamic brake hatch to accommodate SCR mixing chamber
- DEF tank, pump, and delivery system
- Modified engine exhaust plumbing to connect to SCR chamber
- Control electronics
- Locomotive emissions levels reduced from Tier 0+ to cleaner than Tier 4 for NOx, HC, CO, Tier 3+ for PM

Both the ZEBL and BATS systems are passive upgrades that do not require any specific maintenance requirements beyond standard locomotive maintenance. The Rail Division will purchase DEF as needed for its locomotives; bulk cost is expected to be under $10,000 per year.

8. Battery Switcher: $1.38 million
   TP56ZH-300 Battery Switcher to use at the NCDOT Capital Maintenance Yard; would preclude having to operate locomotives for switching actions within the Yard. This unit is functionally equivalent to the Freight Switcher unit identified in Item #4 of the Eligible Mitigation Project Category, but for a passenger rail maintenance yard in the case of NCDOT. Acquisition of this battery switcher unit is estimated to save approximately 1500 idling hours per year.

The NCDOT Rail Division is wholly open to discussion with DEQ personnel regarding any funding discussions, including partial funding in any capacity if the entirety of the above projects cannot be funded.

Identify projected cost share and, if applicable, what additional sources of funds may be utilized as matching funds.

No matching funds are anticipated to be necessary for the requested projects. ZEBL implementation should be funded as an electric repower project, which is covered at 100% per the terms of the VW settlement. Similarly the BATS system is an EPA verified emissions reduction retrofit, which is also covered at 100% per the terms of the VW settlement. The Yard Switcher should be covered under Item 4 of the indicated eligible mitigation project categories.

Expected Proposed Project Benefits:

Calculate and provide capital cost effectiveness ($/short ton of NOx reduced for each unit) and total cost effectiveness ($/short ton of NOx reduced for the entire project).

Calculate and provide the expected annual and lifetime project emissions reductions/offsets for NOx.

Calculate and provide capital cost effectiveness ($/short ton of NOx reduced for each unit) and total cost effectiveness ($/short ton of NOx reduced for the entire project).

Data for the requested project benefits is provided below using the indicated EPA Diesel Emissions Quantifier Tool:

BATS System Implementation, 4 Locomotives

Metric	Model based on expected 6 year lifetime	Actual expected lifetime – est. 12 years
Annual Baseline of Vehicles (NOx, short tons)	221.88531	Same
Lifetime Baseline of Vehicles (NOx, short tons)	1331.31186	Same
Percent Reduced (NOx, %)	85.00%	85%
Baseline of Vehicles Retrofitted per year (NOx, short tons/year)	221.8853	Same
Amount Reduced per Year(NOx, short tons)	188.6025	Same
Lifetime Baseline of Vehicles Retrofitted (NOx, short tons)	1,331.31	2662.62
Lifetime Amount Reduced (NOx, short tons)	1,131.62	2663.24
Lifetime Amount Emitted After Retrofit, Retrofitted Vehicles (NOx, short tons)	199.6968	399.38
Capital Cost Effectiveness ($/short ton), Retrofitted Vehicles (NOx)	1,944.12	2,888.24

Note that the model allows for a maximum unit lifetime of only six years based on the date of rebuild. In reality the locomotives and CCUs are expected to be in service for at least 10-15 years from the date of rebuild, thus the total emissions reduction levels will be even greater than what is indicated. Estimates of these full unit lifetime reductions are indicated in the right-hand column above.

ZEBL Battery-Hybrid Locomotive

The ZEBL design engineers have indicated an additional 30-40% fuel savings upon implementation, which directly translates to an additional 30-40% fleet-wide reduction in emissions.

Metric	Model based on expected 6 year lifetime	Actual expected lifetime – est. 12 years
Annual Baseline of Vehicles (NOx, short tons)	480.479586	Same
Lifetime Baseline of Vehicles (NOx, short tons)	2882.87752	Same
Percent Reduced (NOx, %)	92.00%	92%
Baseline of Vehicles Retrofitted per year (NOx, short tons/year)	480.4796	Same
Amount Reduced per Year(NOx, short tons)	442.0412	Same
Lifetime Baseline of Vehicles Retrofitted (NOx, short tons)	2,882.88	5,765.76
Lifetime Amount Reduced (NOx, short tons)	2,652.25	5,304.50
Lifetime Amount Emitted After Retrofit, Retrofitted Vehicles (NOx, short tons)	230.6302	461.26
Capital Cost Effectiveness ($/short ton), Retrofitted Vehicles (NOx)	4,524.46	9,048.92

Software tools available to calculate projected emissions reductions and capital and total cost effectiveness of proposed mitigation projects:

Environmental Protection Agency's (EPA) Diesel Emissions Quantifier Tool: https://www.epa.gov/cleandiesel/diesel-emissions-quantifier-deq

Argonne National Laboratory Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) Tool (2016 rev1): https://greet.es.anl.gov/afleet

Greenhouse gases, Regulated Emissions, and Energy use in Transportation Model (GREET 2012): https://greet.es.anl.gov/carbon_footprint_calculator
Identity the method(s) used to calculate the emissions reductions/offsets and cost, and describe and document your methods.

VOLKSWAGEN CONSENT DECREE

ENVIRONMENTAL MITIGATION TRUST PROJECT IDEAS

REQUEST FOR INFORMATION (RFI) SUBMITTAL

NCDOT FERRY DIVISION SUBMITTAL #1

REPOWER NINE (9) RIVER CLASS VESSELS

SECTION 1 – PROJECT APPLICANT INFORMATION

- Agency:
  North Carolina Department of Transportation (NCDOT) / Ferry Division

- Contact Name:
  Sterling Baker, P.E.
  Director of Facilities Management Division & Multimodal Special Projects Engineer

- Government/Non-Government:
  Government

- Mailing Address:
  8550 Shipyard Road
  Manns Harbor, NC 27953

- Phone Number:
  252-339-5964

- Email Address:
  sbaker@ncdot.gov

SECTION 2 – VW Program and Solicitation Design Questions

Respondents should consider providing information in response to the following questions:

1. **How should DEQ prioritize projects?**
   The NCDOT Ferry Division suggests that DEQ should consider the following when determining priority of projects:
   - Opportunities to introduce new emissions reduction technologies. Embracing new technologies into our fleet will help establish North Carolina as a national leader in air pollution reduction efforts.
   - Most optimal air pollution improvements per dollar spent

- Ability of agencies to pay for projects without VW money; i.e. projects that otherwise may not be accomplished without VW funding should take priority over agencies that possess means to pay for emissions reduction efforts

2. **What is the anticipated demand for each eligible project type?**
   It is anticipated that there will be a significant demand for each project type.

3. **The percentage of trust funds, if any, that DEQ should devote to Light Duty Zero Emission Vehicle Supply Equipment?**
   The percentage of funds devoted to LDZEV supply equipment should be proportional to the amount these vehicles contribute to total air pollution for the State.

4. **What is the anticipated demand for specific types of diesel emission reduction projects not eligible under the VW settlement but otherwise eligible under DERA or other state programs?**
   It is anticipated that repowering of the vessels mentioned in the Ferry Division's requests will not eliminate the demand for future capital replacement or refurbishment projects, but it will assist in moving these needs out several years in our long range capital replacement plan.

5. **Should a certain percentage of available VW funds be allocated to each eligible project type and if so how should the percentage be determined?**
   DEQ should determine how much each project type contributes to overall levels of air pollution across the State, taking into account cost of upgrades/replacement vs. amount of pollution generated.

6. **Should a certain percentage of available Mitigation Trust funds be reserved for government projects?**
   Yes. The NCDOT Ferry Division is an excellent example of a State government agency that has embraced state-of-the-art technology to reduce air pollution on many of our Hatteras Class Vessels by repowering 5 of the these vessel approximately 5 years ago under a Ferry Boat Discretionary Grant from FHWA – please note this program no longer exists, therefore funding to continue similar activities would have to come from some other source such as this VW settlement.

7. **Should funds be geographically distributed, and if so how?**
   Funds should be distributed in a manner that results in the maximum reduction of air pollution across the State, in keeping with the criteria suggested in Question #1 above.

8. **Should governmental entities be required to provide matching funds and if so, how much?**
   The Ferry Division recommends no matching fund requirement for government agencies.

9. **Should DEQ establish a minimum project size and if so, what size?**

The Ferry Division recommends that DEQ consider all projects regardless of size and provide funding in accordance with the criteria indicated in Question #1 above.

10. **In addition to evaluating a proposed project's total cost effectiveness ($/ton), what other key factors should DEQ consider when evaluating projects?**
    In order to maximize the benefits of the settlement funding in reducing emissions support for government projects that provide support for North Carolina businesses and promote traffic conveyance with greatly reduced emissions should be looked at.

11. **What other feedback do you have on project evaluation and/or scoring criteria?**
    The Ferry Division requests that DEQ continue to keep all interested parties apprised of the project schedule to ensure that all critical applications and other documentation is received within proper timeframes.

12. **What publicly available tool(s) should be used to quantify anticipated emission reductions/offsets for eligible mitigation projects? What, if any, additional resources should be provided and made available?**
    The emissions reduction calculation tools provided in this RFI were not very helpful in regards to Ferry Division scopes, but the Ferry Division niche is a very specialized one. We had to get most of our data from vendors. DEQ should continue to make itself available as a resource to all parties interested in VW funding.

13. **What methods could DEQ employ to reduce barriers and increase participation in future solicitations for projects?**
    The Ferry Division believes that DEQ does a good job of communicating solicitations for projects. Continued communication of future solicitations to previous applicants is important to ensure these solicitations receive positive feedback. DEQ should continue to encourage applicants to communicate opportunities for funding to their colleagues to increase interest and potential number of applicants.

14. **What information/resources would be most valuable for stakeholders interested in submitting projects and what is the best way to communicate those?**
    Information such as scope, funding limits, and application requirements are critical for submitting proposals. DEQ communicates this information well in RFPs and announcements associated with funding solicitations.

SECTION 3 – Project Information

The NCODT Ferry Division (headquartered at the Manns Harbor, NC Shipyard) runs twenty two boats on seven regular routes across five bodies of water along the east coast of North Carolina: Currituck and Pamlico Sounds, and the Cape Fear, Neuse, and Pamlico Rivers. The ferries transport about 850,000 vehicles and two million passengers a year, making it the second largest state-run ferry system in the United States. Not only are visitors transported, but residents, commuters, and school children as well. Two of the routes (Hatteras-Ocracoke and Ocracoke-Cedar Island) are officially part of The Outer Banks Scenic Byway. The Ferry Division runs an emergency route between Stumpy Point and Rodanthe that provides a crucial transportation link between Hatteras Island and the mainland when NC Highway 12 is damaged due to storms and other issues. The Ferry Division operates and serves in nine counties which are: Currituck, Dare, Hyde, Beaufort, Craven, Carteret, Pamlico, New Hanover, and Brunswick. The majority of these counties are either Tier 1 or Tier 2. The ferry vessels fall into three different classes (River, Sound, and Hatteras) categorized by different lengths. The River Class vessels measure 180', Sound Class measures 220' and Hatteras Class measures 150'. The projects proposed by the Ferry Division consist of repowering from Tier1/2 engines and generators to Tier 3 or Tier 4 engines and generators (depending on size requirements), installing shore power at locations that currently do not provide shore power, and updating older locations that have shore power but need modernization due to age and the harsh environment it is in.

Diagram 1 – Ferry Routes in North Carolina

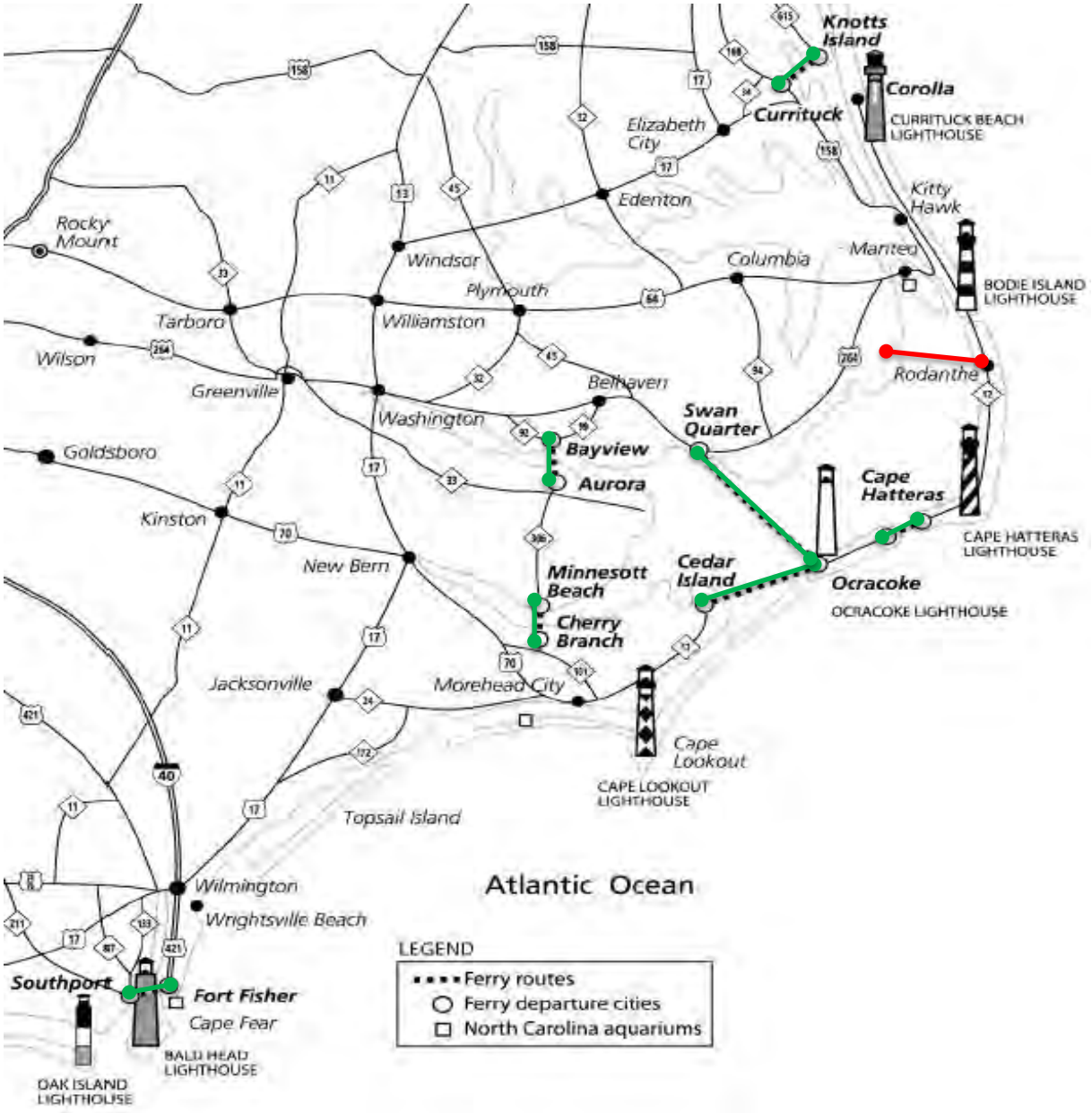


Diagram 2 – 2017 North Carolina County Tier Designations

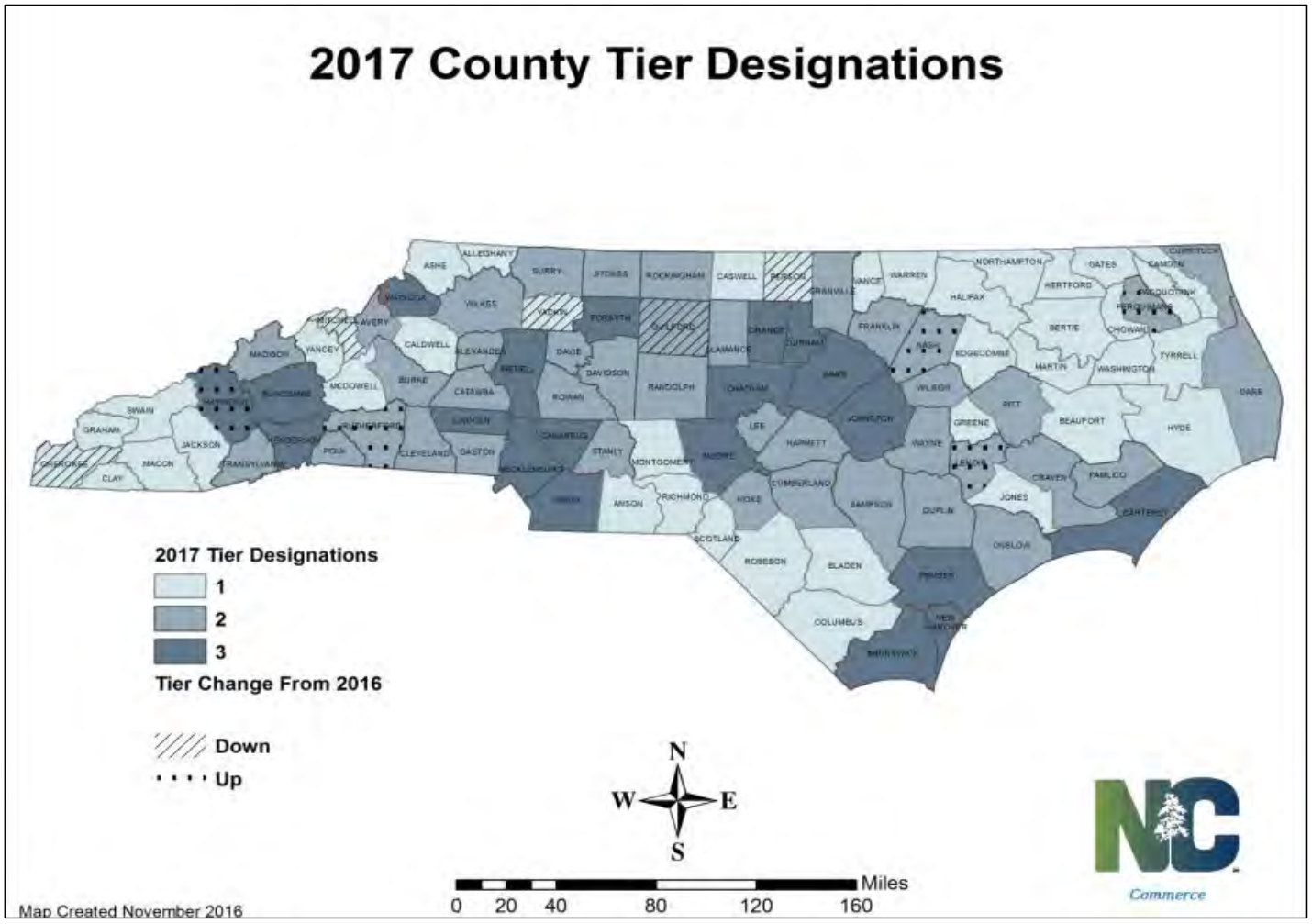


Table 1 – Ferry Division Counties and Tier Designations

County Name	2017 Tier Designation
Currituck	2
Dare	2
Hyde	1
Beaufort	1
Pamlico	2
Craven	2
Carteret	3
New Hanover	3
Brunswick	3

The VW Settlement will provide the Ferry Division with an opportunity to participate in a mitigation engine repower type project. This particular project will address the need to repower and upgrade the existing eighteen diesel engines and the eighteen generators on nine River Class ferries, taking them from an unregulated listing to a Tier 3 listing. Repowering and upgrading the systems on the River Class ferries will drastically reduce the emissions that are currently being produced and emitted by the unregulated equipment. The chart below details each individual vessel that is to be addressed and the costs associated with the new equipment. As a whole this project is estimated at $4,420,088.

Table 2 – Vessel and Total Project Cost Detail

River Class 180	New ME Engine Make and Model	Tier #	New Electronic Reduction Gear	Main Engines and Gears Cost (2 Engines)	New Generator Cost (2 Generators)	Labor & Material Cost	Total Cost of Installation
Southport	CAT C18 600 HP	3	TD MGX5145SC 2.48:1	221,500.00	69,596.00	177,300.00	$468,396.00
Neuse	CAT C18 600 HP	3	TD MGX5145SC 2.48:1	221,500.00	69,596.00	177,300.00	$468,396.00
Lupton	CAT C18 600 HP	3	TD MGX5145SC 2.48:1	221,500.00	69,596.00	177,300.00	$468,396.00
Ft Fisher	CAT C18 600 HP	3	TD MGX5145SC 2.48:1	221,500.00	69,596.00	177,300.00	$468,396.00
Croatoan	CAT C18 600 HP	3	TD MGX5145SC 2.48:1	221,500.00	69,596.00	177,300.00	$468,396.00
W. Stanford White	CAT C18 600 HP	3	TD MGX5145SC 2.48:1	221,500.00	69,596.00	177,300.00	$468,396.00
Hatteras	CAT C18 600 HP	3	TD MGX5145SC 2.48:1	221,500.00	69,596.00	177,300.00	$468,396.00
Gov. Russell	CAT C18 600 HP	3	TD MGX5145SC 2.48:1	221,500.00	69,596.00	292,662.00	$583,758.00
Gov. Hunt	CAT C18 600 HP	3	TD MGX5145SC 2.48:1	221,500.00	69,596.00	266,462.00	$557,558.00
						Total	**$4,420,088.00**

This mitigation project will affect nine of the River Class ferries. Currently the River Class vessels are all equipped with two 105 kW Cat 3304 generators and two CAT 3412 450HP engines. Repowering the vessels will allow the Ferry Division to remove the two old engines and install two new CAT C18 600 HP Tier 3 engines. The two old CAT 3304 105kW generators will also be replaced with two John Deere 4045 105kW generators. These ferries use #2 diesel to fuel their engines. Table 3 details the annual fuel usage for each vessel in the River Class during fiscal year 15/16 and fiscal year 16/17. Table 4 details the existing equipment that is installed on each River Class ferry.

