clean AIRE nc HEALTH

Clean Construction Toolkit

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MAHA

Medical Advocates for Healthy Air

Dear Healthcare Professional,

April 23, 2018

Healthcare systems regularly undergo construction to address the needs of the community and improve the care they provide. Every day, individuals from all walks of life visit hospitals and care facilities. It may be for their own healthcare, to visit someone they know undergoing treatment, or to go to work. When people walk by construction sites they are exposed to diesel exhaust and other air pollutants that cause adverse health outcomes and exacerbate ongoing health conditions. We would like to invite your health care system to join our Clean Construction Partnership to substantially reduce diesel pollution at your construction sites and improve public health.

The combustion of diesel fuels produces particulate matter, a toxic blend of fine and microscopic particles, and nitrogen oxides, a component of smog and a particulate matter precursor. Diesel particulate matter may linger in the atmosphere around the combustion area, such as a construction site, contaminating the air and resulting in exposure long after the machines are turned off.

Particulate matter poses a significant health risk as some of the particles are small enough to evade the body's respiratory protections, enter deep into the lungs and pass into the bloodstream impacting the cardiovascular system. Both short- and long-term exposure to particulate matter has been shown to have adverse health effects. Exposure to these particles threatens the health of hospital staff, patients and visitors.

The Medical Advocates for Healthy Air (MAHA) Clean Construction Partnership aims to reduce particulate matter exposure and its adverse health effects on the health of the patients and care team by adopting clean construction standards. Novant Health and Atrium Health have already joined the partnership and implemented the standards by requiring the use of EPA Tier 4 low emission equipment and discouraging unnecessary idling.

MAHA, along with Novant Health and Atrium Health asks that you join this partnership and protect the health of your patients, health care workers, construction workers and surrounding community.

Sincerely,

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Clean Air Carolina

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THE CASE FOR CLEAN CONSTRUCTION

Diesel engines are used to power almost all construction activities. Construction sites at healthcare facilities expose staff, patients, visitors, vendors, neighbors, and construction workers to air pollution emitted by diesel engines. While many healthcare facilities have implemented environmental controls such as smoking bans to limit exposure to air pollution, air toxics emitted by diesel engines have largely been overlooked.

Environmental Protection Agency (EPA) regulations, adopted in 2007 and 2010, require that diesel engines contain controls to reduce emissions of air pollution by 90%. However, the durability of construction equipment means that older diesel engines will still be in use for decades. The differentiation in air toxics emissions between dirty and clean construction equipment provides hospitals and health-care facilities with the opportunity to protect human health by requiring contractors to follow clean construction site standards.

PM EXPOSURE

The combustion of diesel fuels produces particulate matter (PM), a toxic blend of fine and microscopic particles, and nitrogen oxides (NOx), a PM precursor. Diesel PM contains over 40 materials that are designated air toxics by the EPA. Humans may be exposed to both primary and secondary sources of PM as these microscopic particles are released directly by diesel engines and also form as the result of reactions between precursors in the atmosphere, including NOx. Diesel PM may linger in the atmosphere around the combustion area, contaminating the air and resulting in exposure long after the machines are in use.

Particulate matter poses a significant health risk as the particles are small enough to enter deep into the lungs and pass to the bloodstream. Both short- and long-term exposure to PM has been shown to have negative health effects. Therefore, exposure to these particles threatens the health of hospital staff, patients, visitors, vendors, neighbors, and construction workers.

HEALTH EFFECTS OF PM EXPOSURE

- Irritation of eyes, nose, throat, and lungs
- Respiratory effects including coughing, wheezing, aggravation of existing respiratory conditions such as COPD or asthma, lung inflammation, reduction in lung capacity
- Nausea and vomiting
- Neurological effects including headaches, numbness, weakness, and dizziness
- Cardiovascular effects such as heart attack, heart disease, and stroke
- Lung cancer
- Reproductive and developmental harm

AT-RISK POPULATIONS

Those most at-risk populations to the short- and long-term health effects of diesel pollution include children, the elderly, and those with preexisting asthma, heart or lung disease, or other respiratory problems. Children are particularly at-risk because they breathe in 50% more air per pound of body weight than adults. Given that the most at-risk populations represent a significant proportion of hospital and healthcare patients and visitors, clean construction regulations should be implemented to protect the health and safety of vulnerable individuals.