Table 3 – Fuel and Usage Rates FY15-FY17

Vessel Name	Days Running at 12 Hours FY15/16	FY15/16 Fuel Usage (gal)	Days Running at 12 Hours FY16/17	FY16/17 Fuel Usage (gal)	2 Year Fuel Usage Average
MV Hunt	196.2	61,150	193.6	53,543	57,347
MV Russell	191.7	63,999	150.2	50,168	57,084
MV Southport	336.3	88,509	107.9	38,609	63,559
MV Neuse	93.3	35,055	306.3	104,957	70,006
MV Lupton	155.4	74,050	416.9	204,657	139,354
MV Ft. Fisher	120.9	37,122	256.9	89,988	63,555
MV White	537.9	233,748	275.3	133,128	183,438
MV Croatoan	290.5	97,445	174.9	72,646	85,046
MV Hatteras	254.3	93,233	351.7	148,860	121,047

Table 4 – Existing Equipment on River Class Vessels

River Class 180’	Existing ME Engine Make and Model	Tier #	Reduction Gear	Main Engines and Gears	Generator	Year Installed	Age
Southport	CAT 3412 450 HP	n/a	Voith Turbo Coupling	Existing	105 kW Cat 3304	1996	21
Neuse	CAT 3412 450 HP	n/a	Voith Turbo Coupling	Existing	105 kW Cat 3304	1998	19
Lupton	CAT 3412 450 HP	n/a	Voith Turbo Coupling	Existing	105 kW Cat 3304	1999	18
Ft Fisher	CAT 3412 450 HP	n/a	Voith Turbo Coupling	Existing	105 kW Cat 3304	2000	17
Croatoan	CAT 3412 450 HP	n/a	Voith Turbo Coupling	Existing	105 kW Cat 3304	2003	14
W. Stanford White	CAT 3412 450 HP	n/a	Voith Turbo Coupling	Existing	105 kW Cat 3304	2003	14
Hatteras	CAT 3412 450 HP	n/a	Voith Turbo Coupling	Existing	105 kW Cat 3304	2006	11
Gov. Russell	CAT 3412 450 HP	n/a	TD MG 514	Existing	105 kW Cat 3304	1993	24
Gov. Hunt	CAT 3412 450 HP	n/a	TD MG 514	Existing	105 kW Cat 3304	1984	33

Expected Project Benefits

As the online calculators were not very useful in regards to the marine engines like the Ferry Division utilizes we are still awaiting data from Caterpillar in regards to their emissions produced by the older engines we have in service. Hopefully this information will be provided the first week of January and we can supply the calculations for this section.

VOLKSWAGEN CONSENT DECREE

ENVIRONMENTAL MITIGATION TRUST PROJECT IDEAS

REQUEST FOR INFORMATION (RFI) SUBMITTAL

NCDOT FERRY DIVISION SUBMITTAL #2

REPOWER TWO (2) SOUND CLASS VESSELS TO TIER 4

SECTION 1 – PROJECT APPLICANT INFORMATION

- Agency:
  North Carolina Department of Transportation (NCDOT) / Ferry Division

- Contact Name:
  Sterling Baker, P.E.
  Director of Facilities Management Division & Multimodal Special Projects Engineer

- Government/Non-Government:
  Government

- Mailing Address:
  8550 Shipyard Road
  Manns Harbor, NC 27953

- Phone Number:
  252-339-5964

- Email Address:
  sbaker@ncdot.gov

SECTION 2 – VW Program and Solicitation Design Questions

Respondents should consider providing information in response to the following questions:

1. **How should DEQ prioritize projects?**
   The NCDOT Ferry Division suggests that DEQ should consider the following when determining priority of projects:
   - Opportunities to introduce new emissions reduction technologies. Embracing new technologies into our fleet will help establish North Carolina as a national leader in air pollution reduction efforts.
   - Most optimal air pollution improvements per dollar spent
   - Ability of agencies to pay for projects without VW money; i.e. projects that otherwise may not be accomplished without VW funding should take priority over agencies that possess means to pay for emissions reduction efforts

2. **What is the anticipated demand for each eligible project type?**
   It is anticipated that there will be a significant demand for each project type.

3. **The percentage of trust funds, if any, that DEQ should devote to Light Duty Zero Emission Vehicle Supply Equipment?**
   The percentage of funds devoted to LDZEV supply equipment should be proportional to the amount these vehicles contribute to total air pollution for the State.

4. **What is the anticipated demand for specific types of diesel emission reduction projects not eligible under the VW settlement but otherwise eligible under DERA or other state programs?**
   It is anticipated that repowering of the vessels mentioned in the Ferry Division's requests will not eliminate the demand for future capital replacement or refurbishment projects, but it will assist in moving these needs out several years in our long range capital replacement plan.

5. **Should a certain percentage of available VW funds be allocated to each eligible project type and if so how should the percentage be determined?**
   DEQ should determine how much each project type contributes to overall levels of air pollution across the State, taking into account cost of upgrades/replacement vs. amount of pollution generated.

6. **Should a certain percentage of available Mitigation Trust funds be reserved for government projects?**
   Yes. The NCDOT Ferry Division is an excellent example of a State government agency that has embraced state-of-the-art technology to reduce air pollution on many of our Hatteras Class Vessels by repowering 5 of the these vessel approximately 5 years ago under a Ferry Boat Discretionary Grant from FHWA – please note this program no longer exists, therefore funding to continue similar activities would have to come from some other source such as this VW settlement.

7. **Should funds be geographically distributed, and if so how?**
   Funds should be distributed in a manner that results in the maximum reduction of air pollution across the State, in keeping with the criteria suggested in Question #1 above.

8. **Should governmental entities be required to provide matching funds and if so, how much?**
   The Ferry Division recommends no matching fund requirement for government agencies.

9. **Should DEQ establish a minimum project size and if so, what size?**
   The Ferry Division recommends that DEQ consider all projects regardless of size and provide funding in accordance with the criteria indicated in Question #1 above.

10. **In addition to evaluating a proposed project's total cost effectiveness ($/ton), what other key factors should DEQ consider when evaluating projects?**
    In order to maximize the benefits of the settlement funding in reducing emissions support for government projects that provide support for North Carolina businesses and promote traffic conveyance with greatly reduced emissions should be looked at.

11. **What other feedback do you have on project evaluation and/or scoring criteria?**
    The Ferry Division requests that DEQ continue to keep all interested parties apprised of the project schedule to ensure that all critical applications and other documentation is received within proper timeframes.

12. **What publicly available tool(s) should be used to quantify anticipated emission reductions/offsets for eligible mitigation projects? What, if any, additional resources should be provided and made available?**
    The emissions reduction calculation tools provided in this RFI were not very helpful in regards to Ferry Division scopes, but the Ferry Division niche is a very specialized one. We had to get most of our data from vendors. DEQ should continue to make itself available as a resource to all parties interested in VW funding.

13. **What methods could DEQ employ to reduce barriers and increase participation in future solicitations for projects?**
    The Ferry Division believes that DEQ does a good job of communicating solicitations for projects. Continued communication of future solicitations to previous applicants is important to ensure these solicitations receive positive feedback. DEQ should continue to encourage applicants to communicate opportunities for funding to their colleagues to increase interest and potential number of applicants.

14. **What information/resources would be most valuable for stakeholders interested in submitting projects and what is the best way to communicate those?**
    Information such as scope, funding limits, and application requirements are critical for submitting proposals. DEQ communicates this information well in RFPs and announcements associated with funding solicitations.

SECTION 3 – Project Information

The NCODT Ferry Division (headquartered at the Manns Harbor, NC Shipyard) runs twenty two boats on seven regular routes across five bodies of water along the east coast of North Carolina: Currituck and Pamlico Sounds, and the Cape Fear, Neuse, and Pamlico Rivers. The ferries transport about 850,000 vehicles and two million passengers a year, making it the second largest state-run ferry system in the United States. Not only are visitors transported, but residents, commuters, and school children as well. Two of the routes (Hatteras-Ocracoke and Ocracoke-Cedar Island) are officially part of The Outer Banks Scenic Byway. The Ferry Division runs an emergency route between Stumpy Point and Rodanthe that provides a crucial transportation link between Hatteras Island and the mainland when NC Highway 12 is damaged due to storms and other issues. The Ferry Division operates and serves in nine counties which are: Currituck, Dare, Hyde, Beaufort, Craven, Carteret, Pamlico, New Hanover, and Brunswick. The majority of these counties are either Tier 1 or Tier 2. The ferry vessels fall into three different classes (River, Sound, and Hatteras) categorized by different lengths. The River Class vessels measure 180', Sound Class measures 220' and Hatteras Class measures 150'. The projects proposed by the Ferry Division consist of repowering from Tier1/2 engines and generators to Tier 3 or Tier 4 engines and generators (depending on size requirements), installing shore power at locations that currently do not provide shore power, and updating older locations that have shore power but need modernization due to age and the harsh environment it is in.

Diagram 1 – Ferry Routes in North Carolina

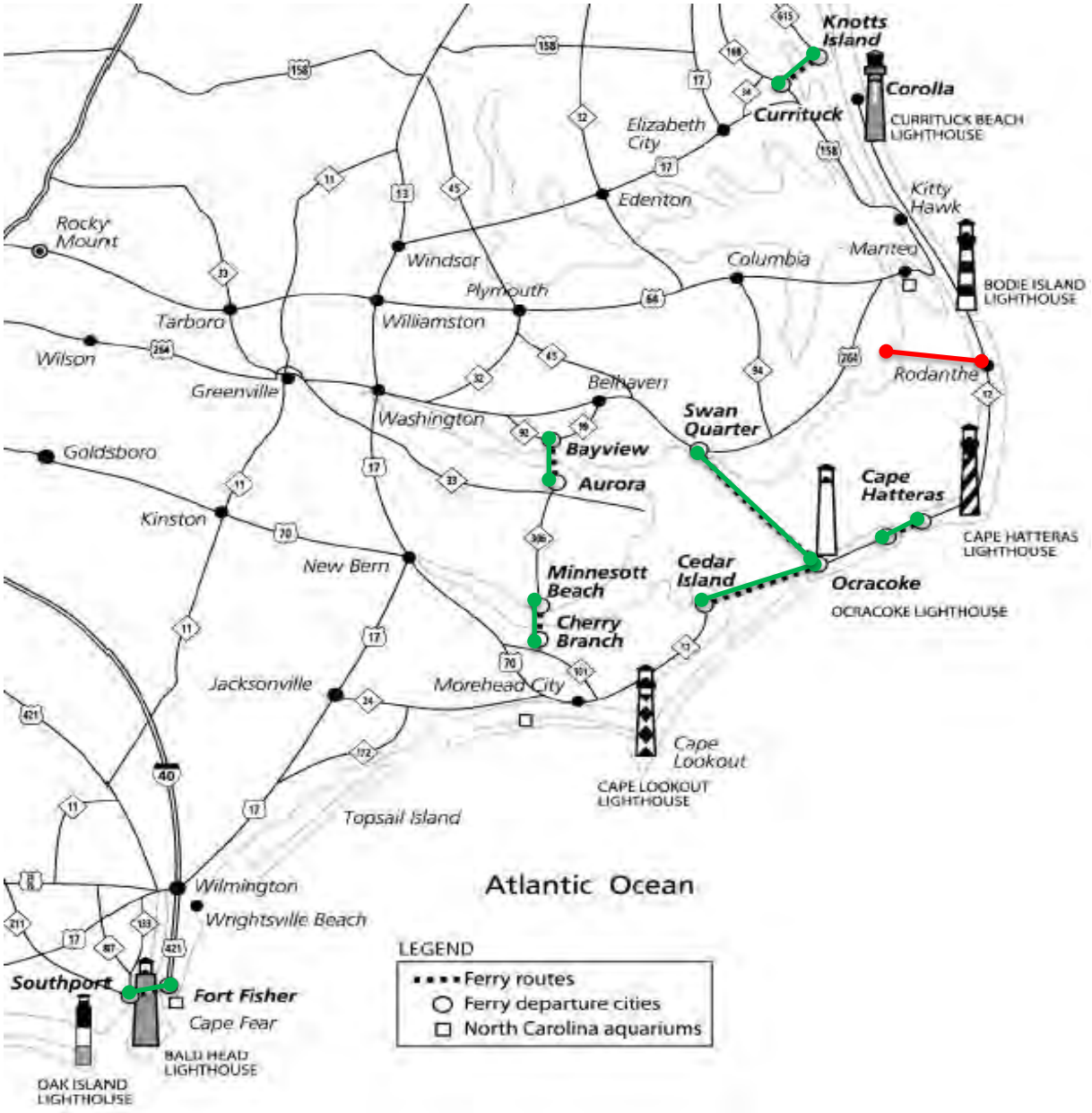


Diagram 2 – 2017 North Carolina County Tier Designations

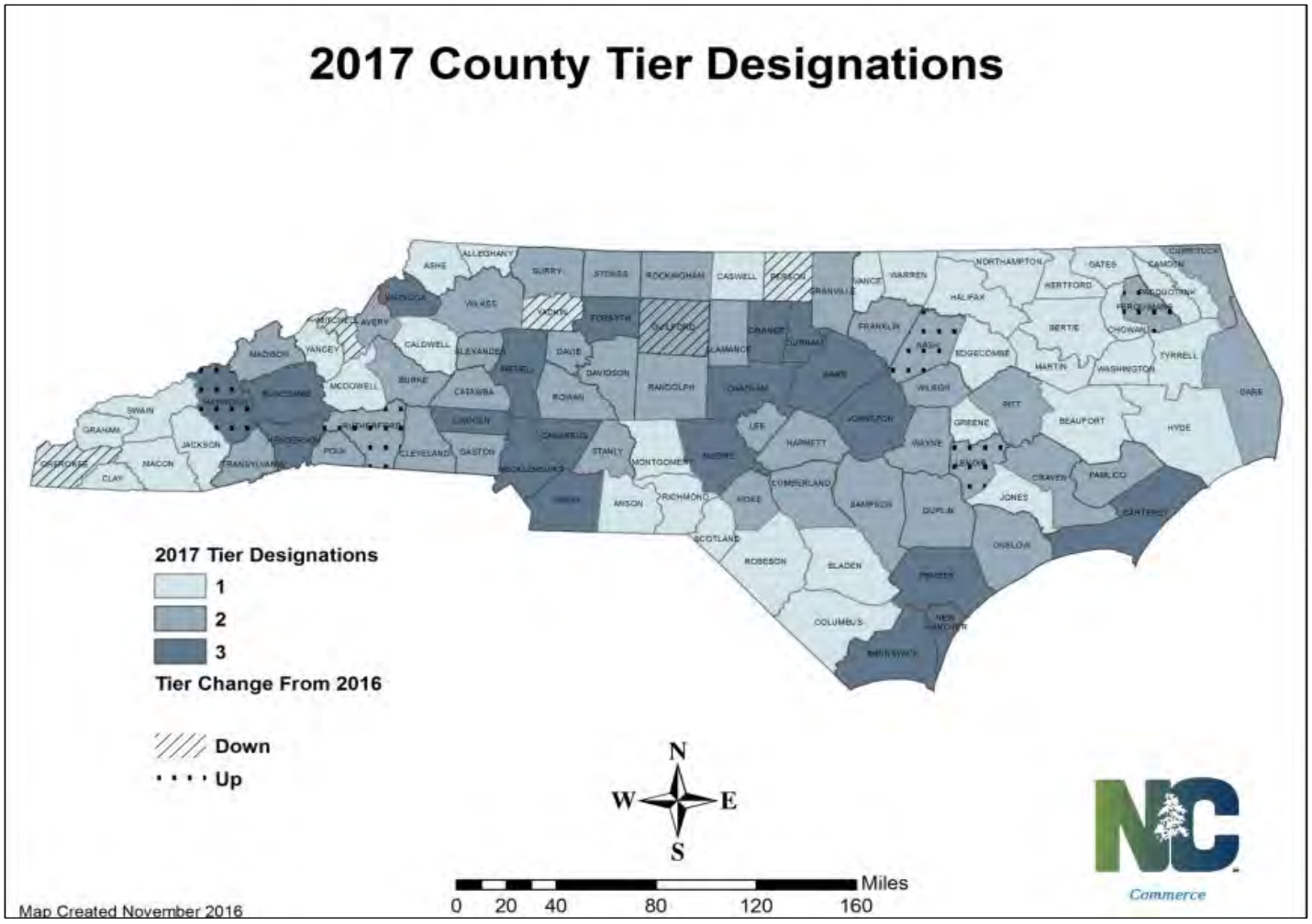


Table 1 – Ferry Division Counties and Tier Designations

County Name	2017 Tier Designation
Currituck	2
Dare	2
Hyde	1
Beaufort	1
Pamlico	2
Craven	2
Carteret	3
New Hanover	3
Brunswick	3

The VW Settlement will provide the Ferry Division with an opportunity to participate in a mitigation engine repower type project. This particular project will address the need to repower and upgrade the existing four diesel engines and the four generators on two of the five Sound Class ferries, taking them from a Tier 2 to a Tier 4 listing. Repowering and upgrading the systems on the Sound Class ferries will drastically reduce the emissions that are currently being produced and emitted by the Tier 2 equipment. The chart below details each individual vessel that is to be addressed and the costs associated with the new equipment. As a whole this project is estimated at $1,525,400.

Table 2 – Vessel and Total Project Cost Detail

Sound Class 220'	New ME Engine Make and Model	Tier #	New Electronic Reduction Gear	Main Engines and Gears Cost (2 Engines)	New Generator Cost (2 Generators)	Labor & Material Cost	Total Cost of Installation
Swan Quarter	CAT 3512 1200 HP	4	ZF Existing	644,800.00	Cat 6.6 215 kW Existing	117,900.00	$762,700.00
Sea Level	CAT 3512 1200 HP	4	ZF Existing	644,800.00	Cat 6.6 215 kW Existing	117,900.00	$762,700.00
						Total	**$1,525,400.00**

This mitigation project will affect two of the Sound Class ferries. Currently the Sound Class vessels are all equipped with two MTU 8V 4000 1500 HP engines and two 175 kW CAT 6.6 generators. Repowering the vessels will allow the Ferry Division to remove the two old engines and install two new CAT 3512 1200 HP Tier 4 engines. The two old 175kW generators will also be replaced with two CAT 6.6 215 kW generators. These ferries use #2 diesel to fuel their engines. Table 3 details the annual fuel usage for each vessel in the River Class during fiscal year 15/16 and fiscal year 16/17. Table 4 details the existing equipment that is installed on each Sound Class ferry.

Table 3 – Fuel and Usage Rates FY15-FY17

Vessel Name	Days Running at 12 Hours FY 15/16	FY 15/16 Fuel Usage (gal)	Days Running at 12 Hours FY 16/17	FY 16/17 Fuel Usage (gal)	2 Year Fuel Usage Average
MV Swan Quarter	276	197,500	154.1	112,200	154,850
MV Sea Level	154.8	114,600	295.9	221,879	168,239

Table 4 – Existing Equipment on Sound Class Vessels

Sound Class 220'	Existing ME Engine Make and Model	Tier #	Reduction Gear	Main Engines and Gears	Generator	Year Installed	Age
MV Swan Quarter	MTU 8V 4000 1500HP	2	ZF 7600 3.231:1	Existing	175 kW CAT 6.6	2011	6
MV Sea Level	MTU 8V 4000 1500HP	2	ZF 7600 3.231:1	Existing	175 kW CAT 6.6	2012	5

Expected Project Benefits

As the online calculators were not very useful in regards to the marine engines like the Ferry Division utilizes we are still awaiting data from Caterpillar in regards to their emissions produced by the older engines we have in service. Hopefully this information will be provided the first week of January and we can supply the calculations for this section.

VOLKSWAGEN CONSENT DECREE

ENVIRONMENTAL MITIGATION TRUST PROJECT IDEAS

REQUEST FOR INFORMATION (RFI) SUBMITTAL

NCDOT FERRY DIVISION SUBMITTAL #3

REPOWER THREE (3) SOUND CLASS VESSELS TO TIER 3

SECTION 1 – PROJECT APPLICANT INFORMATION

- Agency:
  North Carolina Department of Transportation (NCDOT) / Ferry Division

- Contact Name:
  Sterling Baker, P.E.
  Director of Facilities Management Division & Multimodal Special Projects Engineer

- Government/Non-Government:
  Government

- Mailing Address:
  8550 Shipyard Road
  Manns Harbor, NC 27953

- Phone Number:
  252-339-5964

- Email Address:
  sbaker@ncdot.gov

SECTION 2 – VW Program and Solicitation Design Questions

Respondents should consider providing information in response to the following questions:

1. **How should DEQ prioritize projects?**
   The NCDOT Ferry Division suggests that DEQ should consider the following when determining priority of projects:
   - Opportunities to introduce new emissions reduction technologies. Embracing new technologies into our fleet will help establish North Carolina as a national leader in air pollution reduction efforts.
   - Most optimal air pollution improvements per dollar spent
   - Ability of agencies to pay for projects without VW money; i.e. projects that otherwise may not be accomplished without VW funding should take priority over agencies that possess means to pay for emissions reduction efforts

2. **What is the anticipated demand for each eligible project type?**
   It is anticipated that there will be a significant demand for each project type.

3. **The percentage of trust funds, if any, that DEQ should devote to Light Duty Zero Emission Vehicle Supply Equipment?**
   The percentage of funds devoted to LDZEV supply equipment should be proportional to the amount these vehicles contribute to total air pollution for the State.

4. **What is the anticipated demand for specific types of diesel emission reduction projects not eligible under the VW settlement but otherwise eligible under DERA or other state programs?**
   It is anticipated that repowering of the vessels mentioned in the Ferry Division's requests will not eliminate the demand for future capital replacement or refurbishment projects, but it will assist in moving these needs out several years in our long range capital replacement plan.

5. **Should a certain percentage of available VW funds be allocated to each eligible project type and if so how should the percentage be determined?**
   DEQ should determine how much each project type contributes to overall levels of air pollution across the State, taking into account cost of upgrades/replacement vs. amount of pollution generated.

6. **Should a certain percentage of available Mitigation Trust funds be reserved for government projects?**
   Yes. The NCDOT Ferry Division is an excellent example of a State government agency that has embraced state-of-the-art technology to reduce air pollution on many of our Hatteras Class Vessels by repowering 5 of the these vessel approximately 5 years ago under a Ferry Boat Discretionary Grant from FHWA – please note this program no longer exists, therefore funding to continue similar activities would have to come from some other source such as this VW settlement.

7. **Should funds be geographically distributed, and if so how?**
   Funds should be distributed in a manner that results in the maximum reduction of air pollution across the State, in keeping with the criteria suggested in Question #1 above.

8. **Should governmental entities be required to provide matching funds and if so, how much?**
   The Ferry Division recommends no matching fund requirement for government agencies.

9. **Should DEQ establish a minimum project size and if so, what size?**
   The Ferry Division recommends that DEQ consider all projects regardless of size and provide funding in accordance with the criteria indicated in Question #1 above.

10. **In addition to evaluating a proposed project's total cost effectiveness ($/ton), what other key factors should DEQ consider when evaluating projects?**
    In order to maximize the benefits of the settlement funding in reducing emissions support for government projects that provide support for North Carolina businesses and promote traffic conveyance with greatly reduced emissions should be looked at.

11. **What other feedback do you have on project evaluation and/or scoring criteria?**
    The Ferry Division requests that DEQ continue to keep all interested parties apprised of the project schedule to ensure that all critical applications and other documentation is received within proper timeframes.

12. **What publicly available tool(s) should be used to quantify anticipated emission reductions/offsets for eligible mitigation projects? What, if any, additional resources should be provided and made available?**
    The emissions reduction calculation tools provided in this RFI were not very helpful in regards to Ferry Division scopes, but the Ferry Division niche is a very specialized one. We had to get most of our data from vendors. DEQ should continue to make itself available as a resource to all parties interested in VW funding.

13. **What methods could DEQ employ to reduce barriers and increase participation in future solicitations for projects?**
    The Ferry Division believes that DEQ does a good job of communicating solicitations for projects. Continued communication of future solicitations to previous applicants is important to ensure these solicitations receive positive feedback. DEQ should continue to encourage applicants to communicate opportunities for funding to their colleagues to increase interest and potential number of applicants.

14. **What information/resources would be most valuable for stakeholders interested in submitting projects and what is the best way to communicate those?**
    Information such as scope, funding limits, and application requirements are critical for submitting proposals. DEQ communicates this information well in RFPs and announcements associated with funding solicitations.

SECTION 3 – Project Information

The NCODT Ferry Division (headquartered at the Manns Harbor, NC Shipyard) runs twenty two boats on seven regular routes across five bodies of water along the east coast of North Carolina: Currituck and Pamlico Sounds, and the Cape Fear, Neuse, and Pamlico Rivers. The ferries transport about 850,000 vehicles and two million passengers a year, making it the second largest state-run ferry system in the United States. Not only are visitors transported, but residents, commuters, and school children as well. Two of the routes (Hatteras-Ocracoke and Ocracoke-Cedar Island) are officially part of The Outer Banks Scenic Byway. The Ferry Division runs an emergency route between Stumpy Point and Rodanthe that provides a crucial transportation link between Hatteras Island and the mainland when NC Highway 12 is damaged due to storms and other issues. The Ferry Division operates and serves in nine counties which are: Currituck, Dare, Hyde, Beaufort, Craven, Carteret, Pamlico, New Hanover, and Brunswick. The majority of these counties are either Tier 1 or Tier 2. The ferry vessels fall into three different classes (River, Sound, and Hatteras) categorized by different lengths. The River Class vessels measure 180', Sound Class measures 220' and Hatteras Class measures 150'. The projects proposed by the Ferry Division consist of repowering from Tier1/2 engines and generators to Tier 3 or Tier 4 engines and generators (depending on size requirements), installing shore power at locations that currently do not provide shore power, and updating older locations that have shore power but need modernization due to age and the harsh environment it is in.

Diagram 1 – Ferry Routes in North Carolina

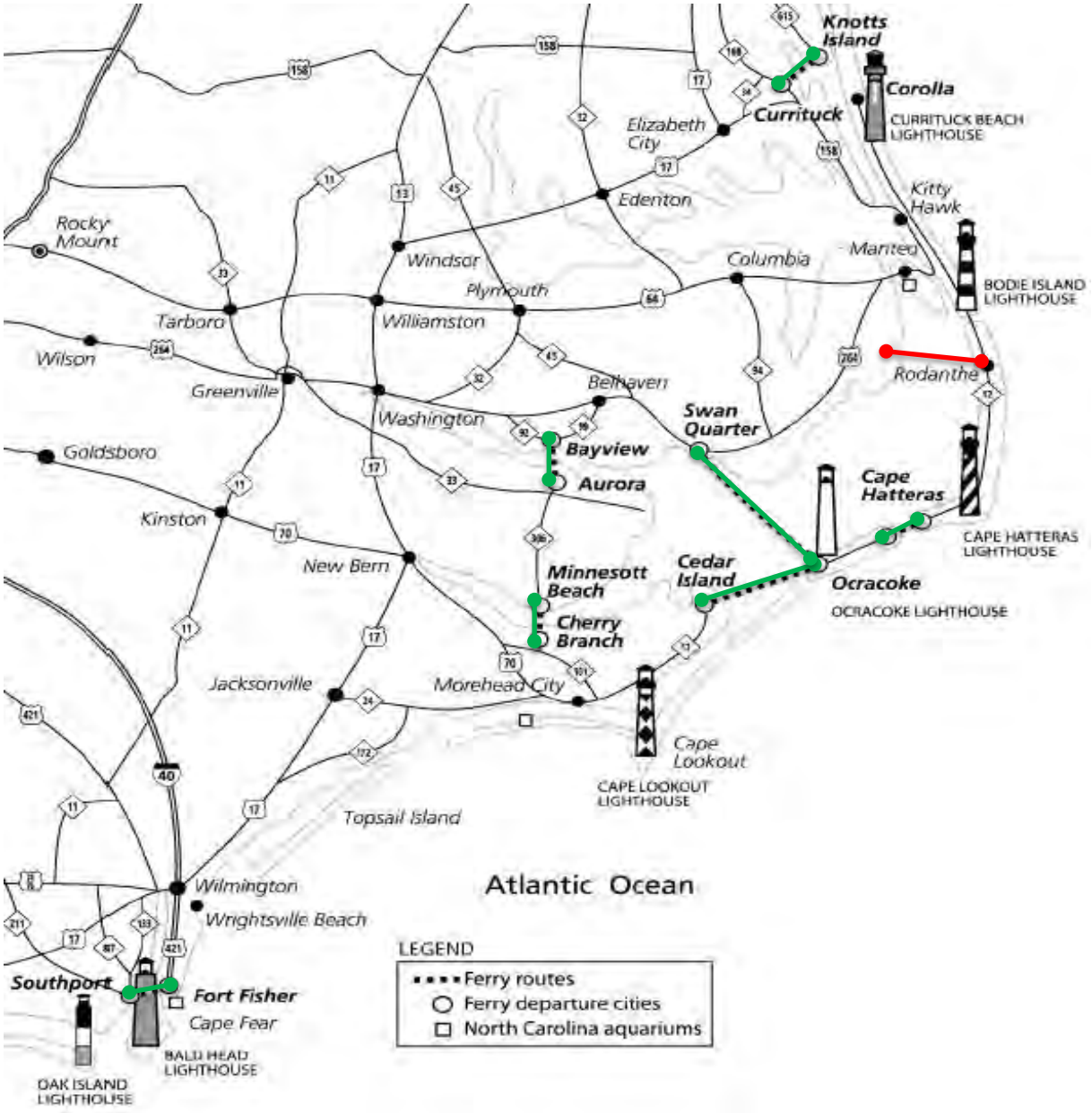


Diagram 2 – 2017 North Carolina County Tier Designations

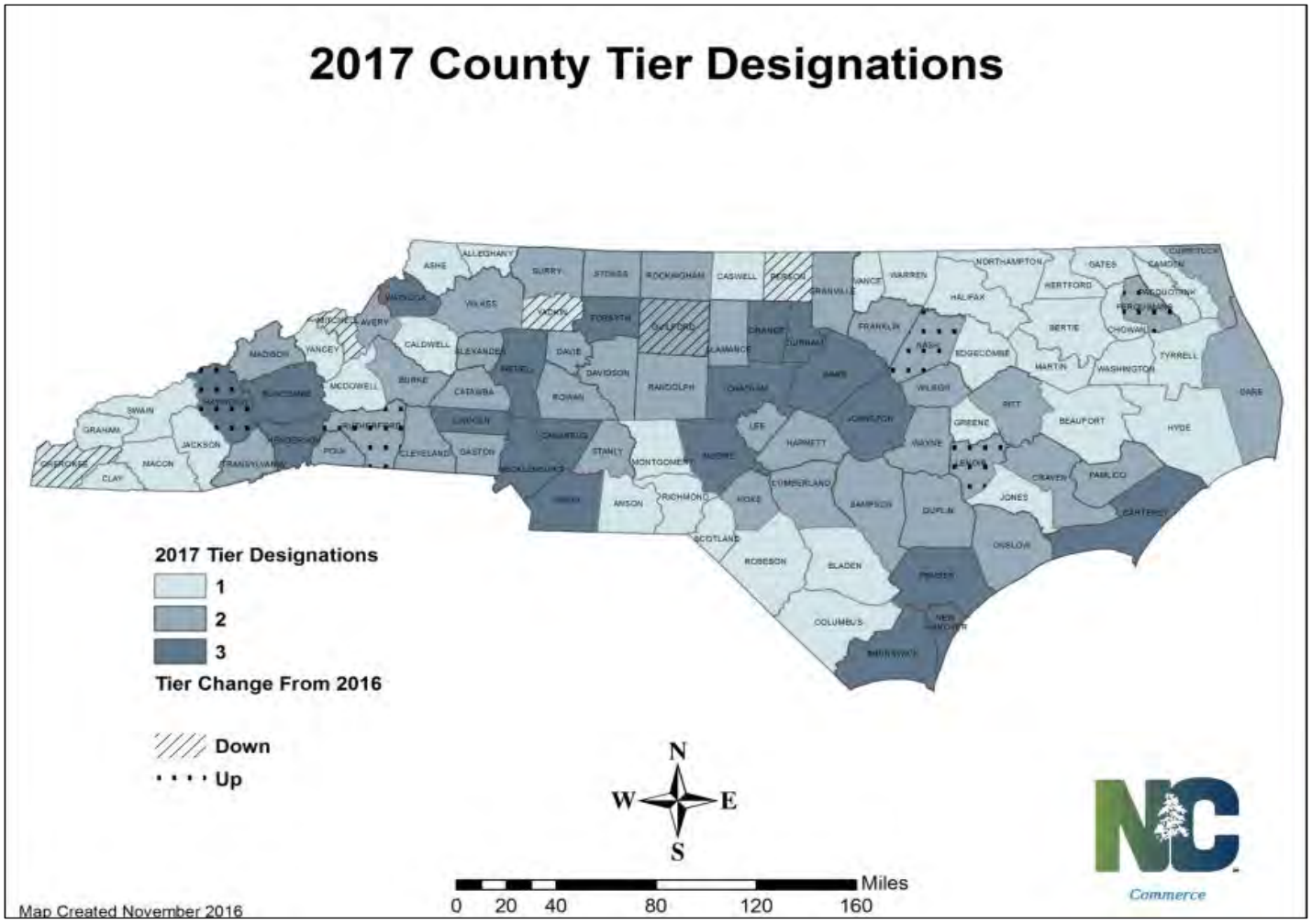


Table 1 – Ferry Division Counties and Tier Designations

County Name	2017 Tier Designation
Currituck	2
Dare	2
Hyde	1
Beaufort	1
Pamlico	2
Craven	2
Carteret	3
New Hanover	3
Brunswick	3

The VW Settlement will provide the Ferry Division with an opportunity to participate in a mitigation engine repower type project. This particular project will address the need to repower and upgrade the existing six diesel engines and the six generators on three of the five Sound Class ferries, taking them from an unregulated listing to a Tier 3. Repowering and upgrading the systems on the Sound Class ferries will drastically reduce the emissions that are currently being produced and emitted. The chart below details each individual vessel that is to be addressed and the costs associated with the new equipment. As a whole this project is estimated at $2,810,406

Table 2 – Vessel and Total Project Cost Detail

Sound Class 220'	New ME Engine Make and Model	Tier #	New Electronic Reduction Gear	Main Engines and Gears Cost (2 Engines)	New Generator Cost (2 Generators)	Labor & Material Cost	Total Cost of Installation
Cedar Island	CAT C32 1000 HP	3	TD MGX540 2.48:1	338,500.00	83,000.00	515,302.00	$936,802.00
Carteret	CAT C32 1000 HP	3	TD MGX540 2.48:1	338,500.00	83,000.00	515,302.00	$936,802.00
Silverlake	CAT C32 1000 HP	3	TD MGX540 2.48:1	338,500.00	83,000.00	515,302.00	$936,802.00
						Total	**$2,810,406.00**

This mitigation project will affect three of the Sound Class ferries. Currently these Sound Class vessels are all equipped with two CAT 3508 850 HP engines and two generators. The MV Cedar Island has two 105 kW CAT 3304 generators while the MC Carteret and the MV Silverlake have two 120 kW CAT 3306 generators. Repowering the vessels will allow the Ferry Division to remove the two old engines and install two new CAT C32 1000 HP engines. The two old generators on each vessel will be replaced with two John Deere 6085 125 kW generators. These ferries use #2 diesel to fuel their engines. Table 3 details the annual fuel usage for each vessel in the River Class during fiscal year 15/16 and fiscal year 16/17. Table 4 details the existing equipment that is installed on each Sound Class ferry.

Table 3 – Fuel and Usage Rates FY15-FY17

Vessel Name	Days Running at 12 Hours FY 15/16	FY 15/16 Fuel Usage (gal)	Days Running at 12 Hours FY 16/17	FY 16/17 Fuel Usage (gal)	2 Year Fuel Usage Average
MV Silver Lake	296.3	171,900	209.1	124,450	148,175
MV Carteret	108.8	67,676	320.9	199,810	133,743
MV Cedar Island	245.3	149,913	234.3	141,501	145,707

Table 4 – Existing Equipment on Sound Class Vessels

Sound Class 220'	Existing ME Engine Make and Model	Tier #	Reduction Gear	Main Engines and Gears	Generator	Year Installed	Age
MV Silver Lake	CAT 3508 850 HP	n/a	TD MG 540	Existing	105 kW CAT 3306	1965	52
MV Carteret	CAT 3508 850 HP	n/a	TD MG 540	Existing	105 kW CAT 3304	1989	28
MV Cedar Island	CAT 3508 850 HP	n/a	TD MG 540	Existing	105 kW CAT 3304	1994	23

Expected Project Benefits

As the online calculators were not very useful in regards to the marine engines like the Ferry Division utilizes we are still awaiting data from Caterpillar in regards to their emissions produced by the older engines we have in service. Hopefully this information will be provided the first week of January and we can supply the calculations for this section.

VOLKSWAGEN CONSENT DECREE

ENVIRONMENTAL MITIGATION TRUST PROJECT IDEAS

REQUEST FOR INFORMATION (RFI) SUBMITTAL

NCDOT FERRY DIVISION SUBMITTAL #3

REPOWER THREE (3) SOUND CLASS VESSELS TO TIER 3

SECTION 1 – PROJECT APPLICANT INFORMATION

- Agency:
  North Carolina Department of Transportation (NCDOT) / Ferry Division

- Contact Name:
  Sterling Baker, P.E.
  Director of Facilities Management Division & Multimodal Special Projects Engineer

- Government/Non-Government:
  Government

- Mailing Address:
  8550 Shipyard Road
  Manns Harbor, NC 27953

- Phone Number:
  252-339-5964

- Email Address:
  sbaker@ncdot.gov

SECTION 2 – VW Program and Solicitation Design Questions

Respondents should consider providing information in response to the following questions:

1. **How should DEQ prioritize projects?**
   The NCDOT Ferry Division suggests that DEQ should consider the following when determining priority of projects:
   - Opportunities to introduce new emissions reduction technologies. Embracing new technologies into our fleet will help establish North Carolina as a national leader in air pollution reduction efforts.
   - Most optimal air pollution improvements per dollar spent
   - Ability of agencies to pay for projects without VW money; i.e. projects that otherwise may not be accomplished without VW funding should take priority over agencies that possess means to pay for emissions reduction efforts

2. **What is the anticipated demand for each eligible project type?**
   It is anticipated that there will be a significant demand for each project type.

3. **The percentage of trust funds, if any, that DEQ should devote to Light Duty Zero Emission Vehicle Supply Equipment?**
   The percentage of funds devoted to LDZEV supply equipment should be proportional to the amount these vehicles contribute to total air pollution for the State.

4. **What is the anticipated demand for specific types of diesel emission reduction projects not eligible under the VW settlement but otherwise eligible under DERA or other state programs?**
   It is anticipated that repowering of the vessels mentioned in the Ferry Division's requests will not eliminate the demand for future capital replacement or refurbishment projects, but it will assist in moving these needs out several years in our long range capital replacement plan.

5. **Should a certain percentage of available VW funds be allocated to each eligible project type and if so how should the percentage be determined?**
   DEQ should determine how much each project type contributes to overall levels of air pollution across the State, taking into account cost of upgrades/replacement vs. amount of pollution generated.

6. **Should a certain percentage of available Mitigation Trust funds be reserved for government projects?**
   Yes. The NCDOT Ferry Division is an excellent example of a State government agency that has embraced state-of-the-art technology to reduce air pollution on many of our Hatteras Class Vessels by repowering 5 of the these vessel approximately 5 years ago under a Ferry Boat Discretionary Grant from FHWA – please note this program no longer exists, therefore funding to continue similar activities would have to come from some other source such as this VW settlement.

7. **Should funds be geographically distributed, and if so how?**
   Funds should be distributed in a manner that results in the maximum reduction of air pollution across the State, in keeping with the criteria suggested in Question #1 above.

8. **Should governmental entities be required to provide matching funds and if so, how much?**
   The Ferry Division recommends no matching fund requirement for government agencies.

9. **Should DEQ establish a minimum project size and if so, what size?**
   The Ferry Division recommends that DEQ consider all projects regardless of size and provide funding in accordance with the criteria indicated in Question #1 above.

10. **In addition to evaluating a proposed project's total cost effectiveness ($/ton), what other key factors should DEQ consider when evaluating projects?**
    In order to maximize the benefits of the settlement funding in reducing emissions support for government projects that provide support for North Carolina businesses and promote traffic conveyance with greatly reduced emissions should be looked at.

11. **What other feedback do you have on project evaluation and/or scoring criteria?**
    The Ferry Division requests that DEQ continue to keep all interested parties apprised of the project schedule to ensure that all critical applications and other documentation is received within proper timeframes.

12. **What publicly available tool(s) should be used to quantify anticipated emission reductions/offsets for eligible mitigation projects? What, if any, additional resources should be provided and made available?**
    The emissions reduction calculation tools provided in this RFI were not very helpful in regards to Ferry Division scopes, but the Ferry Division niche is a very specialized one. We had to get most of our data from vendors. DEQ should continue to make itself available as a resource to all parties interested in VW funding.

13. **What methods could DEQ employ to reduce barriers and increase participation in future solicitations for projects?**
    The Ferry Division believes that DEQ does a good job of communicating solicitations for projects. Continued communication of future solicitations to previous applicants is important to ensure these solicitations receive positive feedback. DEQ should continue to encourage applicants to communicate opportunities for funding to their colleagues to increase interest and potential number of applicants.

14. **What information/resources would be most valuable for stakeholders interested in submitting projects and what is the best way to communicate those?**
    Information such as scope, funding limits, and application requirements are critical for submitting proposals. DEQ communicates this information well in RFPs and announcements associated with funding solicitations.