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RECOMMENDED CLEAN CONSTRUCTION STANDARDS FOR HOSPITALS AND BUSINESSES

Since diesel engines are a major contributor to both ground-level ozone pollution and particulate matter (PM) pollution, the U.S. Environmental Protection Agency (EPA) adopted rules in 1994 to reduce emissions from on-road and off-road diesel engines. These rules phased in new engine standards based on horsepower over a sixteen-year period. Engines manufactured in 2007 for on-road vehicles such as trucks and buses, and engines manufactured in 2010 for off-road equipment including bulldozers, forklifts and excavators had to meet EPA Tier 4 standards. All newly manufactured engines in 2014 had to meet what EPA called Tier 4 Final standards.

Pollution reductions between 1996 and 2014 were extraordinary—approximately 96% for both particulate matter (PM) and oxides of nitrogen (NOx), a major contributor to smog (see graphic). These new standards represented a major win for cleaner air and better public health. But since diesel engines can last up to 30 years, many older diesels will continue to pollute for decades. That's where Clean Construction Standards come in.

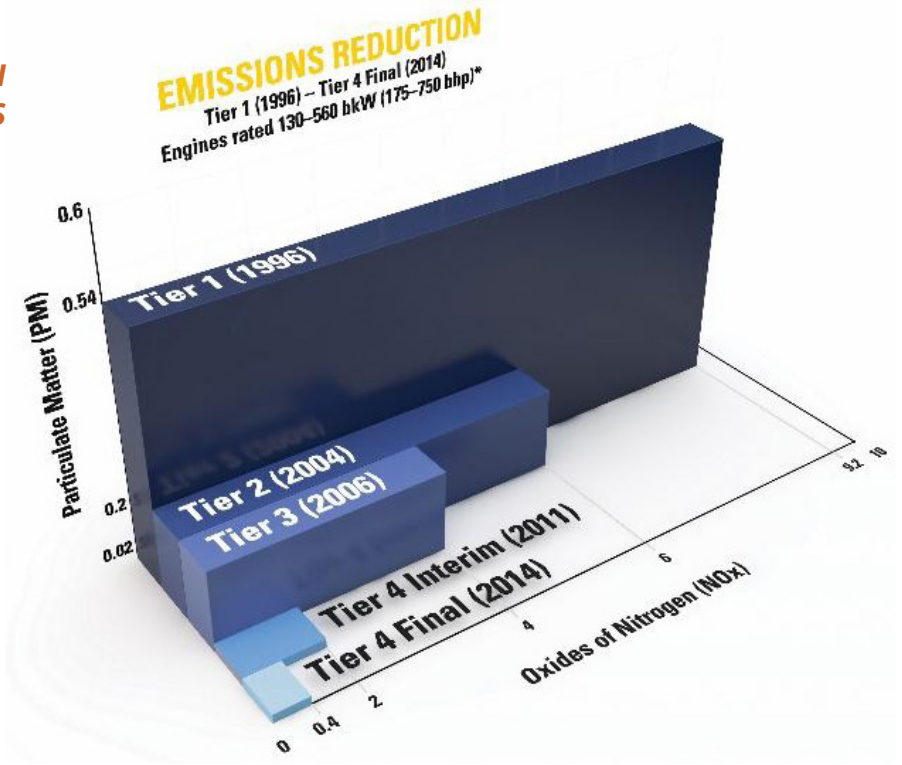
RECOMMENDATION #1:

To improve air quality, Clean Air Carolina is encouraging hospital systems and other businesses to require all off-road equipment used on construction projects meet Tier 4 Final standards. It's easy to confirm Tier 4 Final standards using the Determining Tier Level chart in this toolkit as long you know the engine's horsepower and model year.