SECTION 3 – Project Information

The NCODT Ferry Division (headquartered at the Manns Harbor, NC Shipyard) runs twenty two boats on seven regular routes across five bodies of water along the east coast of North Carolina: Currituck and Pamlico Sounds, and the Cape Fear, Neuse, and Pamlico Rivers. The ferries transport about 850,000 vehicles and two million passengers a year, making it the second largest state-run ferry system in the United States. Not only are visitors transported, but residents, commuters, and school children as well. Two of the routes (Hatteras-Ocracoke and Ocracoke-Cedar Island) are officially part of The Outer Banks Scenic Byway. The Ferry Division runs an emergency route between Stumpy Point and Rodanthe that provides a crucial transportation link between Hatteras Island and the mainland when NC Highway 12 is damaged due to storms and other issues. The Ferry Division operates and serves in nine counties which are: Currituck, Dare, Hyde, Beaufort, Craven, Carteret, Pamlico, New Hanover, and Brunswick. The majority of these counties are either Tier 1 or Tier 2. The ferry vessels fall into three different classes (River, Sound, and Hatteras) categorized by different lengths. The River Class vessels measure 180', Sound Class measures 220' and Hatteras Class measures 150'. The projects proposed by the Ferry Division consist of repowering from Tier1/2 engines and generators to Tier 3 or Tier 4 engines and generators (depending on size requirements), installing shore power at locations that currently do not provide shore power, and updating older locations that have shore power but need modernization due to age and the harsh environment it is in.

Diagram 1 – Ferry Routes in North Carolina

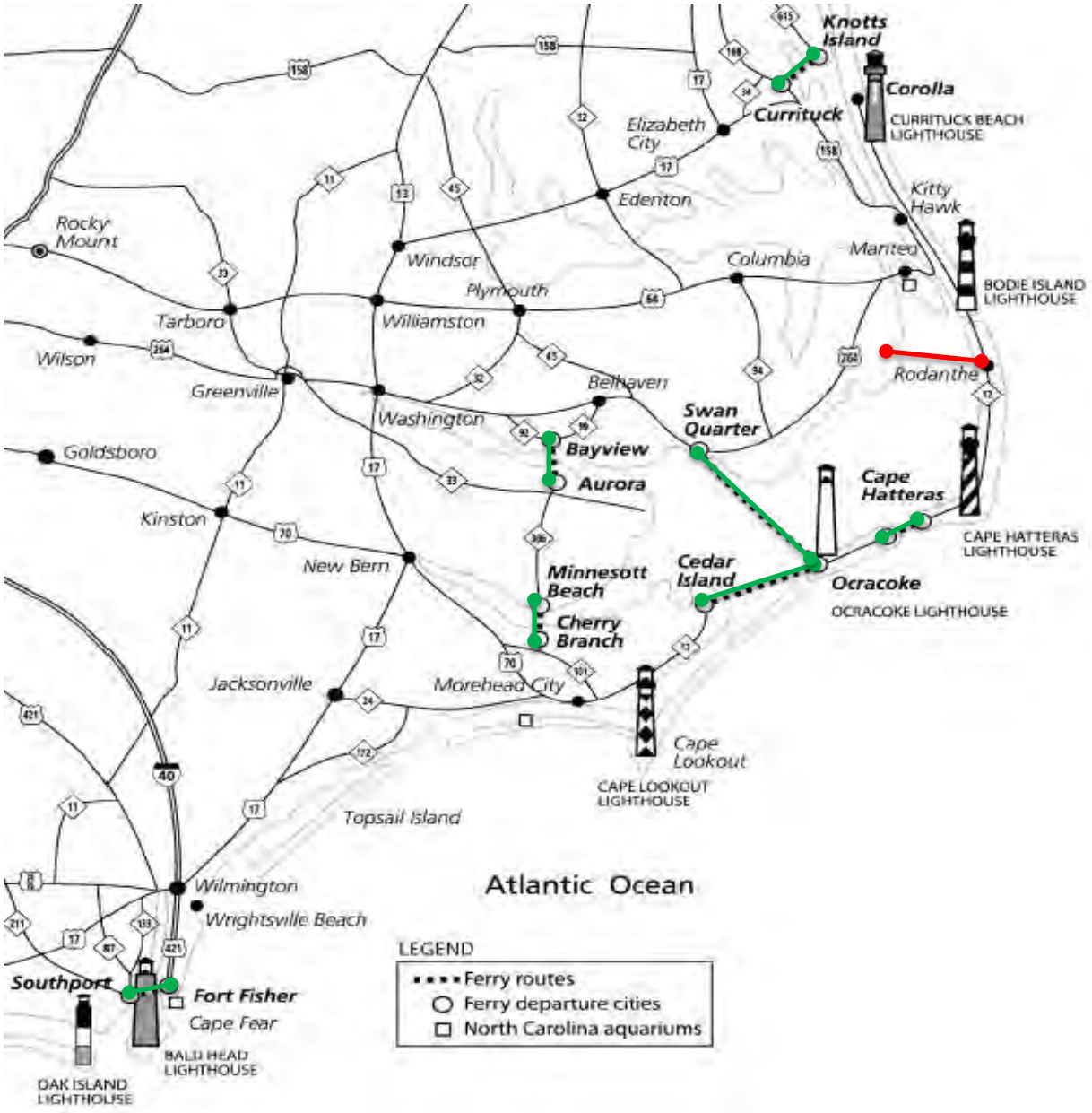


Diagram 2 – 2017 North Carolina County Tier Designations

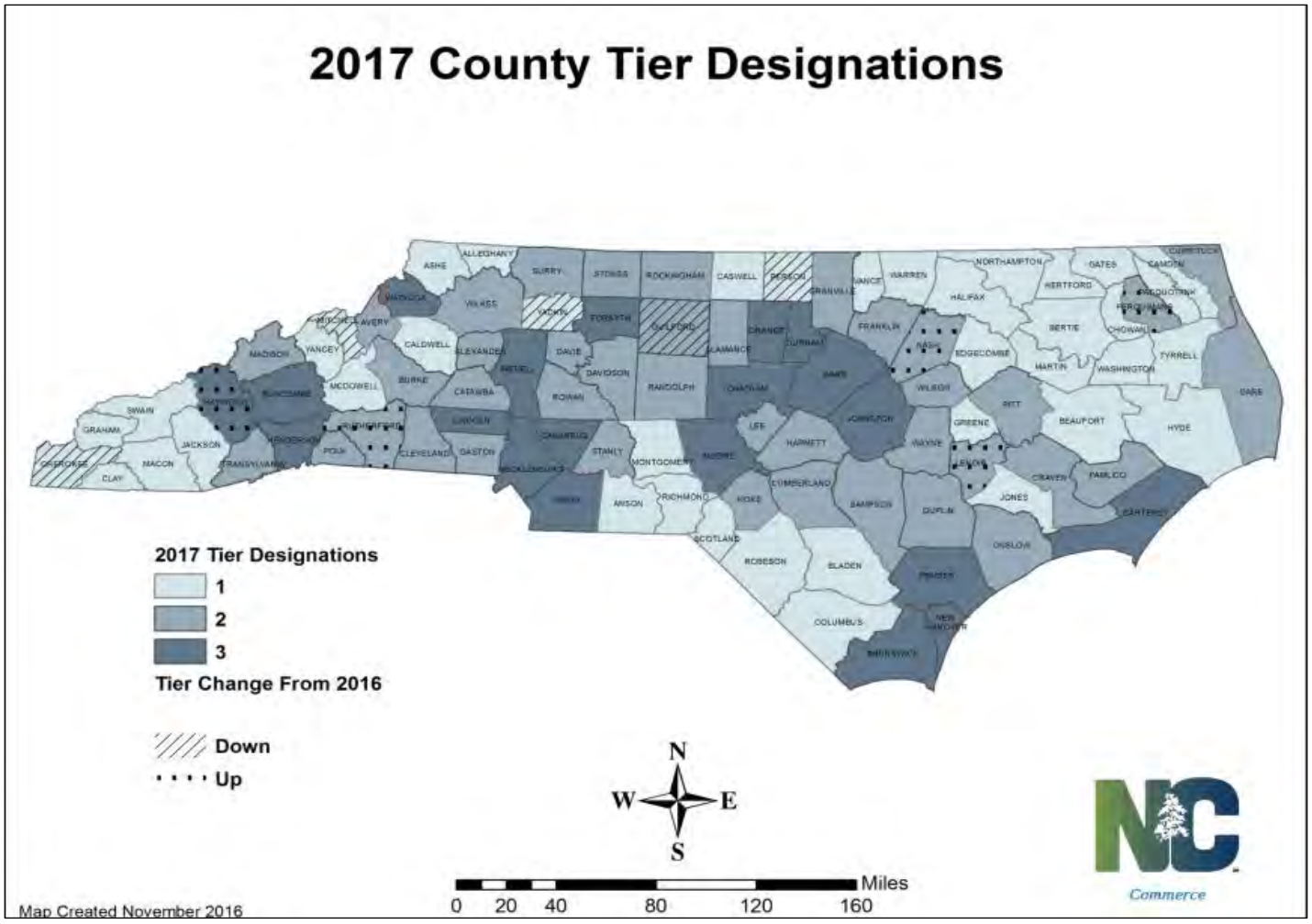


Table 1 – Ferry Division Counties and Tier Designations

County Name	2017 Tier Designation
Currituck	2
Dare	2
Hyde	1
Beaufort	1
Pamlico	2
Craven	2
Carteret	3
New Hanover	3
Brunswick	3

The VW Settlement will provide the Ferry Division with an opportunity to participate in a mitigation engine repower type project. This particular project will address the need to repower and upgrade the existing six diesel engines and the six generators on three of the five Sound Class ferries, taking them from an unregulated listing to a Tier 3. Repowering and upgrading the systems on the Sound Class ferries will drastically reduce the emissions that are currently being produced and emitted. The chart below details each individual vessel that is to be addressed and the costs associated with the new equipment. As a whole this project is estimated at $2,810,406

Table 2 – Vessel and Total Project Cost Detail

Sound Class 220'	New ME Engine Make and Model	Tier #	New Electronic Reduction Gear	Main Engines and Gears Cost (2 Engines)	New Generator Cost (2 Generators)	Labor & Material Cost	Total Cost of Installation
Cedar Island	CAT C32 1000 HP	3	TD MGX540 2.48:1	338,500.00	83,000.00	515,302.00	$936,802.00
Carteret	CAT C32 1000 HP	3	TD MGX540 2.48:1	338,500.00	83,000.00	515,302.00	$936,802.00
Silverlake	CAT C32 1000 HP	3	TD MGX540 2.48:1	338,500.00	83,000.00	515,302.00	$936,802.00
						Total	**$2,810,406.00**

This mitigation project will affect three of the Sound Class ferries. Currently these Sound Class vessels are all equipped with two CAT 3508 850 HP engines and two generators. The MV Cedar Island has two 105 kW CAT 3304 generators while the MC Carteret and the MV Silverlake have two 120 kW CAT 3306 generators. Repowering the vessels will allow the Ferry Division to remove the two old engines and install two new CAT C32 1000 HP engines. The two old generators on each vessel will be replaced with two John Deere 6085 125 kW generators. These ferries use #2 diesel to fuel their engines. Table 3 details the annual fuel usage for each vessel in the River Class during fiscal year 15/16 and fiscal year 16/17. Table 4 details the existing equipment that is installed on each Sound Class ferry.

Table 3 – Fuel and Usage Rates FY15-FY17

Vessel Name	Days Running at 12 Hours FY 15/16	FY 15/16 Fuel Usage (gal)	Days Running at 12 Hours FY 16/17	FY 16/17 Fuel Usage (gal)	2 Year Fuel Usage Average
MV Silver Lake	296.3	171,900	209.1	124,450	148,175
MV Carteret	108.8	67,676	320.9	199,810	133,743
MV Cedar Island	245.3	149,913	234.3	141,501	145,707

Table 4 – Existing Equipment on Sound Class Vessels

Sound Class 220'	Existing ME Engine Make and Model	Tier #	Reduction Gear	Main Engines and Gears	Generator	Year Installed	Age
MV Silver Lake	CAT 3508 850 HP	n/a	TD MG 540	Existing	105 kW CAT 3306	1965	52
MV Carteret	CAT 3508 850 HP	n/a	TD MG 540	Existing	105 kW CAT 3304	1989	28
MV Cedar Island	CAT 3508 850 HP	n/a	TD MG 540	Existing	105 kW CAT 3304	1994	23

Expected Project Benefits

As the online calculators were not very useful in regards to the marine engines like the Ferry Division utilizes we are still awaiting data from Caterpillar in regards to their emissions produced by the older engines we have in service. Hopefully this information will be provided the first week of January and we can supply the calculations for this section.

VOLKSWAGEN CONSENT DECREE

ENVIRONMENTAL MITIGATION TRUST PROJECT IDEAS

REQUEST FOR INFORMATION (RFI) SUBMITTAL

NCDOT FERRY DIVISION SUBMITTAL #4

INSTALL SHORE POWER AT 4 TERMINALS

SECTION 1 – PROJECT APPLICANT INFORMATION

- Agency:
  North Carolina Department of Transportation (NCDOT) / Ferry Division

- Contact Name:
  Sterling Baker, P.E.
  Director of Facilities Management Division & Multimodal Special Projects Engineer

- Government/Non-Government:
  Government

- Mailing Address:
  8550 Shipyard Road
  Manns Harbor, NC 27953

- Phone Number:
  252-339-5964

- Email Address:
  sbaker@ncdot.gov

SECTION 2 – VW Program and Solicitation Design Questions

Respondents should consider providing information in response to the following questions:

1. **How should DEQ prioritize projects?**
   The NCDOT Ferry Division suggests that DEQ should consider the following when determining priority of projects:
   - Opportunities to introduce new emissions reduction technologies. Embracing new technologies into our fleet will help establish North Carolina as a national leader in air pollution reduction efforts.
   - Most optimal air pollution improvements per dollar spent
   - Ability of agencies to pay for projects without VW money; i.e. projects that otherwise may not be accomplished without VW funding should take priority over agencies that possess means to pay for emissions reduction efforts

2. **What is the anticipated demand for each eligible project type?**
   It is anticipated that there will be a significant demand for each project type.

3. **The percentage of trust funds, if any, that DEQ should devote to Light Duty Zero Emission Vehicle Supply Equipment?**
   The percentage of funds devoted to LDZEV supply equipment should be proportional to the amount these vehicles contribute to total air pollution for the State.

4. **What is the anticipated demand for specific types of diesel emission reduction projects not eligible under the VW settlement but otherwise eligible under DERA or other state programs?**
   It is anticipated that repowering of the vessels mentioned in the Ferry Division's requests will not eliminate the demand for future capital replacement or refurbishment projects, but it will assist in moving these needs out several years in our long range capital replacement plan.

5. **Should a certain percentage of available VW funds be allocated to each eligible project type and if so how should the percentage be determined?**
   DEQ should determine how much each project type contributes to overall levels of air pollution across the State, taking into account cost of upgrades/replacement vs. amount of pollution generated.

6. **Should a certain percentage of available Mitigation Trust funds be reserved for government projects?**
   Yes. The NCDOT Ferry Division is an excellent example of a State government agency that has embraced state-of-the-art technology to reduce air pollution on many of our Hatteras Class Vessels by repowering 5 of the these vessel approximately 5 years ago under a Ferry Boat Discretionary Grant from FHWA – please note this program no longer exists, therefore funding to continue similar activities would have to come from some other source such as this VW settlement.

7. **Should funds be geographically distributed, and if so how?**
   Funds should be distributed in a manner that results in the maximum reduction of air pollution across the State, in keeping with the criteria suggested in Question #1 above.

8. **Should governmental entities be required to provide matching funds and if so, how much?**
   The Ferry Division recommends no matching fund requirement for government agencies.

9. **Should DEQ establish a minimum project size and if so, what size?**
   The Ferry Division recommends that DEQ consider all projects regardless of size and provide funding in accordance with the criteria indicated in Question #1 above.

10. **In addition to evaluating a proposed project's total cost effectiveness ($/ton), what other key factors should DEQ consider when evaluating projects?**
    In order to maximize the benefits of the settlement funding in reducing emissions support for government projects that provide support for North Carolina businesses and promote traffic conveyance with greatly reduced emissions should be looked at.

11. **What other feedback do you have on project evaluation and/or scoring criteria?**
    The Ferry Division requests that DEQ continue to keep all interested parties apprised of the project schedule to ensure that all critical applications and other documentation is received within proper timeframes.

12. **What publicly available tool(s) should be used to quantify anticipated emission reductions/offsets for eligible mitigation projects? What, if any, additional resources should be provided and made available?**
    The emissions reduction calculation tools provided in this RFI were not very helpful in regards to Ferry Division scopes, but the Ferry Division niche is a very specialized one. We had to get most of our data from vendors. DEQ should continue to make itself available as a resource to all parties interested in VW funding.

13. **What methods could DEQ employ to reduce barriers and increase participation in future solicitations for projects?**
    The Ferry Division believes that DEQ does a good job of communicating solicitations for projects. Continued communication of future solicitations to previous applicants is important to ensure these solicitations receive positive feedback. DEQ should continue to encourage applicants to communicate opportunities for funding to their colleagues to increase interest and potential number of applicants.

14. **What information/resources would be most valuable for stakeholders interested in submitting projects and what is the best way to communicate those?**
    Information such as scope, funding limits, and application requirements are critical for submitting proposals. DEQ communicates this information well in RFPs and announcements associated with funding solicitations.

SECTION 3 – Project Information

The NCODT Ferry Division (headquartered at the Manns Harbor, NC Shipyard) runs twenty two boats on seven regular routes across five bodies of water along the east coast of North Carolina: Currituck and Pamlico Sounds, and the Cape Fear, Neuse, and Pamlico Rivers. The ferries transport about 850,000 vehicles and two million passengers a year, making it the second largest state-run ferry system in the United States. Not only are visitors transported, but residents, commuters, and school children as well. Two of the routes (Hatteras-Ocracoke and Ocracoke-Cedar Island) are officially part of The Outer Banks Scenic Byway. The Ferry Division runs an emergency route between Stumpy Point and Rodanthe that provides a crucial transportation link between Hatteras Island and the mainland when NC Highway 12 is damaged due to storms and other issues. The Ferry Division operates and serves in nine counties which are: Currituck, Dare, Hyde, Beaufort, Craven, Carteret, Pamlico, New Hanover, and Brunswick. The majority of these counties are either Tier 1 or Tier 2. The ferry vessels fall into three different classes (River, Sound, and Hatteras) categorized by different lengths. The River Class vessels measure 180', Sound Class measures 220' and Hatteras Class measures 150'. The projects proposed by the Ferry Division consist of repowering from Tier1/2 engines and generators to Tier 3 or Tier 4 engines and generators (depending on size requirements), installing shore power at locations that currently do not provide shore power, and updating older locations that have shore power but need modernization due to age and the harsh environment it is in.