RECOMMENDATION #2:

To further improve air quality, require operators of off-road equipment to reduce unnecessary idling through education, installation of signage and a penalty system.

A SAMPLE FACILITY STANDARD WHICH INCLUDES BOTH RECOMMENDATIONS CAN BE FOUND IN THIS TOOLKIT.



CLEAN CONSTRUCTION

DIESEL EMISSION REDUCTION STANDARDS FOR CONSTRUCTION PROJECTS

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1. **Applicability**: This guide applies to any person or business that owns or operates any diesel fueled compression ignition vehicle engine, 25 horsepower or greater, that is used to provide motive power at any _____ construction site or project location.
2. No vehicle or engine subject to this standard shall idle for more than five consecutive minutes, except as allowed below. The idling limit does not apply to:
   - Idling necessary to ensure the safe operation of equipment, including idling to ensure the equipment is in safe operating condition and equipped as required by provisions of law, either as part of daily equipment inspection or as is otherwise needed;
   - Idling required to bring the machine system to operating temperature;
   - Idling when queuing if said queuing requires intermittent movement forward to perform work or a service, when shutting the engine off would impede the progress of the work, or would otherwise be impractical to the queuing. This does not include the time an operator may wait motion less in line before the start of the workday or prior to the opening of a location where work or service will be performed; or
   - Idling of any vehicle being used in an emergency or public safety capacity.
3. Idling of a vehicle or engine that's is owned by a rental company or third party is the responsibility of the renter, lessee, or other responsible operator.
4. Equipment subject to this standard must be located away from sensitive receptors (building fresh air intakes, entrances to facilities, enclosed occupied areas, etc.).
5. Equipment subject to this standard is required to meet or be modified to meet Tier 4 Emission Requirements as set forth by the EPA.
6. **Enforcement:** It shall be incumbent upon the General Contractor to keep appropriate logs and data to validate the enforcement of this standard. For the purpose of inspecting and reporting equipment or to question compliance with these regulations, any individual has the right to observe, inquire and report any perceived violation of this standard.
7. **Penalties:** Violations of this standard are subject to the following:
   - First offense: Written warning to owner or operator of equipment.
   - Second offense: $500 fine to be deducted from payment for services due.
   - Third offense: $1,000 fine to be deducted from payment for services due.
   - Subsequent: $2,500 fine per occurrence to be deducted from payment for services due. Should the total summation of fines exceed payment due to the offending party, _____ will pursue other options to recover fines.
   - _____ reserves the right to discharge without prejudice any tier contractor that, in _____ sole judgment, willfully and knowingly violates the provisions of this standard, with no additional payment for termination being due to the offending party.
8. **Other Law**: Nothing in this standard is intended to allow idling in excess of any applicable law, including but not limited to any local ordinance or requirement as or more stringent than this standard.
9. The General Contractor shall be responsible to maintain a log of all equipment meeting the intent of this standard as soon as it is on the project site. Minimal documentation required shall be make, model and serial number of the equipment (and or engine) along with the rated horse power.

END OF SECTION

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DETERMINING TIER LEVEL WITH ENGINE MODEL YEAR AND HORSEPOWER

Engine Model Year is identified with first number in engine family code. This engine is 2005

Table 1
Engine Tiers by Horsepower and Model Year

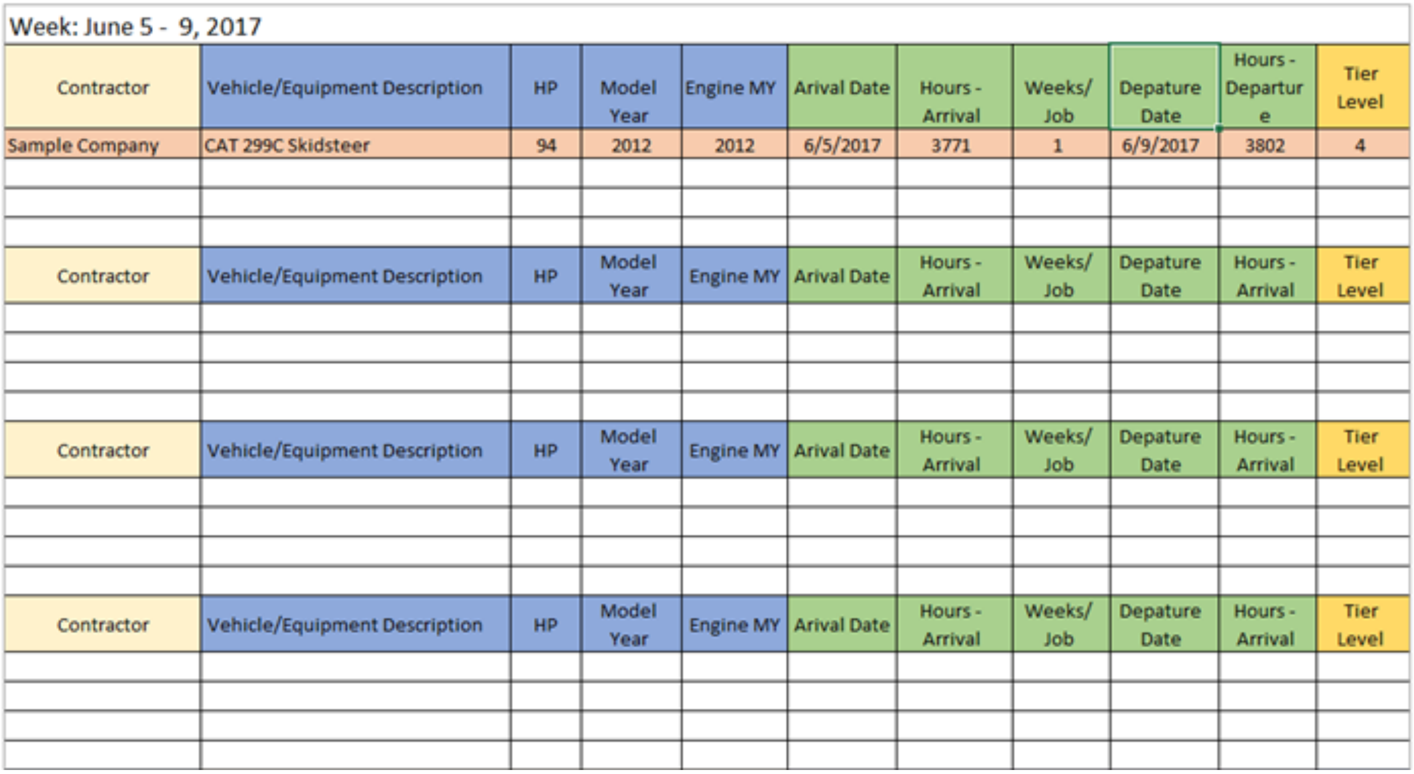
Year	Horsepower									
	0-10	11-24	25-49	50-74	75-99	100-174	175-299	300-599	600-750	750+
1900	T0	T0	T0	T0	T0	T0	T0	T0	T0	T0
1969	T0	T0	T0	T0	T0	T0	T0	T0	T0	T0
1970	T0	T0	T0	T0	T0	T0	T0	T0	T0	T0
1972	T0	T0	T0	T0	T0	T0	T0	T0	T0	T0
1988	T0	T0	T0	T0	T0	T0	T0	T0	T0	T0
1989	T0	T0	T0	T0	T0	T0	T0	T0	T0	T0
1996	T0	T0	T0	T0	T0	T1	T1	T1	T1	T0
1997	T0	T0	T0	T0	T0	T1	T1	T1	T1	T0
1998	T0	T0	T0	T1	T1	T1	T1	T1	T1	T0
1999	T0	T0	T1	T1	T1	T1	T1	T1	T1	T0
2000	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1
2001	T1	T1	T1	T1	T1	T1	T1	T2	T1	T1
2002	T1	T1	T1	T1	T1	T1	T1	T2	T2	T1
2003	T1	T1	T1	T1	T1	T2	T2	T2	T2	T1
2004	T1	T1	T2	T2	T2	T2	T2	T2	T2	T1
2005	T2	T2	T2	T2	T2	T2	T2	T2	T2	T1
2006	T2	T2	T2	T2	T2	T2	T3	T3	T3	T2
2007	T2	T2	T2	T2	T2	T3	T3	T3	T3	T2
2008	T4	T4	T4I	T4I	T3	T3	T3	T3	T3	T2
2009	T4	T4	T4I	T4I	T3	T3	T3	T3	T3	T2
2010	T4	T4	T4I	T4I	T3	T3	T3	T3	T3	T2
2011	T4	T4	T4I	T4I	T3	T3	T4I	T4I	T4I	T4I
2012	T4	T4	T4I	T4I	T4I	T4I	T4I	T4I	T4I	T4I
2013	T4	T4	T4	T4	T4I	T4I	T4I	T4I	T4I	T4I
2014	T4	T4	T4	T4	T4I	T4I	T4	T4	T4	T4I
2015	T4	T4	T4	T4	T4	T4	T4	T4	T4	T4
2016	T4	T4	T4	T4	T4	T4	T4	T4	T4	T4
2017	T4	T4	T4	T4	T4	T4	T4	T4	T4	T4
2018	T4	T4	T4	T4	T4	T4	T4	T4	T4	T4
2019	T4	T4	T4	T4	T4	T4	T4	T4	T4	T4
2020	T4	T4	T4	T4	T4	T4	T4	T4	T4	T4