Diagram 1 – Ferry Routes in North Carolina

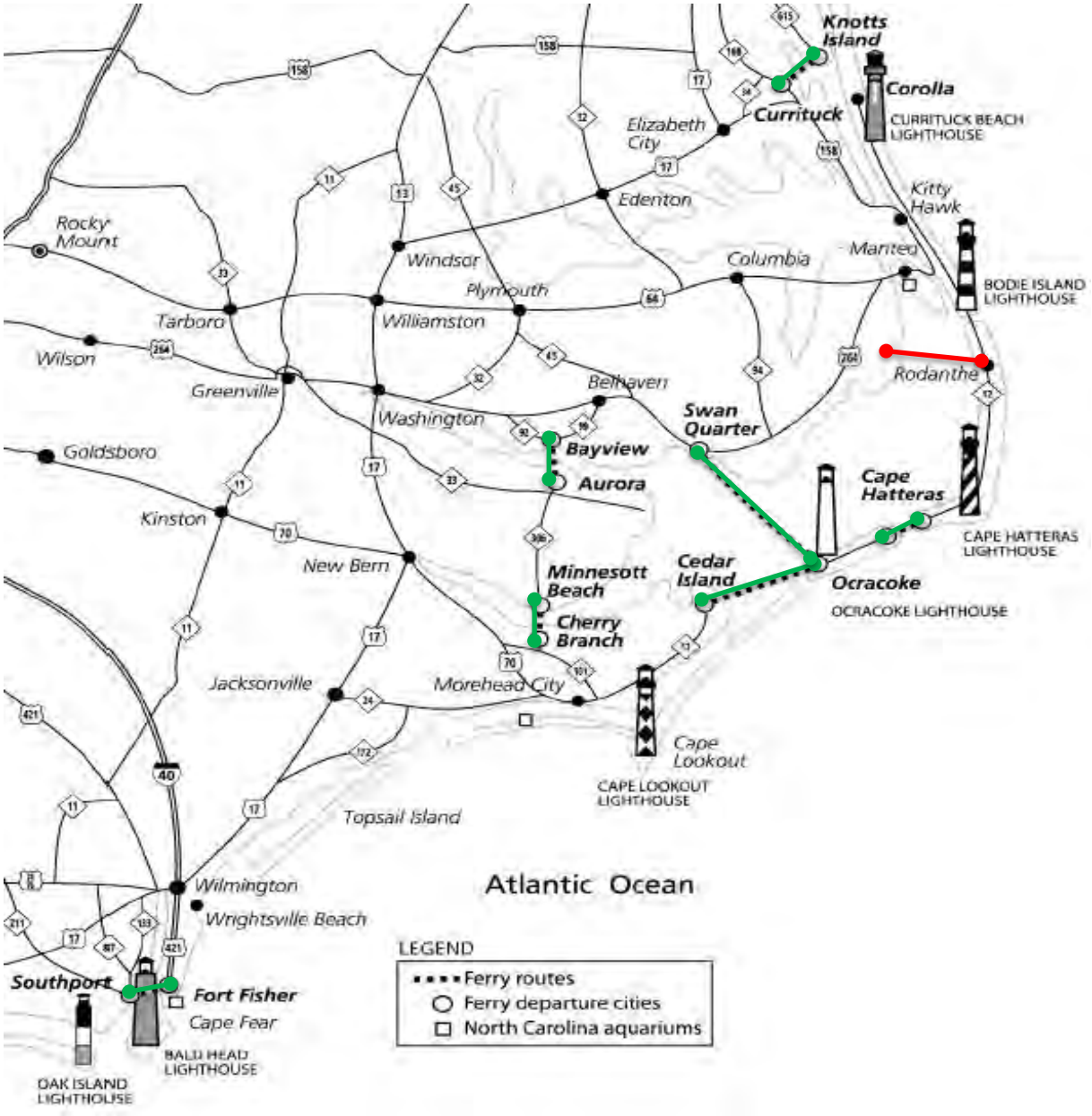


Diagram 2 – 2017 North Carolina County Tier Designations

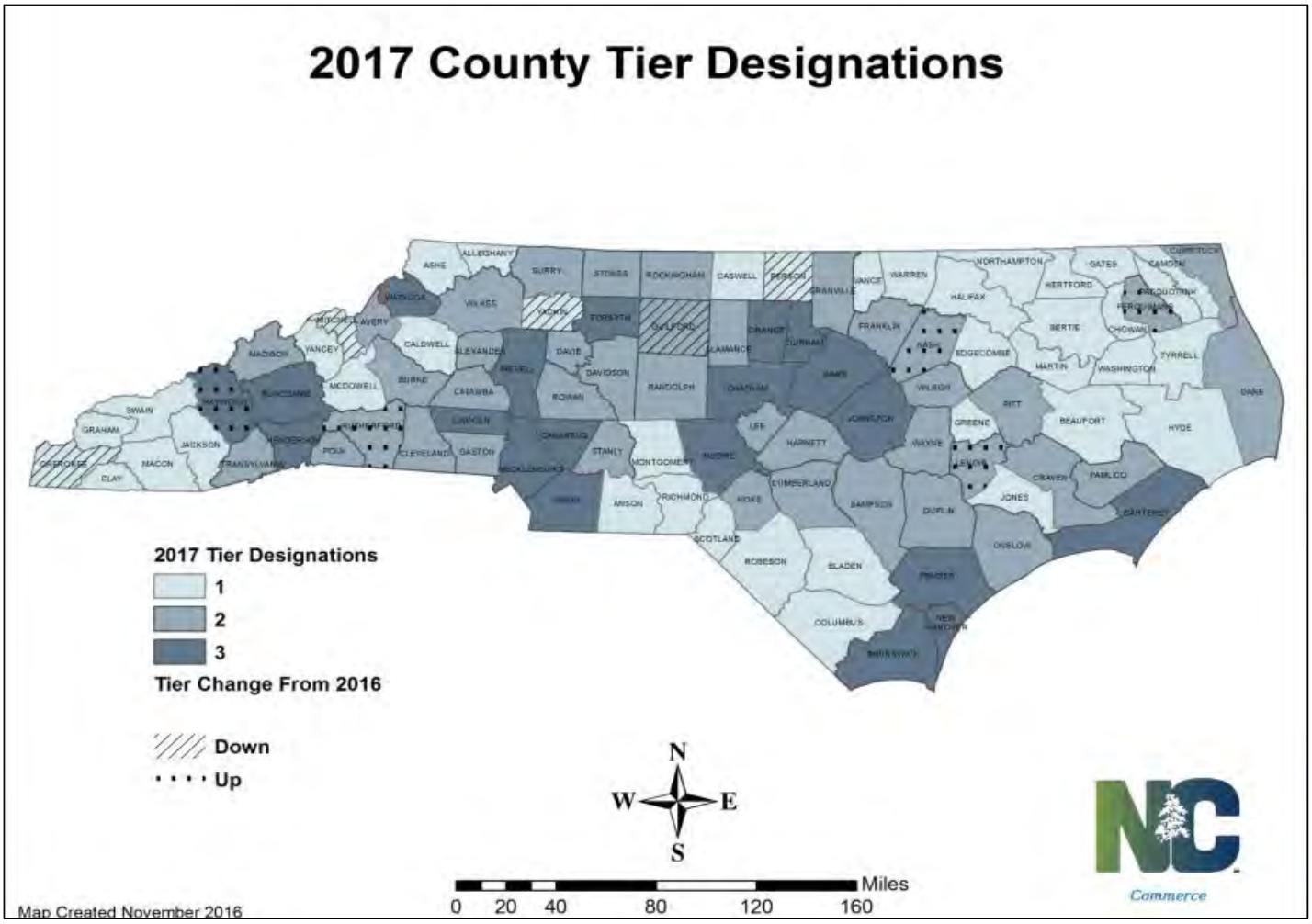


Table 1 – Ferry Division Counties and Tier Designations

County Name	2017 Tier Designation
Currituck	2
Dare	2
Hyde	1
Beaufort	1
Pamlico	2
Craven	2
Carteret	3
New Hanover	3
Brunswick	3

The VW Settlement will provide the Ferry Division with an opportunity to participate in a mitigation project that involves adding new shorepower systems to a few of the ferry terminal locations. This particular project will address the need to add shore power systems at Fort Fisher, Rodanthe, Stumpy Point and Swan Quarter.

Adding these systems to our terminals drastically reduce the emissions that are currently being produced and emitted while vessels are docked and idling. The chart below details each individual location that is to be addressed and the costs associated. As a whole this project is estimated at $360,000.

Table 2 – Location and Total Project Cost Detail

Location Name	Project Description	Type of Project (New/Upgrade)	Cost (Material & Labor)
Fort Fisher	Install receptacle for future fleet increase	New	$90,000
Rodanthe	Install receptacle for emergency services	New	$90,000
Stumpy Point	Install receptacle and breaker	New	$90,000
Swan Quarter	Add receptacle at the dock and dead slip	New	$90,000
Total			$360,000

This mitigation project will affect four of the Ferry Division terminals. Currently Fort Fisher does not have a shore power connection. Adding one to this location will allow for a possible future expansion of the Ferry Division fleet and have the resources to dock a boat at this location overnight. The Rodanthe emergency ferry terminal would receive a shower power system and breaker to allow for vessels to be kept there when needed. While Stumpy Point does have shore power connections at this time there is a need to install a new receptacle. Swan Quarter is in need of adding two shore power connections at their terminal. One connection would be at the dock and another would be at the dead slip.

According to the Environmental Protection Agency (EPA) Shore Power Technology Assessment and Emissions Calculator if a ferry vessel were to use shore power instead of running idle there would be a 98% reduction of NOx, 19% reduction of SOx, and a 40% reduction of CO2 emitted from the vessel and into the atmosphere. Table 1 depicts the estimated emissions and decrease of emission from two 600 HP engines that dock once a day per year and use shore power at the varying lengths of time of 4, 6, 8, and 10 hours.

Table 3 – Emissions Reduction Calculator

Emissions Calculator: High Capacity Shore Power Connection - General Model					Vessel Power Emissions (MT)			Shore Power Emissions (MT)			Difference (MT)			Percent Difference		
Auxiliary Engine Size (kW)	Load Factor	Number of Annual Vessel Calls	Avg. Hotel Hours/Vessel Call	Annual Energy Consumption (kWh)	NOx	SOx	CO2	NOx	SOx	CO2	NOx	SOx	CO2	NOx	SOx	CO2
1200	0.22	365	4	385,440	5.36	0.15	265.95	0.11	0.13	158.74	-5.25	-0.03	-107.21	-98%	-19%	-40%
1200	0.22	365	6	578,160	8.04	0.23	398.93	0.16	0.19	238.12	-7.87	-0.04	-160.81	-98%	-19%	-40%
1200	0.22	365	8	770,880	10.72	0.31	531.91	0.22	0.25	317.49	-10.50	-0.06	-214.42	-98%	-19%	-40%
1200	0.22	365	10	963,600	13.39	0.39	664.88	0.27	0.31	396.86	-13.12	-0.07	-268.02	-98%	-19%	-40%

https://www.epa.gov/ports-initiative/shore-power-technology-assessment-us-ports#documents

VOLKSWAGEN CONSENT DECREE

ENVIRONMENTAL MITIGATION TRUST PROJECT IDEAS

REQUEST FOR INFORMATION (RFI) SUBMITTAL

NCDOT FERRY DIVISION SUBMITTAL #5

MODERNIZE EXISITNG SHORE POWER AT 5 LOCATIONS

SECTION 1 – PROJECT APPLICANT INFORMATION

- Agency:
  North Carolina Department of Transportation (NCDOT) / Ferry Division

- Contact Name:
  Sterling Baker, P.E.
  Director of Facilities Management Division & Multimodal Special Projects Engineer

- Government/Non-Government:
  Government

- Mailing Address:
  8550 Shipyard Road
  Manns Harbor, NC 27953

- Phone Number:
  252-339-5964

- Email Address:
  sbaker@ncdot.gov

SECTION 2 – VW Program and Solicitation Design Questions

Respondents should consider providing information in response to the following questions:

1. **How should DEQ prioritize projects?**
   The NCDOT Ferry Division suggests that DEQ should consider the following when determining priority of projects:
   - Opportunities to introduce new emissions reduction technologies. Embracing new technologies into our fleet will help establish North Carolina as a national leader in air pollution reduction efforts.
   - Most optimal air pollution improvements per dollar spent
   - Ability of agencies to pay for projects without VW money; i.e. projects that otherwise may not be accomplished without VW funding should take priority over agencies that possess means to pay for emissions reduction efforts

2. **What is the anticipated demand for each eligible project type?**
   It is anticipated that there will be a significant demand for each project type.

3. **The percentage of trust funds, if any, that DEQ should devote to Light Duty Zero Emission Vehicle Supply Equipment?**
   The percentage of funds devoted to LDZEV supply equipment should be proportional to the amount these vehicles contribute to total air pollution for the State.

4. **What is the anticipated demand for specific types of diesel emission reduction projects not eligible under the VW settlement but otherwise eligible under DERA or other state programs?**
   It is anticipated that repowering of the vessels mentioned in the Ferry Division's requests will not eliminate the demand for future capital replacement or refurbishment projects, but it will assist in moving these needs out several years in our long range capital replacement plan.

5. **Should a certain percentage of available VW funds be allocated to each eligible project type and if so how should the percentage be determined?**
   DEQ should determine how much each project type contributes to overall levels of air pollution across the State, taking into account cost of upgrades/replacement vs. amount of pollution generated.

6. **Should a certain percentage of available Mitigation Trust funds be reserved for government projects?**
   Yes. The NCDOT Ferry Division is an excellent example of a State government agency that has embraced state-of-the-art technology to reduce air pollution on many of our Hatteras Class Vessels by repowering 5 of the these vessel approximately 5 years ago under a Ferry Boat Discretionary Grant from FHWA – please note this program no longer exists, therefore funding to continue similar activities would have to come from some other source such as this VW settlement.

7. **Should funds be geographically distributed, and if so how?**
   Funds should be distributed in a manner that results in the maximum reduction of air pollution across the State, in keeping with the criteria suggested in Question #1 above.

8. **Should governmental entities be required to provide matching funds and if so, how much?**
   The Ferry Division recommends no matching fund requirement for government agencies.

9. **Should DEQ establish a minimum project size and if so, what size?**
   The Ferry Division recommends that DEQ consider all projects regardless of size and provide funding in accordance with the criteria indicated in Question #1 above.

10. **In addition to evaluating a proposed project's total cost effectiveness ($/ton), what other key factors should DEQ consider when evaluating projects?**
    In order to maximize the benefits of the settlement funding in reducing emissions support for government projects that provide support for North Carolina businesses and promote traffic conveyance with greatly reduced emissions should be looked at.

11. **What other feedback do you have on project evaluation and/or scoring criteria?**
    The Ferry Division requests that DEQ continue to keep all interested parties apprised of the project schedule to ensure that all critical applications and other documentation is received within proper timeframes.

12. **What publicly available tool(s) should be used to quantify anticipated emission reductions/offsets for eligible mitigation projects? What, if any, additional resources should be provided and made available?**
    The emissions reduction calculation tools provided in this RFI were not very helpful in regards to Ferry Division scopes, but the Ferry Division niche is a very specialized one. We had to get most of our data from vendors. DEQ should continue to make itself available as a resource to all parties interested in VW funding.

13. **What methods could DEQ employ to reduce barriers and increase participation in future solicitations for projects?**
    The Ferry Division believes that DEQ does a good job of communicating solicitations for projects. Continued communication of future solicitations to previous applicants is important to ensure these solicitations receive positive feedback. DEQ should continue to encourage applicants to communicate opportunities for funding to their colleagues to increase interest and potential number of applicants.

14. **What information/resources would be most valuable for stakeholders interested in submitting projects and what is the best way to communicate those?**
    Information such as scope, funding limits, and application requirements are critical for submitting proposals. DEQ communicates this information well in RFPs and announcements associated with funding solicitations.

SECTION 3 – Project Information

The NCODT Ferry Division (headquartered at the Manns Harbor, NC Shipyard) runs twenty two boats on seven regular routes across five bodies of water along the east coast of North Carolina: Currituck and Pamlico Sounds, and the Cape Fear, Neuse, and Pamlico Rivers. The ferries transport about 850,000 vehicles and two million passengers a year, making it the second largest state-run ferry system in the United States. Not only are visitors transported, but residents, commuters, and school children as well. Two of the routes (Hatteras-Ocracoke and Ocracoke-Cedar Island) are officially part of The Outer Banks Scenic Byway. The Ferry Division runs an emergency route between Stumpy Point and Rodanthe that provides a crucial transportation link between Hatteras Island and the mainland when NC Highway 12 is damaged due to storms and other issues. The Ferry Division operates and serves in nine counties which are: Currituck, Dare, Hyde, Beaufort, Craven, Carteret, Pamlico, New Hanover, and Brunswick. The majority of these counties are either Tier 1 or Tier 2. The ferry vessels fall into three different classes (River, Sound, and Hatteras) categorized by different lengths. The River Class vessels measure 180', Sound Class measures 220' and Hatteras Class measures 150'. The projects proposed by the Ferry Division consist of repowering from Tier1/2 engines and generators to Tier 3 or Tier 4 engines and generators (depending on size requirements), installing shore power at locations that currently do not provide shore power, and updating older locations that have shore power but need modernization due to age and the harsh environment it is in.

Diagram 1 – Ferry Routes in North Carolina

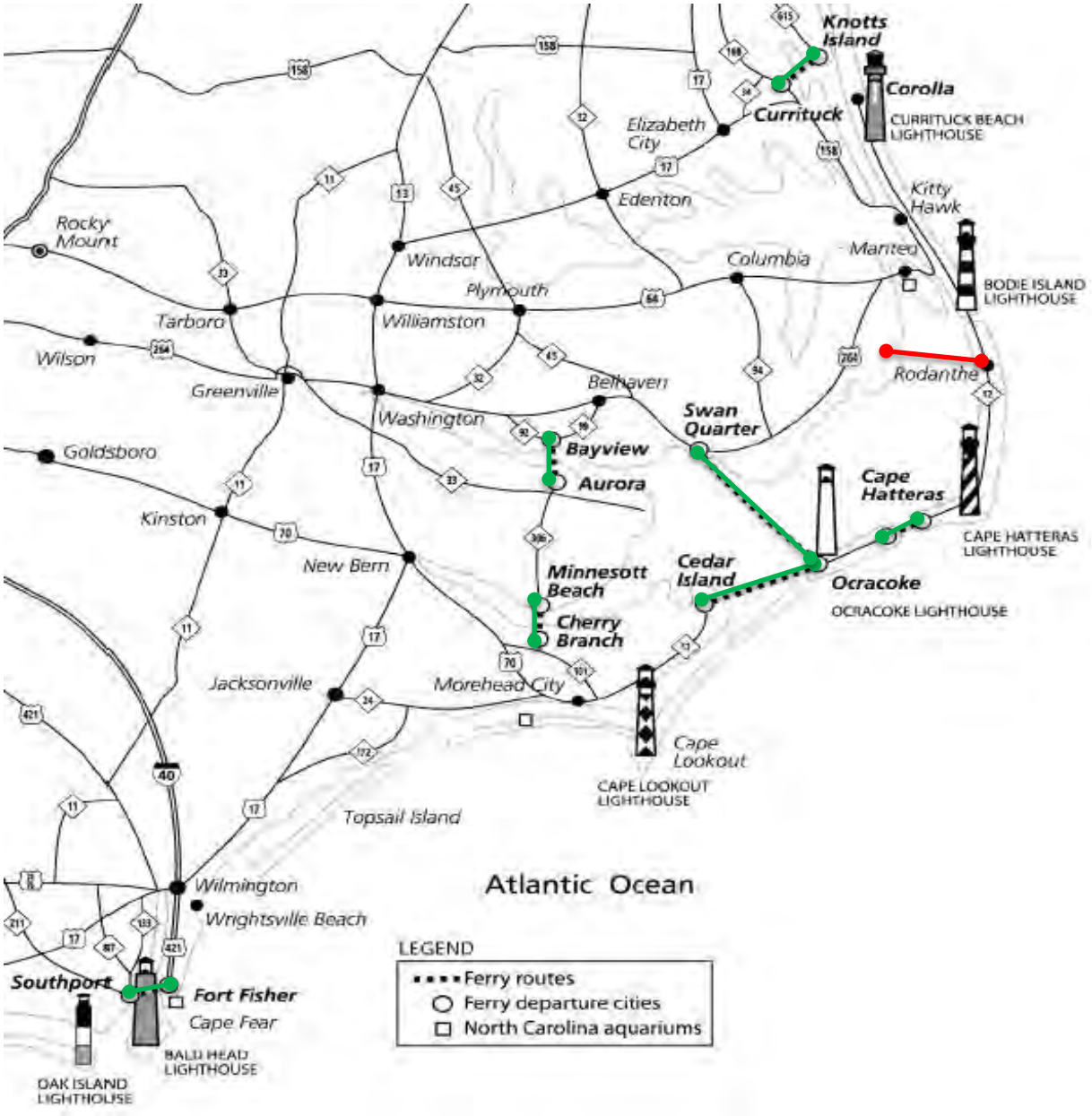


Diagram 2 – 2017 North Carolina County Tier Designations

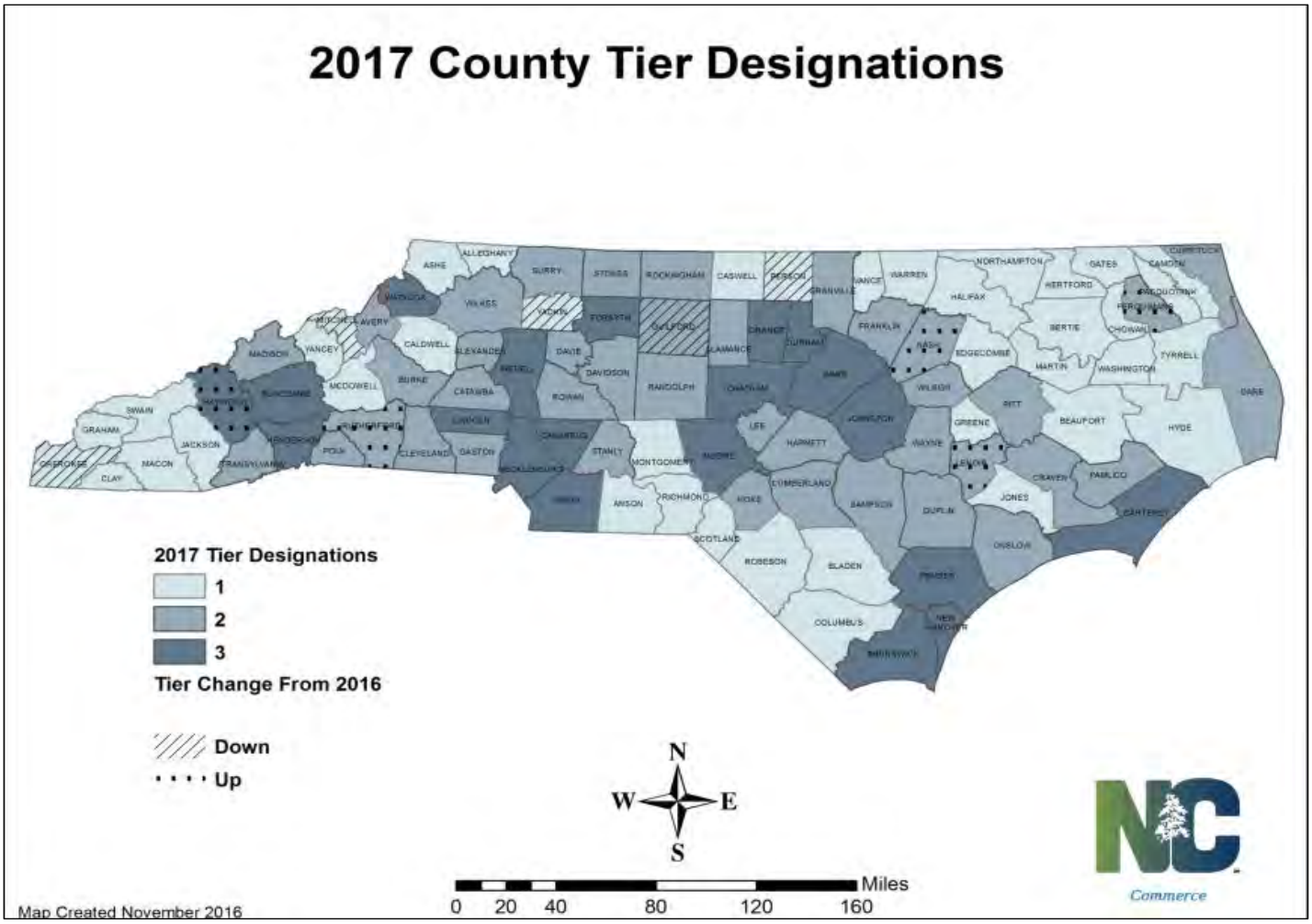


Table 1 – Ferry Division Counties and Tier Designations

County Name	2017 Tier Designation
Currituck	2
Dare	2
Hyde	1
Beaufort	1
Pamlico	2
Craven	2
Carteret	3
New Hanover	3
Brunswick	3

The VW Settlement will provide the Ferry Division with an opportunity to participate in a mitigation project that involves modernizing shorepower systems to a few of the ferry terminal locations. This particular project will address the need to modernize shore power systems at the Shipyard, Hatteras, Southdock, Swan Quarter, and Ocracoke.

Modernizing these systems at terminals will ensure reliability, availability, and will reduce the emissions that are currently being produced and emitted while vessels are docked and idling. The chart below details each individual location that is to be addressed and the costs associated. As a whole this project is estimated at $1,450,000.

Table 2 – Location and Total Project Cost Detail

Location Name	Project Description	Type of Project (New/Upgrade)	Cost (Material & Labor)
Shipyard	Rewire 7 connections, replace boxes and transformers	Modernize	$350,000
Hatteras	Replace all receptacles, supply each with individual circuit, new main panel board	Modernize	$700,000
Southdock	Replace generator and panel board	Modernize	$100,000
Swan Quarter	Upgrade service connection	Modernize	$150,000
Ocracoke	Rebuild dead slip connections with stainless steel	Modernize	$150,000
Total			$1,450,000

This mitigation project will affect five of the Ferry Division terminals. The proposed modernizations are to replace the aging shore power systems and ensure that all of the ferry terminals have reliable connections. When the ferry vessels are unable to connect to shore power at the terminal they are continuously running and emitting gases into the atmosphere. Upgraded systems would ensure that vessels can plug in and reduce their emissions.

Many of the ferry terminal locations are in harsh environments which has caused the existing equipment to deteriorate, become unsafe and or unreliable.

According to the Environmental Protection Agency (EPA) Shore Power Technology Assessment and Emissions Calculator if a ferry vessel were to use shore power instead of running idle there would be a 98% reduction of NOx, 19% reduction of SOx, and a 40% reduction of CO2 emitted from the vessel and into the atmosphere. Table 1 depicts the estimated emissions and decrease of emission from two 600 HP engines that dock once a day per year and use shore power at the varying lengths of time of 4, 6, 8, and 10 hours.

Table 3 – Emissions Reduction Calculator

Emissions Calculator: High Capacity Shore Power Connection - General Model					Vessel Power Emissions (MT)			Shore Power Emissions (MT)			Difference (MT)			Percent Difference		
Auxiliary Engine Size (kW)	Load Factor	Number of Annual Vessel Calls	Avg. Hotel Hours/Vessel Call	Annual Energy Consumption (kWh)	NOx	SOx	CO2	NOx	SOx	CO2	NOx	SOx	CO2	NOx	SOx	CO2
1200	0.22	365	4	385,440	5.36	0.15	265.95	0.11	0.13	158.74	-5.25	-0.03	-107.21	-98%	-19%	-40%
1200	0.22	365	6	578,160	8.04	0.23	398.93	0.16	0.19	238.12	-7.87	-0.04	-160.81	-98%	-19%	-40%
1200	0.22	365	8	770,880	10.72	0.31	531.91	0.22	0.25	317.49	-10.50	-0.06	-214.42	-98%	-19%	-40%
1200	0.22	365	10	963,600	13.39	0.39	664.88	0.27	0.31	396.86	-13.12	-0.07	-268.02	-98%	-19%	-40%

https://www.epa.gov/ports-initiative/shore-power-technology-assessment-us-ports#documents

Project Priority #1

River Class 180'	New ME Engine Make and Model	Tier #	New Electronic Reduction Gear	Main Engines and Gears Cost (2 Engines)
Southport	CAT C18 600 HP	3	TD MGX5145SC 2.48:1	221,500.00
Neuse	CAT C18 600 HP	3	TD MGX5145SC 2.48:1	221,500.00
Lupton	CAT C18 600 HP	3	TD MGX5145SC 2.48:1	221,500.00
Ft Fisher	CAT C18 600 HP	3	TD MGX5145SC 2.48:1	221,500.00
Croatoan	CAT C18 600 HP	3	TD MGX5145SC 2.48:1	221,500.00
W. Stanford White	CAT C18 600 HP	3	TD MGX5145SC 2.48:1	221,500.00
Hatteras	CAT C18 600 HP	3	TD MGX5145SC 2.48:1	221,500.00
Gov. Russell	CAT C18 600 HP	3	TD MGX5145SC 2.48:1	221,500.00
Gov. Hunt	CAT C18 600 HP	3	TD MGX5145SC 2.48:1	221,500.00

Project Priority #2

Sound Class 220'	New ME Engine Make and Model	Tier #	New Electronic Reduction Gear	Main Engines and Gears Cost (2 Engines)
Swan Quarter	CAT 3512 1200 HP	4	ZF Existing	644,800.00
Sea Level	CAT 3512 1200 HP	4	ZF Existing	644,800.00

Project Priority #3

Sound Class 220'	New ME Engine Make and Model	Tier #	New Electronic Reduction Gear	Main Engines and Gears Cost (2 Engines)
Cedar Island	CAT C32 1000 HP	3	TD MGX540 2.48:1	338,500.00
Carteret	CAT C32 1000 HP	3	TD MGX540 2.48:1	338,500.00
Silverlake	CAT C32 1000 HP	3	TD MGX540 2.48:1	338,500.00

Project Priority #4

Location Name	Project Description	Type of Project (New/Upgrade)	Cost (Material & Labor)
Fort Fisher	Install receptacle for future fleet increase	New	$90,000
Rodanthe	Install receptacle for emergency services	New	$90,000

Stumpy Point	Install receptacle and breaker	New	$90,000
Swan Quarter	Add receptacle at the dock and dead slip	New	$90,000
		Total	**$360,000**

Project Priority #5			
Location Name	**Project Description**	**Type of Project (New/Upgrade)**	**Cost (Material & Labor)**
Shipyard	Rewire 7 connections, replace boxes and transformers	Modernize	$350,000
Hatteras	Replace all receptacles, supply each with individual circuit, new main panel board	Modernize	$700,000
Southdock	Replace generator and panel board	Modernize	$100,000
Swan Quarter	Upgrade service connection	Modernize	$150,000
Ocracoke	Rebuild dead slip connections with stainless steel	Modernize	$150,000
		Total	**$1,450,000**

Project Total	**$10,565,894.00**

New Generator Cost (2 Generators)	Labor & Material Cost	Total Cost of Installation
69,596.00	177,300.00	$468,396.00
69,596.00	177,300.00	$468,396.00
69,596.00	177,300.00	$468,396.00
69,596.00	177,300.00	$468,396.00
69,596.00	177,300.00	$468,396.00
69,596.00	177,300.00	$468,396.00
69,596.00	177,300.00	$468,396.00
69,596.00	292,662.00	$583,758.00
69,596.00	266,462.00	$557,558.00
	Total	**$4,420,088.00**

New Generator Cost (2 Generators)	Labor & Material Cost	Total Cost of Installation
Cat 6.6 215 kW Existing	117,900.00	$762,700.00
Cat 6.6 215 kW Existing	117,900.00	$762,700.00
	Total	**$1,525,400.00**

New Generator Cost (2 Generators)	Labor & Material Cost	Total Cost of Installation
83,000.00	515,302.00	$936,802.00
83,000.00	515,302.00	$936,802.00
83,000.00	515,302.00	$936,802.00
	Total	**$2,810,406.00**

Project Priority #1

River Class 180'	New ME Engine Make and Model	Tier#	Tier #	New Electronic Reduction Gear	Main Engines and Gears Cost (2 Engines)	New Generator Cost (2 Generators)	Labor & Material Cost	Total Cost of Installation
Southport	CAT C18 600 HP	1 & 2	3	TD MGX5145SC 2.48:1	221,500.00	69,596.00	177,300.00	$468,396.00
Neuse	CAT C18 600 HP	1 & 2	3	TD MGX5145SC 2.48:1	221,500.00	69,596.00	177,300.00	$468,396.00
Lupton	CAT C18 600 HP	1 & 2	3	TD MGX5145SC 2.48:1	221,500.00	69,596.00	177,300.00	$468,396.00
Ft Fisher	CAT C18 600 HP	1 & 2	3	TD MGX5145SC 2.48:1	221,500.00	69,596.00	177,300.00	$468,396.00
Croatoan	CAT C18 600 HP	1 & 2	3	TD MGX5145SC 2.48:1	221,500.00	69,596.00	177,300.00	$468,396.00
W. Stanford White	CAT C18 600 HP	1 & 2	3	TD MGX5145SC 2.48:1	221,500.00	69,596.00	177,300.00	$468,396.00
Hatteras	CAT C18 600 HP	1 & 2	3	TD MGX5145SC 2.48:1	221,500.00	69,596.00	177,300.00	$468,396.00
Gov. Russell	CAT C18 600 HP	1 & 2	3	TD MGX5145SC 2.48:1	221,500.00	69,596.00	292,662.00	$583,758.00
Gov. Hunt	CAT C18 600 HP	1 & 2	3	TD MGX5145SC 2.48:1	221,500.00	69,596.00	266,462.00	$557,558.00
							Total	**$4,420,088.00**

Project Priority #2								
Sound Class 220'	**New ME Engine Make and Model**	**Original Tier**	**Tier #**	**New Electronic Reduction Gear**	**Main Engines and Gears Cost (2 Engines)**	**New Generator Cost (2 Generators)**	**Labor & Material Cost**	**Total Cost of Installation**
Swan Quarter	CAT 3512 1200 HP	2	4	ZF Existing	644,800.00	Cat 6.6 215 kW Existing	117,900.00	$762,700.00
Sea Level	CAT 3512 1200 HP	2	4	ZF Existing	644,800.00	Cat 6.6 215 kW Existing	117,900.00	$762,700.00
							Total	**$1,525,400.00**

Project Priority #3

Sound Class 220'	New ME Engine Make and Model	Original Tier	Tier #	New Electronic Reduction Gear	Main Engines and Gears Cost (2 Engines)	New Generator Cost (2 Generators)	Labor & Material Cost	Total Cost of Installation
Cedar Island	CAT C32 1000 HP	1&2	3	TD MGX540 2.48:1	338,500.00	83,000.00	515,302.00	$936,802.00
Carteret	CAT C32 1000 HP	1&2	3	TD MGX540 2.48:1	338,500.00	83,000.00	515,302.00	$936,802.00
Silverlake	CAT C32 1000 HP	1&2	3	TD MGX540 2.48:1	338,500.00	83,000.00	515,302.00	$936,802.00
							Total	**$2,810,406.00**

Project Priority #4			
Location Name	**Project Description**	**Type of Project (New/Upgrade)**	**Cost (Material & Labor)**
Fort Fisher	Install receptacle for future fleet increase	New	$90,000
Rodanthe	Install receptacle for emergency services	New	$90,000
Stumpy Point	Install receptacle and breaker	New	$90,000
Swan Quarter	Add receptacle at the dock and dead slip	New	$90,000
		Total	**$360,000**

Project Priority #5			
Location Name	**Project Description**	**Type of Project (New/Upgrade)**	**Cost (Material & Labor)**
Shipyard	Rewire 7 connections, replace boxes and transformers	Modernize	$350,000
Hatteras	Replace all receptacles, supply each with individual circuit, new main panel board	Modernize	$700,000
Southdock	Replace generator and panel board	Modernize	$100,000
Swan Quarter	Upgrade service connection	Modernize	$150,000
Ocracoke	Rebuild dead slip connections with stainless steel	Modernize	$150,000
		Total	**$1,450,000**

North Carolina Department of Agriculture and Consumer Services

N.C. Forest Service

Steven W. Troxler
Commissioner

Scott Bissette
Assistant Commissioner

REQUEST FOR INFORMATION (RFI)
VOLKSWAGEN CONSENT DECREE
ENVIRONMENTAL MITIGATION TRUST PROJECT IDEAS

NORTH CAROLINA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES
NORTH CAROLINA FOREST SERVICE
Submitted December 31, 2017

Organization Name: North Carolina Forest Service
Contact Person Name: Joseph Gilroy, Administrative Services Division Director
Type: Government Entity
Mailing Address: 1616 Mail Service Center, Raleigh, NC 27699
Phone Number: 919-857-4853
Email Address: joseph.gilroy@ncagr.gov

VW Program and Solicitation Design

How should DEQ prioritize projects? The VW Mitigation Settlement Trust is sure to draw the interest of many companies, agencies and organizations proposing worthy and beneficial projects. While the settlement amount is large, it is also finite and must be handled with tremendous stewardship. Therefore, it is important to prioritize projects based on their ability to provide prolonged and targeted environmental benefits not only after the funds are spent, but also well beyond the life of the purchased equipment. This "sustainability return on investment" model will help ensure that funded projects meet the settlement requirement to fully mitigate the lifetime excess NO_x pollution emitted by VW vehicles that violated the Clean Air Act. Projects that carry environmental benefits in addition to direct emissions reduction, such as those that have an educational component, provide for tree planting and other carbon sequestering activities, or improve, protect, restore or reduce risks to public health, should be given greater weight.

What is the anticipated demand for specific types of diesel emission reduction projects not eligible under the VW settlement but otherwise eligible under DERA or other state programs? Due to the cost of DERA eligible equipment, demand for shares of DERA funding should be high regardless of the number of project proposals submitted. For the North Carolina Forest Service (NCFS), it is extremely cost-prohibitive to regularly replace agricultural and construction equipment. The purchase of one replacement fire dozer unit, which includes a truck tractor, crawler tractor and trailer, would consume most of the NCFS annual equipment budget. Therefore, as the demand for replacement has grown, so too has the need for external funding sources to either carry or supplement the cost. NCFS expects that this will be the case for other government agencies and companies with relatively small equipment replacement budgets. NCFS anticipates that about half of the equipment it is seeking to replace would be eligible for more than $18 million in DERA funding.

Should a certain percentage of available Mitigation Trust funds be reserved for government projects? Funds should be awarded based on the project's ability to fully mitigate the lifetime excess NO_x pollution emitted by VW vehicles that violated the Clean Air Act regardless of whether a government or non-government organization is conducting the work.

Should funds be geographically distributed, and if so how? Should DEQ establish a minimum project size and if so, what size? Funds should be distributed in a way that ensures the widest geographical impact.

Should governmental entities be required to provide matching funds and if so, how much? No. Many applications from governmental and non-governmental entities will be need based. Requiring a match from governmental entities may be cost-prohibitive to them and discourage the submission of what would be impactful and beneficial project proposals.

Project Information

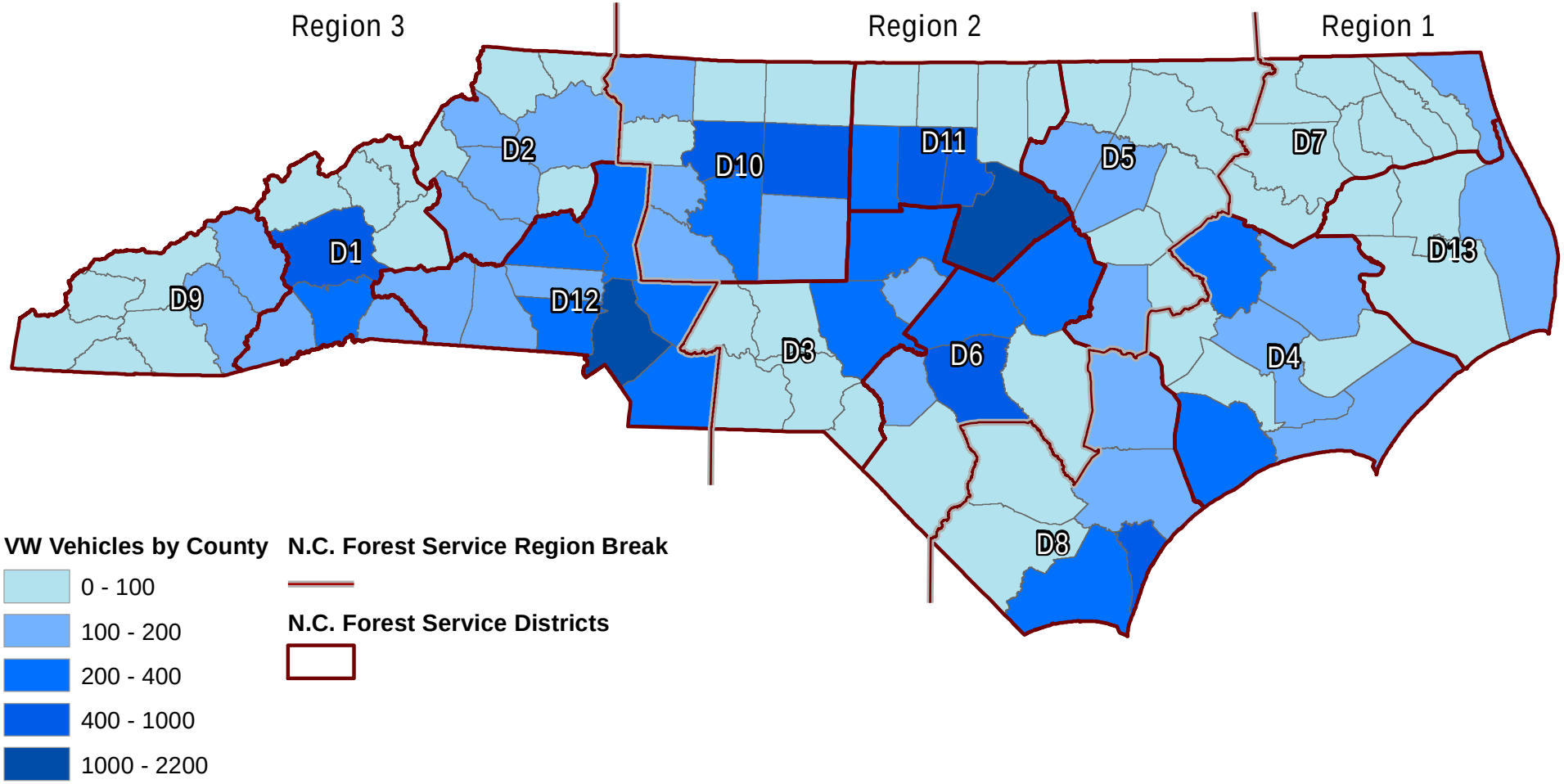
The North Carolina Forest Service (NCFS) owns, operates and maintains a fleet of equipment used to deliver forestry services across the state, such as wildfire mitigation and containment, forest management, and tree seedling production. The fleet includes over 400 pieces of heavy equipment, such as truck, crawler and farm tractors, backhoes, motor graders, skid steers, forklifts and others. It also includes smaller equipment such as water pumps, mowers and mulchers. The equipment is located at NCFS County, District and Regional offices statewide. The vast majority of equipment use is in rural areas serving North Carolina landowners as well as local governments, non-profits and public lands. The NCFS operates in all 100 North Carolina counties.

NCFS forest protection and forest management services provide significant environmental benefits to the state. Nationally, North Carolina ranks fifth in the annual number of wildfires and tenth in the percentage of forested land. In state fiscal year 2017, NCFS equipment was used to contain many of the 5,545 wildfires that burned 79,675 acres of the state, helping to limit the amount of carbon and other pollutants released into the air versus not using the equipment at all. During that time, the NCFS Forestation Program used some of the same equipment to perform wildfire fuel mitigation, stand improvement, and site preparation for tree planting and NCFS nurseries used farm tractors, refrigeration units and other equipment to grow approximately 16 million tree seedlings.

With an average age of approximately 21 years, NCFS equipment has not only become increasingly difficult to repair and maintain, but most pieces operate under Tier Zero emissions standards. NCFS seeks to mitigate its emissions output and improve and prolong the environmental benefits of its services by replacing its fleet with equipment that meet Tier Four Final standards. While the estimated cost of full replacement is approximately $84 million, NCFS equipment may qualify under both the VW Mitigation Settlement Trust EMA and DERA options. The estimated project cost under the EMA option is $31.1 million in 100% settlement funds and $18.5 million under the DERA option assuming a 35% settlement cost-share. Funds would be expended according to the NCFS equipment replacement priority list.

There are two attachments to this document. One is a spreadsheet showing all equipment that NCFS is seeking to replace with VW Mitigation Trust funds. The spreadsheet identifies, among other information, the NCFS Region (1 – Coastal Plain; 2 – Piedmont; 3 – Mountains) and county where the equipment is stationed to show how potential funding and environmental benefit would be distributed. Blank cells on the spreadsheet indicate that information was not immediately available. The other attachment is a map showing the number of registered VW vehicles within NCFS Districts and Regions.