Part 89 of Title 40 of the Code of Federal Regulations.

CLEAN CONSTRUCTION WEEKLY INVENTORY SUMMARY

PROJECT NAME

____



Week: June 5 - 9, 2017

Contractor	Vehicle/Equipment Description	HP	Model Year	Engine MY	Arival Date	Hours - Arrival	Weeks/ Job	Depature Date	Hours - Departure	Tier Level
Sample Company	CAT 299C Skidsteer	94	2012	2012	6/5/2017	3771	1	6/9/2017	3802	4
Contractor	Vehicle/Equipment Description	HP	Model Year	Engine MY	Arival Date	Hours - Arrival	Weeks/ Job	Depature Date	Hours - Arrival	Tier Level
Contractor	Vehicle/Equipment Description	HP	Model Year	Engine MY	Arival Date	Hours - Arrival	Weeks/ Job	Depature Date	Hours - Arrival	Tier Level
Contractor	Vehicle/Equipment Description	HP	Model Year	Engine MY	Arival Date	Hours - Arrival	Weeks/ Job	Depature Date	Hours - Arrival	Tier Level

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CLEAN CONSTRUCTION PARTNERSHIP BENEFITS

Certificate of Partnership

All new partners will receive a Certificate of Partnership from Clean Air Carolina recognizing them for being a leader in reducing diesel emissions and improving the health of their community.

Press Release

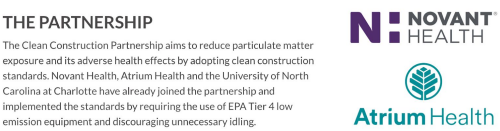
Clean Air Carolina will send out a press release to statewide media outlets to publicize your commitment to clean air. We will also write a blog for posting on our website about your membership in the partnership.

Annual Partnership Meeting

Clean Air Carolina will host an annual partnership meeting with all organizations, prospective partners, and other key stakeholders. Discussion will focus on the implementation of the standard, additional ideas for reducing emissions and suggestions for new partners.

Logo on Website

Once an organization joins the partnership, their logo will be added to the Clean Air Carolina Clean Construction website.