VW Vehicle Distribution by NC County, NCFS District, and NCFS Region



CALL SIGN	REGION	DISTRICT	COUNTY	YEAR	FAS#	SERIAL#	ITEM	DESCRIPTION	PLATE#	MILES	Class	Class Title (local freight)	Engine Make (i.e. Cummins, Detroit, Cat, etc)	Engine Model Year	Fuel Type (Diesel / Gas)	Fuel Consumption Rate (mpg)	Annual Miles	EMA (1992-2009) / DERA (1995-2006)
R-183	1	FE	N/A	2008	30892	EBB5303	Ford	F-550	PK-8014	176005	5	Local Freight	International	2008	Diesel	9	17,600	EMA
R-184	1	FE	N/A	2006	32074	EA63729	Ford	F-450	PP-9091	15219	4	Local Freight	International	2006	Diesel	9	75800	EMA
810	1	8	N/A	2011	30268	1FDUF4HT9BEB96186	Mech Truck	F-450	PJ-5922	61505	4	Local Freight	FORD	2011	Diesel	11	8,786	EMA
811	1	8	N/A	2011	30267	1FDUF4HT7BEB96185	Mech Truck	F-450	PJ-5921	74985	4	Local Freight	FORD	2011	Diesel	11	9,373	EMA
812	1	8	N/A	2015	31749	1FDUF4HT5EC16603	Mech Truck	F-450	PP-7028	64125	4	Local Freight	FORD	2015	Diesel	11	21,357	EMA
R1-61	1	N/A	N/A	2017	32205	1FDUF4HTXHEB70592	Mech Truck	F-450 Ford	PP-9553	4,671	4	Local Freight	FORD	2017	Diesel	8.3		EMA
R1-62	1	N/A	N/A	2016	32201	1FDUF4HT6GEC86547	Mech Truck	F-450 Ford	PA-1657	3,290	4	Local Freight	FORD	2016	Diesel	8.3		EMA
R1-63	1	N/A	N/A	2011		1FDUF4HT9BEB96184	Mech Truck	F-450 Ford	PJ-5919	86,610	4	Local Freight	FORD	2011	Diesel	8.3		EMA
	1	R1HQ	N/A	1995	31784	1HTSCAN8TH272434	IHC JET Fuel Truck	IHC JET FUEL TRUCK	PP-7323	43115	7	Local Freight	IHC	1995	Diesel			EMA
	1	R1HQ	N/A	1997	527830	1HTSCAAN4WH527830	IHC AVGAS Truck	IHC AVGAS TRUCK	PJ-7514	56134	7	Local Freight	IHC	1997	Diesel			EMA
410	1	4	CRAVEN	2014	31465	1FDUFHT6EEA98382	Mech Truck	F-450	PP-3514	36187	4	Local Frieght	FORD	2014	Diesel	9.9	12062	EMA
4B81	1	4	PAMLICO	1983		1HSLCHYL5EHA19695	IHC 1800	BRIDGE TRUCK	PR-5799	109945	6	Local Frieght	IHC	1983	Diesel	6	113	EMA
4B71	1	4	ONSLOW	1978		HCA14576	IHC 1850B	BRIDGE TRUCK	PR-5573	36357	6	Local Frieght	IHC	1978	Diesel	5	115	EMA
4B72	1	4	ONSLOW	1985	NFC-160661	1HSLRTVROGHA12568	IHC 1800	BRIDGE TRUCK	PK-5279	178692	6	Local Frieght	IHC	1985	Diesel	6	110	EMA
4B73	1	4	ONSLOW	1988		1FDWK64PXKVA17792	FORD F600	BRIDGE TRUCK	PL-4112	9698	6	Local Frieght	FORD	1988	Diesel	6	118	EMA
4B21	1	4	BEAUFORT	1980	NFC-160506	1HAA185XBHA14442	IHC 1800	BRIDGE TRUCK	PN-7720	133223	6	Local Frieght	IHC	1980	Diesel	8	120	EMA
D-4E1	1	4	CRAVEN	1985	NFC-160667	1HTLLUYR6GHA32869	IHC 1900	ENGINE	PK-8714		6	Local Frieght	IHC	1985	Diesel	5	80	EMA
D-4E2	1	4	CRAVEN	1996		1HTSJAAROTH276146	IHC 1900	ENGINE	PJ-7978		6	Local Frieght	IHC	1996	Diesel	5	87	EMA
13-11	1	13	Hyde	2015	31748	1FDUF4HT3FEC16602	Mech Truck	F-450	PP7029	41000	4	Local freight	Ford	2015	Diesel	10	13600	EMA
13B1	1	13	D.O.	1994	FEPP	1FDXF80C2AVA08625	Ford (Single Axle)	BRIDGE TRUCK	PL-7172	35,075	7	Local freight	Ford	1992	Diesel	4	600	EMA
13B32	1	13	Hyde	1994			Ford F-800	Truck/Tractor	PL-7178	57,903	7	Local freight	Ford	1994	Diesel	4	600	EMA
13B41	1	13	Tyrrell	1986	181783	1HSLRTVR9GHA12620	IHC	Truck/Tractor	PJ-2879	182,807	7	Local freight	IHC	1986	Diesel	4	600	EMA
13B51	1	13	Washington	1993	FEPP		Ford (Single Axle)	BRIDGE TRUCK		27,255	7	Local freight	Ford	1993	Diesel	4	600	EMA
13X3 HU	1	13	D.O.	1989	NFC-160683	1HSSJZ6R7LH684042	IHC	6X6 T/T	PJ-5694	9360	7	Local freight	IHC	1989	Diesel	4	1200	EMA
13Engine1	1	13	D.O.	1991	NFC-160683	1HSSJN2R0MH388909	IHC	6X6 2100 gal. engine	PJ-5693	5,968	7	Local freight	IHC	1991	Diesel	4	2500	EMA
1-93	3	1	Transylvania	2007	29096	1FDXX47P77EA79132	FORD	F-450/Flatbed	Pk-4601	73,210	4	Local freight	Ford Power stroke	2007	Diesel	12.5	2223	EMA
D1T1	3	1	Buncombe	1997	29039	1FDXF80C5WVA11167	FORD	F-800 TANKER	PK-8772	3,255	7	Local freight	Ford	1997	Diesel	5	100	EMA
2-19	3	2	Dist.Staff	1988	029466	NFK0D2H-0325-13034	Kaiser 2 1/2 Ton	TANKER	PJ2853	24178	6	Local freight	White	1988	Diesel	4	834	EMA
2-53	3	2	burke	1972	181261	NK04CH053410623	Kaiser 2 1/2 Ton	TANKER	PJ1321	38931	6	Local freight	White	1972	Diesel	4	905	EMA
258	3	2	Caldwell	2010	030819	1HTMKAZNXBH332888	International	Type 4 Engine	PJ5309	32319	7	Local freight	MAXX Forc 330HP	2010	Diesel	5.5	4617	EMA
*2-10	3	2	Caldwell	2008	030679	1FDWF37R08EB94165	Mech Truck	F-550	PK8047	80917	5	Local freight	Ford Power Stroke	2008	Diesel	6.7	8990	EMA
*2-8	3	2	Caldwell	2015	031747	1FDUF4HT7FEC16604	Mech Truck	F-450	PP7027	20267	4	Local freight	Ford Power Stroke	2015	Diesel	10.2	10133	EMA
Type 5	3	9	D-9 DO	2007	30480	1FDXX47P27EA02023	TYPE 5	FORD F-450	PK-3825	78117	4	Local freight	Ford Power stroke	2007	Diesel	15	1819	EMA
TYPE 4	3	9	D-9 DO	1996	93052	1HTSEAAN5TH319154	International Incident Tru	TYPE 4	PJ-7557	1190.3	4	Local freight	International	1996	Diesel	10	1572	EMA
9-D1	3	9	D-9 DO	1995	181969	1FDXF80CXSVA56888	Dump Truck	FORD F800	PJ-3183	14560.9	7	Local freight	Cummins	1995	Diesel	8	100	EMA
Dump1	3	D12	MIESF	1988	1606766	1HTLFZWN8JH5950099	IHC	Dump tk 4x4	PJ-4232	18131	7	Local freight	DT360	1988	Diesel			EMA
F.W.	3	D12	F.W.	2001	30933	1FDAF56FX1ED34130	Mech Truck	F-550	PM-7970	81812	5	Local freight	Ford Power stroke	2001	Diesel			EMA
12.95	3	D-12	F.W.	1997	181918	1FDNF80C2WVA09609	FORD	F-800 STAKE BODY	PJ-6828	62248	7	Local freight	5.9 CUM	1997	Diesel			EMA
12E1	3	D-12	D-12	2000	29285	1HTSEAAN21H365912	International	4X4 4800 TYPE 4	PJ-5655	22679	6	Local freight	DT 466E	2000	Diesel			EMA
F.W.	3	D-12	F.W.	1995	181922	1FDXF80E6SVA73964	FORD	F-800 SERVICE TRUCK	PJ-3166	67808	7	Local freight	5.9 CUM	1995	Diesel			EMA
F.W.	3	F.W	F.W.	2008	29284	1FAF57R5ED69208	Mech Truck	F-550	PK-8702	29755	5	Local freight	Ford Power stroke	2008	Diesel	9		EMA
F.W.	3	FW	F.W.	1992	30930	1GBM7H1J4NJ108601	KODIAK	Stake body Dump	PJ-2177	78658	7	Local freight	3216 CAT	1992	Diesel			EMA
DX1	3	DSF	DSF	1993	509142	1HTSJPCROPH50P142	International	Dump Truck	PJ-5912	30818	7	Local freight	400 Cummings	1993	Diesel	5	1400	EMA
CHASE-1	3	DSF	DSF	2000	30542	1GBM7H1C1YJ521940	Chevy	C7500	Pm-3274	26901	7	Local freight	3208 Cat	2000	Diesel	6	1582	EMA
	2			2006		1HTMPAFM37H543886	International 4700	Type IV Engines		3899	7	Local freight	International	2006	Diesel			EMA
	2			2009		1HTJTSKM79H113307	Internatinal 4700	Type IV Engines		4321	7	Local freight	International	2009	Diesel			EMA
	2			2006		1HTMPAFMX7H543884	International 4700	Type IV Engines		3668	7	Local freight	International	2006	Diesel			EMA
	2			2006		1HTMMAAP27H519976	International 4701	Type IV Engines		3565	7	Local freight	International	2006	Diesel			EMA
CN	CO	GFC	Wayne	1991	30749	1GBM7H1J5HJ102255	Flatbed	Chevrolet Kodiak	PM-7721	88471	6	Local freight	CAT	1991	DIESEL	8	700	EMA
LRN	CO	LRN	Avery	1990	181533	1GBS7A4JXMJ104988	Flatbed	Chevrolet Kodiak Tandem	PJ-4291	50770	7	Local freight	Cat	1990	Diesel	5.5	1880	EMA
CN	CO	GFC	Wayne	1997	29063	1FTHX26G4VEB53490	Mechanic	Ford F250	PN-3326	96807	3	Local freight	International	1997	DIESEL	13	5378	EMA
5-E1	2	5	DO	1993	031-740	1FUCMZYB3PP529514	FREIGHTLINER	Type IV Engines	PP-3556		4	Local Freight	Detroit	1993	Diesel	8		EMA

CALL SIGN	REGION	DISTRICT	COUNTY	YEAR	FASE	SERIALE	ITEM	PLATER	Miles	Class	Class Title (Local Freight / All Diesel Hwy Vehicles)	Engine Make (Ex. Cummins, Detroit, Cat,	Engine Model	Year	Fuel Type (Diesel / Gas)	Fuel Consumption Rate (mpg)	Annual Miles	EMA (1992, 2009) / CERA (1995-2003)
FX7	1	N/A	N/A	2001	30886	2HSCHASR21C007881	International	PM-5840	782501	8	Local Freight	CAT	2001	Diesel	6.3	8500	EMA
FX5	1	N/A	N/A	1995	30900	2HSFBAERXSC028411	International	PR-3140	856313	8	Local Freight	Cummins	1995	Diesel	6.3	8500	EMA
FX4	1	N/A	N/A	1995	30901	2HSFBAERXSC034787	International	PR-3867	912581	8	Local Freight	Cummins	1995	Diesel	6.3	8500	EMA
BX23	1	8	Brunswick	2007	31827	1FVXALDJ007FY40207	FREIGHTLINER	PP-7416	11428	8	Local Freight	CUMMINS	2007	DIESEL	4	2086	EMA
BX24	1	8	Brunswick	2007	31829	1FVXALDJ007FY40174	FREIGHTLINER	PP-7418	5583	8	Local Freight	CUMMINS	2007	DIESEL	4	2507	EMA
BX51	1	8	Pender	2007	31834	1FVXALDJ05BPZ13055	FREIGHTLINER	PP-7415	8383	8	Local Freight	CUMMINS	2007	DIESEL	4	2762	EMA
BX43	1	8	Columbus	2007	31260	1FVXALDJ06BPZ60031	FREIGHTLINER	PJ-3789	15415	8	Local Freight	CUMMINS	2007	DIESEL	4	2401	EMA
BX61	1	8	Duplin	2007	31828	1FVXALDJ077FY40186	FREIGHTLINER	PP-7417	10834	8	Local Freight	CUMMINS	2007	DIESEL	4	2984	EMA
BX1	1	8	Columbus	1998	30375	4VGJDBGG3XN864830	Volvo	PN6782	53310	8	Local Freight	VOLVO	1998	DIESEL	4	3164	EMA
BX2	1	8	Columbus	1998	30285	4VGJDBGG4XN864172	Volvo	PN6714	68404	8	Local Freight	VOLVO	1998	DIESEL	4	3936	EMA
BX53	1	8	Pender	1998	30345	4VGJDBGG3WN864177	Volvo	PN6708	64600	8	Local Freight	VOLVO	1998	DIESEL	4	3552	EMA
BX31	1	8	Bladen	1998	30356	4VGJDBGGXWN864175	Volvo	PN6712	63891	8	Local Freight	VOLVO	1998	DIESEL	4	3555	EMA
BX32	1	8	Bladen	1998	30355	4VGJDBGG9WN864173	Volvo	PN6713	43227	8	Local Freight	VOLVO	1998	DIESEL	4	2406	EMA
BX52	1	8	Pender	1998	30392	4VGJDBGG1WN864176	Volvo	PN6709	47842	8	Local Freight	VOLVO	1998	DIESEL	4	2693	EMA
BX21	1	8	Brunswick	2002	30325	1FUALCG72LX018836	Freightliner	PM7240	47446	8	Local Freight	DETROIT	2002	DIESEL	4	3549	EMA
BX3	1	8	Pender	2006	30349	2HSCNAPR07C458141	INTERNATIONAL	PK4659	26416	8	Local Freight	CUMMINS	2006	DIESEL	4	2968	EMA
BX22	1	8	Brunswick	2006	30328	2HSCNAPR06C245101	INTERNATIONAL	PK1928	24785	8	Local Freight	CUMMINS	2006	DIESEL	4	2800	EMA
BX42	1	8	Columbus	2006	30379	2HSCNAPR86C245100	INTERNATIONAL	PK1926	25484	8	Local Freight	CUMMINS	2006	DIESEL	4	2539	EMA
BX41	1	8	Columbus	2007	30303	2HSCNAPR27C458142	INTERNATIONAL	PK4658	27137	8	Local Freight	CUMMINS	2007	DIESEL	4	3520	EMA
BX4	1	8	Pender	2008	30408	2FWJA3CX78AZ69424	Sterling	PK8911	14468	8	Local Freight	DETROIT	2008	DIESEL	4	2295	EMA
BLSF	1	N/A	N/A	2001	030593	1FUALCDS21XDJ1837	FREIGHTLINER	PM-7242	102982	8	Local Freight	DETROIT		DIESEL			EMA
BLSF	1	N/A	N/A	2000	AG0001606672	1HTGCAAR11H364457	INTERNATIONAL	PK-8932	52648	8	Local Freight	INT.		DIESEL			EMA
BLSF	1	N/A	N/A	1991	DOD 1861	1FUYMZY87NPS20902	FREIGHTLINER	PJ-6889	37147	8	Local Freight	DETROIT		DIESEL			EMA
TX31	1	7	Camden	2008	31830	1FVXALBD18PF13053	FREIGHTLINER	PP-7419	10723	8	Local Freight	CUMM	2008	DIESEL	5.4	1500	EMA
7X2	1	7	Pasquotank	1994	169912	4V1VDBRH1RN674139	VOLVO	PK-8068	349903	8	Local Freight	DETROIT	1993	DIESEL	6.3	1500	EMA
7X71	1	7	Martin	2006	31831	1FVXALDJ87FY40147	FREIGHTLINER	PP-7420	7792	8	Local Freight	CUMM	2006	DIESEL	5.4	1500	EMA
7X41	1	7	Chowan	2008	30177	2FWJA3CK48AZ69414	STERLING	PK-8909	34719	8	Local Freight	DETROIT	2008	DIESEL	6.1	1500	EMA
7X21	1	7	Bertie	2006	30226	2HSCNAPR56C245099	INTERNATIONAL	PK-1927	41642	8	Local Freight	CUMM	2006	DIESEL	6	1500	EMA
7X61	1	7	Hertford	2008	30176	2FWJA3CK28AZ69413	STERLING	PK-8905	21562	8	Local Freight	DETROIT	2008	DIESEL	5.9	1500	EMA
7X1	1	7	Pasquotank	2008	178542	2FWJA3CK58AZ69415	STERLING	PK-8910	27213	8	Local Freight	DETROIT	2008	DIESEL	6	1500	EMA
D7	1	7	DO	1992	1282	1HSLNZR2NH434242	I.H.C.	PJ-3796		8	Local Freight	CUMM	1992	DIESEL	5.7	1200	EMA
7B1	1	7	DO	2001	178588	1HTSCABN02H533990	INTERNATIONAL	PK-8313		8	Local Freight	CUMM	2001	DIESEL	5.4	1200	EMA
D-7-T	1	7	DO	1980	181816	4V1WDBCH15N700368	VOLVO	PJ-3108		8	Local Freight	CAT	1994	DIESEL	5.8	1200	EMA
D7	1	7	DO	1983	181782	1FDZU3DE4RWA13892	FORD	PJ-2867		8	Local Freight	CAT	1993	DIESEL	5.2	1200	EMA
R1X6	1	N/A	N/A	1993	181817	1FDZU3DX5PVA06978	Ford	PJ-3109	33,935	8	Local Freight	Cat	1993	Diesel	6	5,000	EMA
R1X8	1	N/A	N/A	1994	169250	4V1VDBRH8RN674137	Volvo	PK-1500	375,234	8	Local Freight	Detroit	1994	Diesel	6	5,000	EMA
R1X5	1	N/A	N/A	1994	181867	1FDZU90X1RVA13901	Ford	PJ-3115	74,151	8	Local Freight	Cat	1994	Diesel	6	5,000	EMA
Reg 1	1	N/A	N/A	2007	31799	1FVXALJ0X7PX66575	Freightliner	PP-7321	9,789	8	Local Freight	Cummins	2007	Diesel	6	3,000	EMA
Reg 1	1	N/A	N/A	2007	32073	1FVXALJ0X8PF23066	Freightliner	PP-9090	11,496	8	Local Freight	Cummins	2007	Diesel	6	3,000	EMA
4X21	1	4	Beaufort	2008	178548	2FWJA3CKX8AZ69420	STERLING	PK-8907	13496	8	Local Freight	Detroit	2008	Diesel	3.5	1997	EMA
4X22	1	4	Beaufort	2008	178546	2FWJA3CK88AZ69416	STERLING	PK-8908	12821	8	Local Freight	Detroit	2008	Diesel	3.5	2480	EMA
4X31	1	4	Carteret	2006	31833	1FVXALJ057PY40171	FREIGHTLINER	PP-7422	70614	8	Local Freight	Cummins	2006	Diesel	2.5	1024	EMA
4X32	1	4	Carteret	2008	178549	2FWJA3CK18AZ69421	STERLING	PK-8917	14361	8	Local Freight	Detroit	2008	Diesel	3.5	2106	EMA
4X41	1	4	Craven	2008	29816	2FWJA3CKX8AZ69417	STERLING	PK-8906	12009	8	Local Freight	Detroit	2008	Diesel	3.5	2350	EMA
4X1	1	4	DO	2006	29755	2HSCNAPR96C263890	INTERNATIONAL	PK-1946	19648	8	Local Freight	Cummins	2006	Diesel	3.5	3386	EMA
4X51	1	4	Jones	2007	31832	1FVXALJ0037PY40184	FREIGHTLINER	PP-7421	5708	8	Local Freight	Cummins	2007	Diesel	2	1774	EMA
4X61	1	4	Lenoir	2007	31685	1FVXALJ077PY66901	FREIGHTLINER	PP-6487	14358	8	Local Freight	Cummins	2007	Diesel	2	1126	EMA
4X71	1	4	Onslow	2007	31683	1FVXALJ17PY40197	FREIGHTLINER	PP-6485	10349	8	Local Freight	Cummins	2007	Diesel	2	1370	EMA
4X72	1	4	Onslow	2007	31262	1FVXALJ004BPZ73618	FREIGHTLINER	PJ-3797	15891	8	Local Freight	Cummins	2007	Diesel	2	1256	EMA
4X73	1	4	Onslow	1998	135076	4VGJDBGGXWN864174	VOLVO	PW-6711	42965	8	Local Freight	Volvo	1998	Diesel	3	2355	EMA
4X81	1	4	Pamlico	1999	135082	4VGJDB6G5XN864831	VOLVO	PN-6781	49323	8	Local Freight	Volvo	1999	Diesel	3	2996	EMA
4X11	1	4	Pitt	2007	31684	1FVXALJ038PZ13023	FREIGHTLINER	PP-6486	18152	8	Local Freight	Cummins	2007	Diesel	2	2084	EMA
4B31	1	4	Carteret	1978		CJ938V133600	CHEVY	PX-9152	62961	8	Local Freight	Detroit	1978	Diesel	4	87	EMA
4B41	1	4	Craven	1979	110584	C49CH9V149233	CHEVY	PW-6539	67754	8	Local Freight	Detroit	1979	Diesel	4	112	EMA
4B51	1	4	Jones	1978		CJ938V133601	CHEVY	PZ-9016	62967	8	Local Freight	Detroit	1978	Diesel	4	76	EMA
4X2	1	4	DO	1986	29834	1HSZBJMR6GHA34790	INTERNATIONAL	PK-6870	97093	8	Local Freight	Cummins	1986	Diesel	4	87	EMA
4X3	1	4	DO	1991	29818	1HSGGERROMH299816	INTERNATIONAL	PT-9144	91122	8	Local Freight	Cummins	1991	Diesel	4	92	EMA
13X1	1	13	DO	2008	29372	2FWJA3CK18HZ69418	Sterling	PK-8959	24549	8	Local Freight	Detroit	2007	Diesel	5	1500	EMA
13X2	1	13	DO	2008	31263	1FVXALD048PZ60027	Freightliner	PJ-3795	13407	8	Local Freight	Cummins	2008	Diesel	5	1302	EMA
13X21	1	13	Dare	2007	31800	1FVXALJ0X7PY40201	Freightliner	PP-7193	5430	8	Local Freight	Cummins	2007	Diesel	5	540	EMA
13X32	1	13	Hyde	2008	29373	2FWJA3CK38AZ69419	Sterling	PK-8957	22907	8	Local Freight	Detroit	2007	Diesel	5	2784	EMA
13X41	1	13	Tyrrell	1993	127808/29429	2HSFBHCR3PC075521	INTERNATIONAL	PS-7764	93769	8	Local Freight	Cummins	1993	Diesel	5	416	EMA
13X51	1	13	Washington	2008	31261	1FVXALD098PZ73629	FREIGHTLINER	PJ-7401	22820	8	Local Freight	Cummins	2008	Diesel	5	810	EMA
13X61	1	13	DBR	2001	NA	2HSCNASRX1C007880	INTERNATIONAL	PM-5098	60850	8	Local Freight	Detroit	2001	Diesel	5	3803	EMA
13X62	1	13	DBR	2003	NA	2FZJAZG03AL87014	Sterling	PL-2108	31937	8	Local Freight	Cummins	2003	Diesel	5	2285	EMA
13X63	1	13	DBR	2014	NA	3AKJGND69FDFY0113	FREIGHTLINER	PP-3753	6900	8	Local Freight	Cummins	2014	Diesel	5	2300	EMA
13X64	1	13	DBR	2012	NA	1FUJGEBG1CLBK4395	Freightliner	PJ-6824	15699	8	Local Freight	Cummins	2012	Diesel	5	3140	EMA
13X65	1	13	DBR	2008	NA	2FWJA3CK18AZ86218	Sterling	PL-8325	24457	8	Local Freight	Cummins	2008	Diesel	5	3717	EMA
13X66	1	13	DBR	2015	NA	3AKJGND64FDGT7938	FREIGHTLINER	PP7199	2227	8	Local Freight	Cummins	2015	Diesel	5	1113	EMA
13 HU 1	1	13		1992	None	1FUYMZY83NPS20930	Freightliner	PJ-6898	44,535	8	Local Freight	Detroit	1992	Diesel	6	600	EMA
13 HU 2	1	13		1992	NFC1606839	1FUYMZY82NPS20984	Freightliner	PJ-6899	44,492	8	Local Freight	Detroit	1992	Diesel	6	600	EMA
1x1	3	1	DO	1990	29044	1HTGDGRR2MH299814	International	PT-9142	77217	8	Local Freight	Detroit NTC-350 Cummins ISX-500	1990	Diesel	5.5	2100	EMA
1x2	3	1	DO	2006	29032	2HSCNAPR36C263889	International	PK-1945	43230	8	Local Freight	Cummins NTC-400	2006	Diesel	6.5	2000	EMA
1x4	3	1	DO	2007	31266	1FVXADDDBPZ60039	Freightliner	PJ-7510	10928	8	Local Freight	Cummins NTC-400	2007	Diesel	5	3050	EMA
2X1	3	2	DO	2007	031268	1FVXALD038PZ73609	Freightliner	PJ7527	22391	8	Local Freight	Cummins 3406-B CAT-425	2007	Diesel	5	2239	EMA
2X2	3	2	Wilkes	1992	028485	4V1CDBCHNNN648579	Volvo	PS3985	112946	8	Local Freight	3406-B CAT-425	1992	Diesel	4	4517	EMA
2X3	3	2	DO	1992	028484	4V1CDBCHNNN648578	Volvo	PS3986	127333	8	Local Freight	3406-B CAT-425 NTC-400	1992	Diesel	5.5	5093	EMA
2x2R 9X1 (HAULER)	3	2	DO	2007	32387	1FVXALD08BPZ13065	Freightliner	PA-1252	5282	8	Local Freight	Cummins	2007	Diesel	5	528	EMA
	3	9	DO	1999	30499	4VHJCAGGDXN866253	Volvo	PN-8553	58221	8	Local Freight	Volvo	1999	Diesel	5	1500	EMA
9X2	3	9	DO	2011	30457	1NKDL49X8BJ279595	Kenworth	PJ-3189		8	Local Freight	Cummins	2011	Diesel	7	1600	EMA
9X3	3	9	Haywood	2005	89027	1FVKBXAF75DJB9027	FREIGHTLINER	PP-6264	34718	8	Local Freight	Caterpillar	2005	Diesel	4	4984	EMA
9X4 (HAULER)	3	9		2007	31269	4FVHAUD038PZ73612	FREIGHTLINER	PJ-7561	10235	8	Local Freight	Cummins NTC-400	2007	Diesel	6	50	EMA
B1	3	BRIDGE	N/A	1985	030632	1FDYU90R1FVA50049	FORD	PV-5446	90026	8	Local Freight	Cummins 6V-92 DETROIT NTC-400	1985	Diesel	4		EMA
0x1	3	DESF		2006	32012	1FVHAU0007PH66870	Freightliner	PP-9410	14185	8	Local Freight	Cummins NTC-400	2006	Diesel	5	1290	EMA
12X2H	3	12	Union	2007	31826	1FVXALJ001?PY40183	Freightliner	PP-7414	10620	8	Local Freight	Cummins	2007	Diesel	5		EMA
F.W.	3	12		1992	29309	4V1CDBCHZNN648581	Volvo	PS-3988	134531	8	Local Freight	3406-B CAT NTC-400	1992	Diesel	5		EMA
12x1H	3	12	DO	2007	31825	1FVXALJ005BPZ12973	Freightliner	PP-7413	9341	8	Local Freight	Cummins ISX-500	2007	Diesel	5		EMA
12x1H Big Dump	3	12	DO	2006	29282	2HSCNAPRX7C458146	International	PK-4657	54605	8	Local Freight	Cummins	2006	Diesel	5.5		EMA
	3			1987	31255	1HSLLDCRGJH1523167	International	PJ 6998	10877	8	Local Freight	IHT DT 360 NTC-400	1987	Diesel	6		EMA
12x6H	3	12	DO	2007	31325	1FVXALJ006BPZ60045	Freightliner	PJ-9206	23175	8	Local Freight	Cummins Volvo	2007	Diesel	5		EMA
F.W.	3	12		1995	31242	4V1JDBGF25NB42912	White GMC	PJ-6715	35250	8	Local Freight	RTV12.E Detroit 60-series NTC-350	1995	Diesel	5		EMA
R3X1	3			2003	158548	2FZJAZCGX3AL10344	Sterling	PM-9395	126993	8	Local Freight		2002	Diesel	5.5		EMA
R3-DT1	3	DESF		1986	31135	1HTZPJMR8GHA44198	International	PV-7505	88,682	8	Local Freight	Cummins NTC-400	1986	Diesel	5		EMA
R3-DT2	3	DESF		2007	31311	1FVXALJ009BPZ73632	Freightliner	PJ-7964	15,354	8	Local Freight	Cummins	2007	Diesel	5		EMA
3x67	2	3	Moore	2006	32133	1FVXALJ017PY60149		PA1086		8	Local Freight	cummins	2006	diesel			EMA
3x25	2	3	Anson	2007	32134	1FVXALJ017PY4202		pa-1087		8	Local Freight	cummins	2007	diesel			EMA
E3B2	2	3		1999	31259	505445		PJ-3800		8	Local Freight	cat	1999	diesel			EMA
3X05	2	3	Stanly	2002	27396	2FWJA2AS24A54056		PJ-7984		8	Local Freight	cat	2002	diesel			EMA
3X15	2	3	DO	2006	29583	2HSCNAPR16C245097		PK-1498		8	Local Freight	cummins	2006	diesel			EMA
3X45	2	3	Lee	2007	29635	2HSCNAPR07C458137		PK-4653	32842	8	Local Freight	cummins	2007	diesel			EMA
3X77	2	3	Richmond	2007	29676	2HSCNAPR27C458139		PK-4661	49343	8	Local Freight	cummins	2007	diesel			EMA
3X55	2	3	Montgomery	2007	29645	2HSCNAPR07C458138		PK-4662		8	Local Freight						EMA
3X75	2	3	Richmond	2008	29679	2FWJA3CK98AZ69411		PK-8916	60725	8	Local Freight	detroit	2008	diesel			EMA
3X65	2	3	Moore	2008	29666	2FWJA3CK78AZ69410		PK-8958	47724	8	Local Freight	detroit	2008	diesel			EMA
3X35	2	3	Chatham	2008	29623	2FWJA3CKOBAAZ69412		PK-8930		8	Local Freight	detroit	2008	diesel			EMA
3X85	2	3	Scotland	2000	29689	4V4GD2JH4YN520802		PN-2381	64130	8	Local Freight	cummins	2000	diesel			EMA
E32	2	3		1986		NLOHWPC52306475		PP-1434		8	Local Freight	cummins	1986	diesel			EMA
OLD 3X67	2	3		1995	29653	1FUYFMDB45H552831		PR3860	95570	8	Local Freight	cummins	1995	diesel			EMA
x83X25	2	3		1994	29605	1FVXFCYB6RHE06359		PS-9551		8	Local Freight	cummins	1994	diesel			EMA
3X17	2	3	DO	1994		4V1VDBRH8RN674140		PL-4121		8	Local Freight	detroit	1994	diesel			EMA
xb-1	2			1984	1605041	IHTAA1604YA212208				8	Local Freight	int.	1984	diesel			EMA
5X15	2	5	DO	2007	029-916	2HSCNAPR67C458144	International	PK-4654	35,792	8	Local Freight	Cummins	2007	Diesel			EMA
5X25	2	5	Edgecomb	2008	031-265	1FVXJD008PZ60011	Freightliner	PJ-7513	18,020	8	Local Freight	Detroit	2008	Diesel			EMA
5X35	2	5	Franklin	2001	029-941	1FUALCG52J4D1835	Freightliner	PM-7241	75,856	8	Local Freight	Detroit	2001	Diesel			EMA
5X55	2	5	Halifax	2008	029-972	2FWJACK08AZ69426	Sterling	PK-8912	22,845	8	Local Freight	Cat	2008	Diesel			EMA
Spare	2	5		1993	029-981	2HSFBHCR2PC075323	International	PS-7766	96,473	8	Local Freight	Cummins	1993	Diesel			EMA
5X85	2	5	Wayne	2007	029-998	2HSCNAPR47C458143	International	PK-4655		8	Local Freight	Cummins	2007	Diesel			EMA
5X93	2	5	Warren	2007	031-757	1FVXALJ003BPZ13037	Freightliner	PP-7103	10,538	8	Local Freight	Cummins	2007	Diesel			EMA
5X97	2	5	Wilson	2007	031-878	1FVXALJ00X7PY40165	Freightliner	PP-7438	13,977	8	Local Freight	Cummins	2007	Diesel			EMA
Spare	2	5		1993	030-013	1HSFBHCROPC075322	International	PS-7765	83,432	8	Local Freight	Cummins	2007	Diesel			EMA
5x75	2	5	Northampton	2007	031-877	1FVXALJ008?PY40200	Freightliner	PP-7394		8	Local Freight	Cummins	2007	Diesel			EMA
Spare	2	5		1989	029-932	1HSZBG2R6KH614388	International	PT-4853	89,562	8	Local Freight	Cummins	1989	Diesel			EMA
6X1	2	6	DO	2007	30137	2HSCNAPR97C458140	International	PK4660	51545	8	Local Freight	Cummins	2007	Diesel			EMA
6X25	2	6	Cumberland	2008	30051	2FWJA3CK38AZ69422	Sterling	PK8914	29368	8	Local Freight	Detroit	2008	Diesel			EMA
6X27	2	6	Cumberland	2007	31880	1FVXALJ028PZ13028	Freightliner	PP7342	13170	8	Local Freight	Cummins	2007	Diesel			EMA
6X35	2	6	Harnett	2008	30061	2FWJA3CK58AZ69423	Sterling	PK8956	31470	8	Local Freight	Detroit	2008	Diesel			EMA
6X45	2	6	Hoke	2007	31879	1FVXALD007?PY40172	Freightliner	PP7341	7953	8	Local Freight	Cummins	2007	Diesel			EMA
6X55	2	6	Johnston	2007	31267	1FVXALD0X8PZ73610	Freightliner	PJ7508	18760	8	Local Freight	Cummins	2007	Diesel			EMA
6X65	2	6	Robeson	1999	30092	4VGJDBGGXNB67724	Volvo	PN9609	97860	8	Local Freight	Volvo	1999	Diesel			EMA
6X67	2	6	Robeson	2006	30100	2HSVNAPR36C245098	International	PK1499	45667	8	Local Freight	Cummins	2006	Diesel			EMA
6X75	2	6	Sampson	2006	31881	1FVXALJ005?PY66864	Freightliner	PP7340	6032	8	Local Freight	Cummins	2006	Diesel			EMA
6X77	2	6	Sampson	1998	30109	4VGJDBGG5WN864178	Volvo	PN6710	73809	8	Local Freight	Volvo	1998	Diesel			EMA
Reg 2X1	2			2006	32390	1FVXALD007?PY66884	Freightliner	PP9665	9437	8	Local Freight	Cummins	2006	Diesel			EMA
R2	2			1994	30064	FUYFCYB5RHE063620	Freightliner	PJ9550	91831	8	Local Freight	Cummins	1994	Diesel			EMA
R2	2			1994	30105	FUYFCYB3RHE063621	Freightliner	PJ9553	58091	8	Local Freight	Cummins	1994	Diesel			EMA
10x1	2	10	DO	2007	0 31258	1FVXALD008BPZ73623	Truck tractor	PJ7438	27650	8	Local Freight	CUMMINS	2007	DIESEL	5	10	EMA
10x2	2	10		2006	0 32350	1FVXALJ00X7PY66861	Truck tractor	PP9615	6997	8	Local Freight	CUMMINS	2006	DIESEL	5	5	EMA
10x33	2	10	Davidson	2006	0 29146	2HSCNAPR87C458145	Truck tractor	PK4656	59775	8	Local Freight	CUMMINS	2006	DIESEL	5	5434	EMA
10x57	2	10	Randolph	2008	29167	2FWJA3CK08AZ69409	Truck tractor	PK8915	40510	8	Local Freight	DETROIT	2008	DIESEL	5	6000	EMA
MRB	2	10	Davidson	2007	0 31257	1FVXALD078P?73614	Truck tractor	PJ7437	13351	8	Local Freight	CUMMINS	2007	DIESEL	5	5	EMA
M915-A5	2			2010	NOT ASSIGNED	1FUJATCG38LAZ53119	Truck tractor	n/a	4300	8	Local Freight	DETROIT	2010	DIESEL	5	N/A	EMA
11X1	2	11	DO	2008	029211	2FWJA3CK98AZ69425	Sterling	PK-8913	33364	8	Local Freight	Detroit	2008	Diesel	8	3000	EMA
11X35	2	11	Caswell	1999	029224	4VGJDBGG6XN867723	Volvo	PN-9608	62189	8	Local Freight	Volvo	1999	Diesel	8	3000	EMA
11X55	2	11	Granville	2007	031824	1FVXALJ0027PY66871	Freightliner	PP-7412	10315	8	Local Freight	Cummins	2007	Diesel	8	3000	EMA
11X95	2	11	Wake	2007	031400	1FVXALJ004BPZ73635	Freightliner	PP-2819	15716	8	Local Freight	Cummins	2007	Diesel	8	2500	EMA
R2	2			1985	189477	1FUPYDYB2FH267891	Freightliner	PJ-6806		8	Local Freight	Cummins	1985	Diesel			EMA
CN	N/A	N/A	Wayne	2001	27231	2HSCEAXR01C012157	International	PM-5097	40207	8	Local Freight	CAT	2001	Diesel	6	3300	EMA
CN	N/A	N/A	Wayne	1999	30746	2HSPHAMRBRCD53638	International	PM-5137	359016	8	Local Freight	International	1999	Diesel	5	19950	EMA
L8N	N/A	N/A	Avery	2007	31277	1FVXALJ006BPZ73622	Freightliner	PJ-7919	40034	8	Local Freight	Cummins	2007	Diesel	9	4000	EMA

CALL SIGN	REGION	DISTRICT	COUNTY	YEAR	FAS#	SERIAL#	ITEM	DESCRIPTION	Miles/Hours	Engine Make (i.e. Cummins, Detroit, Cat, etc)	Engine Model Year	Fuel Type (Diesel / Gas)	Fuel Consumption Rate (mpg / gph)	Annual Miles / Hours	EMA (2009+) / DERA (1995-2006), Forklift (no yr requirement)
None Assn	3	1	D1	1977	NA	901075	Wiggins	Forklift(10K)	2047	HUK	1977	DIESEL	1	6	EMA
LIFT KING	3	2	D2	1988		LK87322	LIFTKING 10,000LBS	FORKLIFT	294	4BT Cummins	1988	Diesel	3	10	EMA
HYSTER	3	2	Wilkes	1996		F006G03183T	Hyster 10,000Lbs	FORKLIFT	634	Perkins	1996	Diesel	4	30	EMA
9F3	3	9	DO D9	1991	606227	F605434M	WHISTLER-10000LB	FORKLIFT (RT)	1383.6	Perkins	1991	Diesel	2	20	EMA
	3	DSF	DSF			FOO6G06716N	Hyster	10K Fork Lift	3277 hrs	Perkins		Diesel	1 gph	unkwn	EMA
	1	7	D.O.	1990		F006G04498L	HYSTER	10K FORKLIFT		PERKINS	1990	Diesel	2	24	EMA
	1	7	D.O.	1968		LT-1923	ANTHONY	10K A/T FORKLIFT		DETROIT	1968	Diesel	4	24	EMA
	1	7	D.O.	1991		DW544ER532741	JOHN DEERE	10K FORKLIFT		JD	1991	Diesel	4	24	EMA
	1	R1HQ	N/A	2005		10KA1709	SkyTrac 10,000 LB AT	10K Forklift	2515	Duetz	2005	Diesel			DERA
	1	R1HQ	N/A	2011		657805	Terex 6,000 LB AT	6K Forklift	53	Perkins	2011	Diesel			EMA
	1	R1HQ	N/A	2005		H177B56451C	Hyster 6,000 LB	6K Forklift	1551	Cummins	2005	Diesel			DERA
Forklift #1	1	13	D.O.	1991	29392	535479	John Deere 544E	10K LB. All Terrain Forklift	3039	John Deere	1991	Diesel	1	120	DERA
Forklift #2	1	13	D.O.		29393	E177B22996V	Yale	6K LB. Forklift	3519	Cummins	NA	Diesel	1	150	DERA
	2	5	DO		191-177	544E	John Deere	Forklift	4695	JD					EMA
	2	10	Davidson	2005	1606288	6000M2E1709	n/a	Skytrac Forklift	1386	John Deere	1992	Diesel	3	20	EMA
	2	10	Davidson		2943	61532	n/a	Toyota Forklift	673.4	toyota		Diesel	2	50	EMA
	2			1991	2472	D1M10F7-686	Lull forklift	10K all terrain forklift	600		1991	Diesel		30	EMA
Nursery	N/A	N/A	Wayne	2002	DOD	O456	Terex TX51	Telescopic Forklift	78	Perkins	2002	Diesel	5.5	5	DERA
	2	6	DO	1991	535434	FFP2496	John Deere	Fork Lift		JD	1991	Diesel			EMA

CALL SIGN	REGION	DISTRICT	COUNTY	YEAR	FAS#	SERIAL#	ITEM	DESCRIPTIO	PLATE#	MILES	Class	Class Title (local freight)	Engine Make (i.e. Cummins, Detroit, Cat, etc)	Engine Model Year	Fuel Type (Diesel / Gas)	Fuel Consumption Rate (mpg)	Annual Miles	EMA (1992-2009) / DERA (1995-2006)
B-31	3	BRIDGE	BURKE	1999	030656	1CJAA6YCF7	REIGHTLINE	25 PASS BU	PM-2379	20108	7	Local freigh	CAT	1999	Diesel	7		EMA
B-32	3	BRIDGE	BURKE	2000	030653	AXAK51CH4	REIGHTLINE	25 PASS BU	PM-3282	34609	7	Local freigh	CAT	2000	Diesel	7		EMA