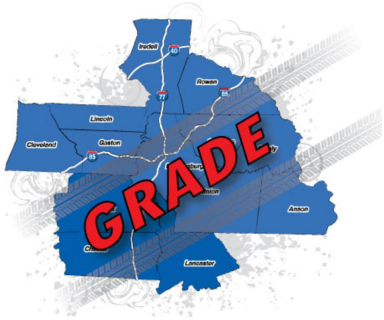
FUNDING TO UPGRADE DIESEL EQUIPMENT

There are funding opportunities to replace or upgrade diesel equipment to reduce emissions. Funding sources include federal, state and local programs. Below is a list of major potential funding sources.

NC Department of Environmental Quality DERA Grants

The NC Department of Environmental Quality's Division of Air Quality funds projects that reduce diesel emissions through the EPA Diesel Emissions Reduction Act (DERA) Program. Any private or public sector entity or individual stationed in North Carolina is eligible to apply for funding. Applications are typically due in the fall.
https://deq.nc.gov/about/divisions/air-quality/motor-vehicles-air-quality/mobile-source-emissions-reduction-grants

Grants to Replace Aging Diesel Engines (GRADE)



Mecklenburg County Air Quality has sponsored this grant program since 2007 designed to reduce oxides of nitrogen (NOx), an ozone forming air pollutant, by providing businesses and organizations in the Charlotte region funding incentives to replace or repower heavy-duty non-road equipment with newer, cleaner, less polluting engines.

https://www.mecknc.gov/LUESA/AirQuality/MobileSources/Pages/GRADE.aspx

US Department of Energy

DOE's Clean Cities Program promotes alternative fuels and vehicles, fuel blends, fuel economy, hybrid vehicles, and idle-reduction. In addition to financial assistance for projects, Clean Cities maintains a database of state and federal assistance.
https://cleancities.energy.gov/

North Carolina Hospitals Offer Breath of Fresh Air, Literally

By Stephanie Carson, N.C. Public News Service

Two major hospital systems in North Carolina are taking steps to make sure their communities and patients breathe easier on their campuses.

Beginning January 1, Carolinas HealthCare System and Novant Health now require all construction equipment on site to use the lowest exhaust-emitting machinery and promote anti-idling practices. The change came about after Clean Air Carolina reached out to hospital leadership to educate them about the impact some construction equipment can have on air quality.

> "This is a major clean air win for public health, and we are hoping other hospital systems across North Carolina will follow suit and take steps to reduce diesel emissions on their construction sites."

Clean Air Carolina Executive Director June Blotnick explains, "This is a major clean air win for public health, and we are hoping other hospital systems across North Carolina will follow suit and take steps to reduce diesel emissions on their construction sites."

The group worked with Novant Health on a study in 2016 to demonstrate the impact hospital construction projects can have on air quality as it monitored the construction of Novant's new Women's Center in Matthews. The Environmental Protection Agency estimates that every dollar spent on reducing diesel pollution results in $13 in public health benefits.

Thomas Zweng, MD, chief medical officer with Novant Health, championed Clean Air Carolina's request from the beginning and says the decision to reduce emissions on their campuses is in line with his organization's mission.

"We exist to improve the health of the communities one person at a time, and foundational to that is that we all have clean water and clean air," says Zweng. "So it's a natural alliance, a natural partnership, to work with others in the community who are focused on clean air."

Carolinas HealthCare System has changed its policies regarding construction equipment. Director of Environmental Sustainability Solutions for the health system, Kady Cowan, says construction happens on medical campuses more often that you might imagine.

"We are constantly renovating and expanding and changing our facilities," says Cowan. "The idea is to really start to look towards market transformation and making sure that the most clean-burning equipment is the equipment that is the most widely used and available across Charlotte."

According to the EPA, diesel exhaust contains more than 40 toxic pollutants and is a designated carcinogen by the World Health Organization. Particulate matter found in the exhaust contributes to asthma in vulnerable populations, as well as to climate change.